



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Table of Contents

- A. General Application Information
- B. Eligibility Factors
- C. Executive Summary
- D. Proposed Funded Service
- E. Proposed Service Offering
- F. Technology Strategy
- G. Project Milestones Completion Factors
- H. Project Budget
- I. Self Scoring
- J. BTOP Certification Requirements
- K. BIP Certification Requirements
- L. Schedules
- M. BIP – BTOP Service Area Details
- N. Uploads



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A. General Application Information

1. Applicant Information	
1-A. Name, Address, and Federal ID for Applicant	
i. Legal Name:	OpenCape Corporation
ii. Employer/Taxpayer Identification Number (EIN/TIN):	208670761
Street 1:	PO Box 762
Street 2:	
City:	West Barnstable
County:	Barnstable
State:	MA
Country	United States
Zip/Postal Code:	02668

1-B. Name and Contact Information of Person to be Contacted on Matters Involving this Application:	
Prefix:	Mr.
First Name:	Daniel
Middle Name:	Joseph
Last Name:	Gallagher
Suffix:	
Telephone Number:	508-367-9884
Fax Number:	508-375-4162
Email:	dgallagher@capecod.edu
Title:	President



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1-C. Other Required Identification Numbers	
i. Organizational DUNS:	825181949
ii. CCR # (CAGE):	5C2H1
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:

N/A

2. Project Description & Project Title

2-A. Project Title: OpenCape Corporation Middle Mile Project

2-B. Project Description: OpenCape intends to build critical middle mile capacity for the Cape Cod region. The open access network will create opportunities for jobs, economic diversification, and regional efficiencies in government. It will support broadband options for anchor institutions, enable last mile providers to reach un- and underserved areas, and offer an emergency network in this hurricane-vulnerable region.



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3. Application ID for Multiple Submissions for Identified Service Areas:
None

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.

No

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:

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

c) BTOP Infrastructure category for which you are applying.

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

Additional BTOP Factors Selected By Applicant
<ul style="list-style-type: none"> • Conformity with Statutory Purposes • Cost Sharing/Matching • Reasonableness of Project Budget
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.



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- **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 requested.

C. Executive Summary

Executive Summary of Project for BIP and BTOP:

8. Infrastructure Projects Executive Summary

OpenCape Corporation is a 501c(3) nonprofit corporation seeking \$32,000,000 in grant funding from the Broadband Technologies Opportunity Program (BTOP) to build and operate an open access middle mile network.

a) Opportunity the proposed system seeks to address

Cape Cod and the Islands have seen limited investment in broadband infrastructure largely because the population density is insufficient to deliver a return on investment consistent with traditional provider business models and share holder demands. RCN Metro Optical Networks (RCN) states it would not enter the middle mile market place without an infusion of stimulus funds. Verizon has stated it has no plans to introduce its FiOS service to the Cape and Islands. The proprietary nature and closed access of the limited fiber optics in the region creates a further barrier to entry. The result is a lack of competition that in turn results in a lack of availability of broadband in low density areas, inadequate capacity, and a high cost of service for consumers and anchor institutions.

The Cape, Islands and southeastern Massachusetts are also the most vulnerable region in the state to hurricanes. OpenCape's proposed middle mile network solution will provide the necessary redundant communications backbone needed in times of emergency.



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b) A general description of the proposed funded service areas

The OpenCape network proposed funded service area consists of the entirety of Barnstable, Dukes and Nantucket counties plus the towns of Plymouth, Carver, Kingston, Plympton, Middleboro, Bridgewater, Halifax, East Bridgewater, Brockton, Wareham, Marion, and Mattapoisett in Plymouth County. The OpenCape service area consists of over 15,000 census blocks. There are over 175 unserved or underserved census blocks identified within the OpenCape service area.

OpenCape, by necessity, must build further connections to the Internet in Providence, RI and to Boston through Plymouth and Brockton. Though OpenCape has not developed a comprehensive solution along the South Coast, OpenCape's fiber will be used to develop a later comprehensive solution in that region as well. Unemployment in South Coast cities such as Fall River is over 14%. UMass Dartmouth is developing plans to model the OpenCape effort along the South Coast using the OpenCape network as a foundation.

c) Number of households and businesses passed.

The OpenCape service area contains approximately 321,204 households representing approximately 515,648 individuals as well as 62,129 businesses.

d) Number of community anchor institutions, public safety entities, and critical community organizations

OpenCape will connect over 70 anchor institutions to the network using laterals as part of its initial build-out. Highlights of these include twelve emergency shelters (schools), thirty libraries, five colleges, six academic research facilities, and eighteen town or public safety buildings. The OpenCape path also permits many additional anchor institutions the ability to rapidly obtain service from the network including seven hospitals, two additional higher education institutions, eight additional libraries, ten county, state or federal institutions, five commercial/industrial centers, and potentially over 270 public safety and educational facilities. Letters of support have been received from every town and school district on Cape Cod and the Islands, police and fire chiefs associations, nearly all hospital CEOs and CIOs, the presidents of all of the public higher education institutions in the region, the southeastern Massachusetts



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federal and state legislative delegations, the chamber of commerce, and many other stakeholders in the region.

e) Proposed services and applications for the proposed funded service areas and users.

Specifically, the project will execute on four activities and applications: 1) Build capacity by establishing an open access middle mile network spanning the entire Cape and connecting to core Internet backbones in Providence and Boston; 2) Build needed public safety redundancy through a microwave wireless backhaul network spanning the entire Cape and Islands and connecting to fiber leading to Boston and Providence; 3) Establish a regional datacenter; 4) Establish regional pilot applications in regional GIS, pandemic network, and library interconnection.

f) Approach to addressing the non-discrimination and interconnection obligations

OpenCape is committed to the creation of an open access vendor neutral network. This commitment has been a hallmark of the OpenCape concept since its inception in 2006. OpenCape acknowledges and concurs with the principles of non-discrimination and interconnection as set forth in the NTIA notice of funding availability (NOFA). OpenCape will publish its commitment on its web site, and its operating partner, RCN, must accept these same obligations.

RCN will ensure that its customers can: a) access the lawful Internet content of their choice; b) run applications and use services of their choice, subject to the needs of law enforcement; c) connect their choice of legal devices that do not harm the network; and d) choose between competing network providers, application and service providers, and content providers.

g) Type of broadband system that will be deployed (network type and technology standard).

The OpenCape proposal consists of a core fiber backbone on Cape Cod with extensions to two major regional network connection centers, numerous fiber optic laterals extending off of the backbone and backbone extensions, a high capacity optical transport system, a microwave radio overlay and a collocation center. All of these elements combine to provide a robust, high capacity communications infrastructure for our service area. Carrier grade electrical and



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electro-optical components will be used throughout the project. Fiber optic based services will range from traditional bandwidth based offerings to dedicated wavelengths of light to dark fiber leases. The OpenCape collocation center will be designed and built following current best practices for moderately sized data centers with average power needs. The facility will serve as the focal point of network operations and provide leased collocation space for public and private organizations in the region.

h) Qualifications of the applicant that demonstrate the ability to implement and operate a broadband infrastructure, and/or be a sustainable broadband services provider.

OpenCape Corporation is a 501c(3) nonprofit corporation that has been working on the project for nearly three years. Its 11-member board is comprised of highly experienced individuals in the business, education, government, and technology sectors. Over three years, it has conducted ongoing research with stakeholders across the region, developing a business and engineering plan that both meets regional needs and is sustainable over time.

OpenCape has chosen to combine its regional understanding and mission with a partner's existing capabilities, drawing on the strengths of an established middle mile operator. In July 2009, OpenCape's research and analysis led it to identify RCN Metro Optical Networks (RCN) as its primary operating partner through a competitive process. RCN has a proven track record in middle mile construction and operation.

Specific to the grant, compliance and reporting will be handled in partnership with the Woods Hole Oceanographic Institution, which has decades of experience in significant federal grants management.

i) Overall infrastructure cost of the broadband system.

The project cost, to build the infrastructure as outlined in this grant application, is \$40 million. OpenCape has thus far secured commitments for \$8 million in matching funds from the Massachusetts Broadband Institute (\$5 million), RCN Metro Optical Networks (\$2 million), and Barnstable County (\$1 million).

j) Overall expected subscriber projections for the project.



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OpenCape's business strategy is to address the transport portion of the telecommunications value chain and to provide retail commercial services. It would serve as an open access wholesaler for organizations that use or resell large blocks of bandwidth and related services. Sample customers include cellular carriers, anchor institutions such as hospitals, schools and municipalities, and last mile providers, both incumbent and new entrants.

k) Number of jobs estimated to be created or saved as result of this project.

The OpenCape project will create 233 jobs in the equipment, construction and manufacturing sectors and an additional 194 indirect jobs. The basis of these estimates is the work of Dr. Raul Katz, Director of Business Strategy Research at the Columbia Business School, who estimated the impact of broadband stimulus spending in February, 2009.

In addition to direct and indirect jobs associated with network construction and operation, the network supports job growth by enabling the diversification of the regional economy beyond traditional seasonal occupations. These emergent areas include the creative economy, microbusiness and entrepreneurship, green energy development, and the rise of a distributed workforce. In the June 2009 regional Comprehensive Economic Development plan approved by the Economic Development Agency (EDA), the open access middle mile infrastructure, as defined by OpenCape, was identified as a key enabler of this essential economic diversification.

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

9. BTOP Statutory Purpose:



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Provide access to broadband service to consumers residing in “unserved” areas of the United States.
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.
Improve access to, and use of, broadband service by public safety agencies.

10. Description of BTOP Project Purpose:

Cape Cod and the Islands have seen limited investment in broadband infrastructure largely because the population density is insufficient to deliver a return on investment consistent with traditional provider models and share holder demands. RCN Metro Optical Networks (RCN) states it would not enter the middle mile market place without an infusion of stimulus funds. Verizon has stated it has no plans to introduce its FiOS service to the Cape and Islands. The proprietary nature and closed access of the limited fiber optics in the region also plays a significant role. The result is a lack of competition that in turn results in a lack of availability of broadband in low density areas, inadequate capacity, and a high cost of service for consumers and anchor institutions.

The Massachusetts Technology Collaborative’s (MTC) John Adams Innovation Institute (JAII) conducted a study on behalf of OpenCape in the summer of 2008 and found that municipalities and public safety services have limited fiber optic access. In contrast, within the Interstate 495 highway loop surrounding Boston, there are more than 15 different fiber providers with hundreds of miles of competitive fiber.

According to Columbia Telecommunications Corporation (CTC), a telecommunications consulting firm that performed a study for OpenCape, the most commonly used measure of market concentration or market competition is the Herfindahl-Hirschman Index (HHI), which is used by the U.S. Department of Justice (DOJ) when reviewing potential mergers.

Any market with an HHI greater than 1,800 is considered to have “limited competition.” In the



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course of this project, CTC conducted HHI calculations and found an HHI of 3,200 – that is, numerically there is very limited competition in the region. This translates into high prices and fewer options for both residential and business services, which negatively impacts the region’s ability to grow and sustain economically.

The incumbent providers, Verizon and Comcast, offer broadband service in the region, but limit the penetration of their service for both technical and business model reasons. Residential and business consumers are often unable to obtain DSL at their premises even though their neighbors receive services. Comcast service availability is also limited based on plant descriptions provided by the Massachusetts Department of Telecommunications and Cable. In particular, areas on the Outer Cape and Martha’s Vineyard experience lack of availability in less densely populated areas. In addition, the asymmetrical nature of cable service is not appropriate to business and enterprise needs. The end result is that, although residential cable and telephone DSL services are available in some areas, there are service gaps across the region.

In addition to the economic issues related to this lack of infrastructure is a great concern about the ability of the region to respond to a natural disaster. The Cape, Islands and South Coast are the most vulnerable region in Massachusetts to a hurricane. Additionally, the region’s proximity to the Plymouth nuclear power plant adds to the region’s overall disaster risk. One of the lessons from Katrina is that communication infrastructure is key to both response and recovery. Cape Cod lacks the robust and redundant system of communications it will need to respond to and recover from a natural or man-made disaster.

OpenCape is the result of a three year process of responding to the region’s needs. The project offers a unique opportunity for the grass roots stake holders of the region to participate in the development of the telecommunications infrastructure that will support their needs for the next 50 years.

The Board of Directors of OpenCape Corporation represents both the geography of the region and the functional areas of interest of the region. It has contributed thousands of hours of time to the effort (over three years of coordination and communication with boards and committees throughout the region) to determine their needs and include their recommendations for solutions. Letters of support have been received from every town and school district, most



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hospital CEOs and CIOs, the presidents of all of the public higher education institutions in the region, the entire southeastern Massachusetts federal and state legislative delegations, the Cape Cod Chamber of Commerce, and many other stakeholders in the region. This level of engagement and involvement of the community speaks directly to the level of need in the region, and the lack of satisfaction with the status quo. It stands in contrast to the existing model whereby a few private providers, in a near monopoly, answerable to their shareholders only, make decisions to exclude whole regions from their latest technology or specific neighborhoods because they do not fit a business model.

OpenCape will build an open access vendor neutral middle mile backhaul network to serve the varied interests of the region. This infrastructure will remove a major barrier to entry for last mile providers and likely create a competitive market place to benefit the region. Access entities will take many shapes and forms, including institutional bulk purchasers, municipal users, nonprofit consortia, private companies, and regional aggregation entities. None of these entities alone could cost justify the investment in a middle mile network in the region, but OpenCape anticipates that these organizations would, once the network is established, purchase prorated transport capacity and run access businesses upon it.

OpenCape offers a public private partnership business model that will ensure the sustainability of the project. OpenCape Corporation, as a 501(C)(3) corporation will follow its corporate purpose and represent the interests of the region while licensing RCN Metro Optical Networks to operate the network to its profit advantage. OpenCape will own the physical assets and RCN will operate the network under license for a fee. OpenCape will use the revenues it generates from the license fee to meet its administrative obligations, build a capital reserve, expand and improve the network for public good, and eventually drive the cost of services to government entities to zero should RCN be as successful as models indicate.

OpenCape includes the creation of a regional wide area network (WAN) for towns, school districts, and libraries. OpenCape also intends to create within the regional collocation center a government data center for county, municipal, and education entities to develop a regional umbrella services model of greater impact and efficiency. OpenCape intends to build a virtual machine (VM) server and storage area network (SAN) in the regional collocation/data center where municipalities and school districts will be able to install any number of applications they may wish to place under a regional service umbrella such as geographic information systems



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(GIS), learning management systems (LMS), assessor databases, web services, and other applications well suited to a regional services model. OpenCape Corporation intends to partner with the Barnstable County Commission in this effort.

The OpenCape service area does not include the communities of Bristol County along what is commonly referred to as the South Coast of Massachusetts. However, OpenCape must run fiber through this area to establish its connection with Providence, RI. The communities of the South Coast will be able to exploit the OpenCape fiber to their own advantage in developing a comprehensive solution for this region similar to that fashioned for Cape Cod and the Islands. The University of Massachusetts Dartmouth is leading an effort to do just that. In light of the economic challenges faced by this region, particularly in New Bedford and Fall River, with unemployment in excess of 14%, OpenCape could prove a vital underpinning resource for economic development in the region.

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

Middle mile capacity is essential to the delivery of a wide range of healthcare and educational services. In a geographically dispersed area such as the Cape, enhancing these services through broadband is especially critical.

The OpenCape proposal enhances healthcare in the following ways. First, it is building the core open access middle mile capacity required to achieve regional connectivity of healthcare providers, healthcare data exchange and interoperability, and deployment of healthcare applications. Second, it provides a WAN, and a data center to support application deployment and disaster recovery. Third, it provides the infrastructure needed to enable regional healthcare providers to satisfy the requirements for “meaningful use” of certified Electronic Health Records (EHRs) required for eligibility for Medicare and Medicaid stimulus incentives. Fourth, it provides essential emergency public services in the form of primary and redundant disaster connectivity to government, healthcare and emergency response organizations in our disaster prone region.

Healthcare providers in our region require increased/more cost effective communication capacity, redundant communications infrastructure, enhanced public safety communications, and enhanced connectivity to local, regional and national healthcare resources. Enhanced broadband capacity will improve the quality of care and help to reduce the costs of healthcare overall. It will enable and enhance provider access to patient medical records, support



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interoperability of healthcare systems and applications requiring robust data exchange, enable an enhanced emergency response by connecting EMS, police, fire and other first responders to the now-connected healthcare services and providers, and support clinical research by connecting underserved healthcare providers and patients. It will also enable deployment of telemedicine, including telesurgery, teleradiology, remote consultations and remote monitoring of patients with chronic conditions, and support consumer health, health education and research. The regional disaster-tolerant datacenter will improve the reliability of healthcare information systems and the communication networks connecting health care providers, facilities and designated disaster sites and responders will ensure disaster preparedness and response.

In the OpenCape service area, K-12 schools cannot access robust educational resources such as the Internet2 consortium, which connects 60,000 U.S. educational, research, government and community institutions, including primary and secondary schools, community colleges and universities, public libraries, museums, and healthcare organizations. OpenCape will directly provide high-speed connectivity to school districts and libraries serving more than 40,000 students in its service area, and increase access to virtually every school, library and youth center in the region.

Our schools are constrained by an inability to share resources both within and across districts. Individual districts carry a heavy overhead burden to meet mandated data collection/reporting requirements that could be met more efficiently leveraging shared resources such as datacenter, servers, networks, database and application hosting. The creation of WAN to link all of school districts across the region will create opportunities to deliver more/better services at lower cost. Linking schools to a collocation/data center where technical needs can be aggregated creates the opportunity for higher speeds at lower costs, and access to the rich educational resources of Internet 2. The possibility of shared IT infrastructure allows districts within the region the opportunity to collaborate on common learning management systems, data systems, and applications which are often prohibitively costly for individual districts to create and maintain.

D. Proposed Funded Service Area

12. Proposed Funded Service Area Maps:

12-A. Service Area Map (Reference Number): **F9BA-3D29-46FB-9C37**

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



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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):

N/A

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.

17. Methodology for Area Status:

OpenCape does not have the resources to extensively survey the more than 15,000 census blocks in our service area. Although many areas have adequate levels of services according to the definitions established in the NOFA, there are numerous areas upon Cape Cod and the neighboring islands that we know from experience have little or no broadband coverage. For the purposes of meeting the qualification requirements as a BTOP middle mile project we have focused upon classifying a subset of those areas that are poorly served. They are but a representative sample.

OpenCape has obtained cable strand maps for most of the 15 towns on the Cape, which is served by only one provider - Comcast. We used these to identify areas with no documented cable build out. During a physical survey by OpenCape in July and August, 2009, additional areas were identified where the cable plant has not been installed contrary to the markings on the maps. For areas with no access to broadband over cable, we then looked at the distance from a telephone central office to determine whether or not DSL service could be available. No fixed wireless solution is available. For areas that clearly had neither cable access, nor DSL access, nor fixed wireless, we then looked for mobile wireless coverage. Our primary source of information for this type of coverage was the data maps provided by the carriers (Verizon, AT&T wireless, T-Mobile and Sprint) which although generally optimistic about their level of coverage nevertheless indicated areas of no coverage. There are several areas where the maps



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indicated coverage, but throughout a census block or groups of blocks it was impossible to either obtain a signal or sustain data transfer rates that met even the minimum broadband data rate as defined in the NOFA.

Census blocks that we are designating as unserved are those which have no cable or DSL access, no fixed wireless access, and no mobile broadband service, either as shown on the carriers' maps or as determined by direct measurement, in other words areas with no usable broadband service at all. We are designating as underserved those census blocks with no cable or DSL access, no fixed wireless access, and no 3G mobile wireless access. We believe that these designations are conservative with respect to the BTOP guidelines and that given more time and resources we could easily identify additional census blocks in OpenCape's service area that are either unserved or underserved. In particular we note that we are not relying upon the subscribership clause to qualify an area as underserved. We are confident that if we took this factor into account that the number of underserved census blocks would increase dramatically as well. Since, however, we are a middle mile project, it is not required that we determine all the census blocks that are either unserved or underserved. Finally we observe that from the perspective of a middle project that is very concerned about addressing public safety and economic development issues, it is largely irrelevant whether or not it is possible to obtain cellular 3G service in parts of a census block. This type of service alone will not save lives in an emergency nor create new jobs.

18. Middle Mile Benefits

The OpenCape project will create 233 jobs in the equipment, construction and manufacturing sectors and an additional 194 indirect jobs. The basis of these estimates is the work of Dr. Raul Katz, Director of Business Strategy Research at the Columbia Business School, who estimated the impact of broadband stimulus spending in February, 2009.

In addition to these direct and indirect jobs associated with the construction and operation of the network, there is the greater impact on the broader economy. The current economy of Cape Cod is unsustainable without diversification according to the New England Economic Partnership's Director of Demographic Forecasts, Peter Francese. In response to this analysis, there is concerted effort in the region to exploit the cultural tendencies toward creativity and entrepreneurship in the small and micro-business sectors. Two summits have been held on Cape Cod to develop a strategy to diversify the economy and reverse projected economic trends. Follow on action by the Cape Cod Chamber of Commerce and the Barnstable County



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Commission to develop action plans were successful and incorporated in the Regional Policy Plan and the Cape Cod Region Comprehensive Economic Development Strategy (CEDS). OpenCape is identified in all of these vehicles of economic development as a critical enabling infrastructure that is needed for economic diversification.

OpenCape's business strategy is to address the transport portion of the telecommunications value chain and to provide retail commercial services. It would serve as an open access wholesaler for organizations that use or resell large blocks of bandwidth and related services. Sample customers include cellular carriers, anchor institutions such as hospitals, schools and municipalities, and last mile providers, both incumbent and new entrants.

OpenCape will provide backhaul for any last mile provider. These last mile entities will be further connected to a wide array of Internet service providers within the region, and at major further connection points in Providence, RI and Brockton, MA. The cost of commercial service will be lower than is currently offered in the region, and in addition, non-profits will receive a fifteen percent discount, and government entities a twenty-five percent discount for all services.

OpenCape will, as part of its initial build, connect a variety of education and research anchor institutions across the region at greater speed and lower cost. OpenCape will connect five public institutions of higher education to its fiber backbone. OpenCape will provide connection opportunities to the six research institutions and federal agencies associated with the Woods Hole Oceanographic Institution. The research institutions of Cape Cod play a vital role in regional economic activity as well as contribute to national science and research goals.

OpenCape will connect 30 libraries of the Cape Library Automated Materials System (CLAMS) consortium in a wide area network with aggregation and common services at the regional OpenCape collocation/data center. Libraries were selected because they are centers of education and civic engagement, and information in a crisis.

OpenCape has committed to connecting twelve regional emergency shelters on Cape Cod and one on each of the islands of Martha's Vineyard and Nantucket. All of the shelters are schools. The school districts will be able to use this connection to aggregate service needs at the regional collocation center, and the network will support the evacuation center needs in the



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

Submitted Date: 8/19/2009 4:34:08 PM		Easygrants ID: 1174	
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Task: Submit Application - Infrastructure Programs		Applicant Name: Mr. Daniel Joseph Gallagher	

event of a hurricane. OpenCape will ensure that each town has at least two or three connections to the public sector regional wide area network through the libraries or shelters, and other buildings such as town halls and public safety offices at no cost and with no recurring maintenance fees. This will allow each town in the region to participate in a regional umbrella services model whereby government entities collaborate in the delivery of information services.

OpenCape is working with state, regional, and local public safety officials to improve public safety communications. OpenCape will offer connections to at least six federal, state or regional public safety organizations to its fiber network, and the microwave portion of the network is dedicated to public safety. The network will aid the state in building a state-wide public safety network, provide a redundant trunk path for 800Mhz communications, and increase mobile communications that will permit access to such vital digital resources as the Criminal Justice Information System (CJIS). At minimum the nodes constructed by OpenCape will be appropriate in quantity and placement to support a regional public safety mobile communication system, and may include a 700Mhz public safety data network.

Cape Cod Community College (CCCC) is the region's overflow pandemic treatment site. OpenCape will connect CCCC to Cape Cod Hospital and its data center in Hyannis to ensure the information needs of healthcare providers are met in a pandemic. The OpenCape network will also address the individual needs and collaborative goals of the health care institutions of the region to improve services and reduce costs. OpenCape will provide connection opportunities to the seven hospitals in the region.

The OpenCape network is also being designed to ensure that the maximum number of industrial and commercial sites are provided an interconnection point as future potential customers of the system.

The impact of this middle mile project upon the intended service area is great. The potential for further impact beyond the service area is also very high. OpenCape, by necessity, must build further connections to the Internet in Providence, RI and to Boston through Plymouth and Brockton. Though OpenCape has not developed a comprehensive solution along the South Coast, OpenCape's fiber will be used to develop a later comprehensive solution in that region as well. Unemployment in South Coast cities such as Fall River is over 14%. UMass



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Dartmouth is developing plans to model the OpenCape effort along the South Coast using the OpenCape network as a foundation.

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:

OpenCape is committed to the creation of an open access vendor neutral network. This commitment has been a hallmark of the OpenCape concept since its inception in 2006. OpenCape acknowledges and concurs with the principles of non-discrimination and interconnection as set forth in the NTIA notice of funding availability (NOFA).

The business model that has been created will support these principles as well. The OpenCape Corporation shall be the grant applicant and owner of physical assets funded by any grant award. RCN Metro Optical Networks (RCN) will be the primary contractor in the design and construction of the OpenCape network and is the intended principal operating partner of the completed network.

OpenCape Corporation has built into the terms of negotiation with RCN certain controls to ensure that RCN maintains an open network. In the construction phase, RCN is prohibited from building additional privately held fiber capacity in conjunction with the OpenCape project.



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

After the network is built, a license to operate the OpenCape network through an infeasible right to use for 25 years with a 25 year renewal option, shall be negotiated and issued to RCN as primary operating partner by the OpenCape Corporation. The OpenCape Corporation will hold in reserve approximately 40 percent of the fiber capacity to assure RCN's performance, and possibly for right of way exchanges RCN will be licensed to operate the remaining 60 percent in lit or dark fiber services.

RCN shall be permitted to use no more than approximately thirty five percent (35%) of its allotted fiber for its own lit services. The remaining percentage of dark fiber must be available to other companies consistent with the NOFA non-discrimination and interconnect principles.

To prohibit any one provider from gaining a monopoly over available fiber, RCN shall not lease more than approximately twenty percent (20%) of its leasable dark fiber to any single company on any single segment of the network.

OpenCape's network operator, RCN, proposes to deploy a network that will connect end users to the public Internet. Consistent with RCN's existing network footprint, the proposed project is intended to bring affordable, high-speed broadband middle mile access to Cape Cod communities that are unserved/underserved. As such, RCN supports the network openness and non-discrimination policies established in the NOFA. With respect to the proposed funded network:

RCN will adhere to the FCC's Internet Policy Statement (FCC 05-151). RCN will ensure that its customers can: a) access the lawful Internet content of their choice; b) run applications and use services of their choice, subject to the needs of law enforcement; c) connect their choice of legal devices that do not harm the network; and d) choose between competing network providers, application and service providers, and content providers.

With respect to RCN's Internet delivery and management practices, RCN emphasizes that it employs technical measures to ensure the adequacy of all of its customer's Internet experiences, consistent with the principles of the FCC's Internet Policy Statement. Consistent with the requirements of the NOFA, RCN will not favor any particular lawful content or applications over others. RCN employs only protocol agnostic, non-discriminatory network management practices. RCN will notify customers of any changes to its network management



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

policies.

RCN posts its Acceptable Use Policy (AUP) in a prominent location on the company's public web site where it addresses the company's policy regarding spam, denial of service attacks, illegal content and other related matters.

RCN will offer interconnection, where technically feasible without exceeding current or reasonably anticipated capacity limitations, on reasonable rates and terms to be negotiated with requesting parties. RCN will also offer wholesale access to the project facilities at reasonable rates and terms.

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

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):



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

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):

N/A

27. Affordability

OpenCape's objectives with respect to affordability are:

1. Reduce the barriers to entry for last mile providers by providing a middle mile solution that delivers multiple points of interconnection, at speeds suited to the specific provider, at rates that allow them to operate in a competitive market place over time across the entire region.
2. Provide the technologies, speeds and redundancy required of a varied anchor institution community and other enterprises at costs significantly lower than are available today at commercial rates, with a further 15% discount for non-profits, and 25% discount for government anchor institutions.

OpenCape and in turn its operating partner, RCN Metro Optical Networks (RCN), recognize that a sustainable business model for OpenCape is in large part dependent on expanding market. Attracting new last mile providers and aiding incumbents in the expansion of services,



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

across a broad range of technology options, is key to OpenCape’s sustainability. It is essential that our pricing allows for last mile providers to purchase our services and deliver their services to the end users at both a price that allows for a last mile sustainable business model, and affordable pricing for the consumer. This goal, coupled with the competitive middle mile landscape, is what determined our pricing model, as well as our prices.

We first designed a fiber optic backbone and network capable of delivering the services (Appendix B) required by last mile providers. We then developed a cost estimate (Appendix G) to deliver these broadband services. Next, we researched (Appendix C) the current on Cape middle mile service offerings and their associated prices. Based on these three items, we determined our pricing model and prices for specific service offerings.

We wanted to make our pricing model easy to understand for potential last mile service providers. We developed a simple two tiered pricing model for our middle mile broadband services - an on-Cape and off-Cape schedule. Our pricing is approximately 50% less than the currently available middle mile services offered on Cape Cod. We believe our prices will attract last mile providers to Cape Cod and allow them to develop a sustainable, long term business model.

Anchor institutions and other enterprises will also benefit substantially from these lower rates. In addition to these highly reduced commercial prices, we have provided for an across the board discount of 15 percent for non-profit organizations, and a 25% discount for government anchor institutions.

There are no publicly available collocation services on Cape Cod today. The pricing for our collocation services were determined from RCN collocation prices and its competitors in other regions.

F. Technology Strategy



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

28. Technology Type:

Wireline - Fiber-optic Cable
Wireless - Terrestrial Fixed

Other:

29. System Design

The OpenCape proposal consists of a core fiber backbone on Cape Cod with extensions to two major regional network connection centers, numerous fiber optic laterals extending off of the backbone and backbone extensions, a high capacity optical transport system, a microwave radio overlay and a collocation center. All of these elements combine to provide a robust, high capacity communications infrastructure for our service area. The design, construction, and operating standards will meet or exceed those RCN Metro Optical Networks (RCN) uses on its privately owned networks. Carrier grade electrical and electro-optical components will be used throughout the project. All network equipment in the core, extensions and laterals up to the customer demarcation point will be configured, managed and monitored by RCN.

Fiber Backbone

The core fiber backbone will be constructed as two interconnected 144 strand fiber rings covering most of Cape Cod with backbone extensions to Provincetown, Brockton, and Providence. The rings and extensions are sized to provide a commercially reasonable optical distance to the centrally located Barnstable Collocation Facility or to a central office. Splice points and service loops will be installed along each link to provide connection points for customers.

There will be two major fiber optical cable backbone extensions reaching from the Cape Cod Canal to regional network access locations in Brockton and Providence. One will run from the Cape Cod Canal through Plymouth to the Brockton Central Office. The other will go from Cape Cod through New Bedford and Fall River to the RCN collocation facility in Providence. Both of these backbone extensions will pass major population centers, educational institutions, important industrial areas, key central offices, and finally terminate in Brockton and Providence, major carrier interconnection points.



**Broadband Infrastructure Application
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Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

The Cape Cod Canal will be crossed in two spatially separated locations to minimize the chance that Cape Cod will be cut off from network services. Precisely how the crossings are made depends upon the negotiation of Rights of Way but options include: two highway bridges, a railway bridge, high voltage power lines, and conduits running under the canal. Right of way discussions are in process with the Massachusetts Broadband Institute as an agent for Mass Highway, Verizon, The Army Corp of Engineers, and NSTAR.

The third major extension will be a 72 fiber strand cable run from the fiber backbone core of the OpenCape network in Orleans up the length of the outer Cape to Provincetown. Our initial research shows that it is not practical to install a fiber loop in the region because there would be too little physical separation between cables to provide effective protection in the event of a major storm. A high-speed microwave radio link will serve as a backup network connection until an undersea fiber optic cable can be installed from Provincetown to Plymouth.

In addition to the backbone extension, 72 fiber strand loops will be constructed around Woods Hole and Chatham. The Woods Hole loop will be comprised of a new fiber run from Falmouth to the Woods Hole Oceanographic Institution, where it will interconnect with an existing Woods Hole fiber system. The Chatham fiber loop will run from the backbone fiber core to Chatham center and back to the backbone fiber core. The Woods Hole and Chatham loops will provide these areas with broadband access.

Laterals will be constructed from the network core and the extensions to service locations as needed. The proposal includes fiber optic cables as laterals to the anchor institutions, schools and libraries listed elsewhere. The number of fibers installed for each lateral will vary depending upon anticipated need at each location and the immediate surrounding area, and the initial services offered will be tailored to the locations requirements though there will be a minimum of 100 Mb/s Ethernet service to each location.

There will be a mixture of aerial and buried fiber optic cables installed. Currently most of the cabling is planned to be attached to existing power poles; however, if it is possible to obtain favorable access rights to either use or install underground conduits, then this will be considered. The layout of the fiber will both maximize usefulness to key organizations and businesses and minimize the length of laterals subject to the constraints of local siting



**Broadband Infrastructure Application
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Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

conditions and overall costs.

Optical Network

The core optical network will be constructed as an optical switch mesh using multi-degree reconfigurable optical add drop multiplexers (ROADM)s . Each link in the network will be constructed as a 44 wavelength dense wavelength division multiplexing (DWDM) link, with each wavelength of light capable of carrying 40 Gbits/sec of data. The ROADM network is designed to provide low latency, high capacity service during normal operation as well as redundant, failover service in the event of a major fiber or equipment failure. Carrier class electro-optical switching equipment from recognized telecommunications equipment manufacturers will be used throughout the network. ROADM nodes will be installed in all of the RCN Metro and Verizon central offices and in the Barnstable Collocation Facility, since they have multi-carrier accessibility, emergency power, and are built to withstand major hurricanes. The optical network is the underlying transport system used to deliver wavelength (1, 2.5, 10, 40 Gb/s), Ethernet, SONET, TDM, Video, and SAN services. With nodes in Providence and Brockton, the optical network will be able to deliver those services to key markets in Boston, NYC, and other locations.

Microwave Network

The microwave wireless component of the OpenCape network is primarily designed to serve as an emergency backup for the fiber optic network. The exception to this is the planned link between Falmouth and Martha's Vineyard, where it will be the primary service link to the island. The microwave radios will provide point-to-point links, operating at data rates between 300 Mbps and 1 Gbps, using carrier grade radios. The antennas will be mounted on robust structures, which in most cases will be town water towers, and designed to withstand winds to 130 MPH. This part of the network is key to the overall survivability of the communications infrastructure on the Cape due to the region's exposure to severe storms with high-winds and flooding. It will be less susceptible to storm damage and faster to repair, using local experts if necessary, than the fiber optic network. The microwave work will give priority service to public safety and health and service level agreements (SLA)s will include provisions that will allow the preemption of non-critical traffic during times of crisis to emergency service needs.

Collocation Facility

The OpenCape collocation center will be designed and built to RCN Metro Optical standards



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Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
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Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

following current best practices for moderately sized (approximately 2,000 sq. ft.) data centers with average power needs. It will include a DC power plant with emergency power backup, fire suppression system and access controls for security and 7X24 operational monitoring. It will use modern in-row cooling for efficiency and configuration flexibility. The facility will serve as the focal point of network operations and provide leased collocation space for public and private organizations in the region.

Summary

The Opencape network is designed to be easily upgraded and expanded. Fiber optic based services will range from traditional bandwidth based offerings to dedicated wavelengths of light to dark fiber leases. Initially the optically switched core will use 44 wavelengths each capable of carrying 40 Gbps of data because this is solid, cost effective design point at this time which is sufficient for project needs over the next several years. The core equipment can be in-service upgraded to support both a larger number of wavelengths and higher data rates (up to 88 wavelengths at 100 Gbps) and future generations of optical switching equipment will undoubtedly expand upon that capacity. By building laterals using fiber optic cable instead of copper lines or wireless links, the project is insuring that there is ample expansion capability at every location served.

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 requested.



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

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:

OpenCape Corporation is pursuing a strategy of partnerships to secure the necessary rights of way, leases, and licenses.

Tower Leases: OpenCape is pursuing access to publicly owned water towers for placement of its emergency backup and public safety microwave backhaul component. Attorneys for OpenCape and Water Districts are negotiating the language of final agreements that will result in a licensed access for OpenCape to place antennas, radios, and associated equipment on the water towers, as well as a node to link the microwave component to the fiber component.

Building Lease: OpenCape and Barnstable County have agreed to form a partnership to locate the regional collocation center in a vacant County building. The partnership will allow OpenCape 25 year access to the Barnstable County Public Safety Building. OpenCape will renovate the building to create a regional collocation center to serve the region. This building is ideally suited for this purpose because it has existing robust power, is far from the shoreline at 62 feet above sea level, was built to withstand a bomb blast, and is adjacent to a 200' communications tower.



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

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Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Right of Way License:

Cape Cod Canal: OpenCape has submitted a request to the Army Corps of Engineers for access to the canal right of way, the bridge abutments, and the Sagamore and Bourne bridges for the placement of two 4” utility conduits on each bridge. OpenCape has further requested the Army Corps’ consideration of directional boring under the canal and access to the railroad bridge at the south end of the Canal.

OpenCape is also conducting negotiations with NSTAR, the regional power utility, to gain access to its high tension tower crossing of the Cape Cod Canal.

Microwave Licensed Frequencies: OpenCape and its stake holders currently operate several unlicensed microwave links. Woods Hole Oceanographic Institution (WHOI) and Cape Cod Community College operate several links in the region in the 5.4Ghz and 5.8Ghz range. OpenCape operates one link from WHOI to UMass Dartmouth across Buzzards Bay. This 22 mile link over water was installed as a proof of concept to validate microwave in a challenging scenario. OpenCape will use radios in the licensed 5.x and 3Ghz ranges for its microwave component. RCN Metro has engaged two companies that are experts in this area to validate previously evaluated paths. One of these companies will be selected for installation of the microwave component and will be required to secure the licenses. Preliminary inquiry indicates there will be no obstacle to securing the necessary spectrum.

Pole Access: OpenCape plans to deploy its fiber along roadways through pole attachments. OpenCape intends to create a partnership with the regional power supplier, NSTAR, to compliment its goals in smart grid technology with those of OpenCape. Preliminary negotiations have been conducted and appear promising.

36. Construction and Vendor Contracts

The OpenCape Corporation has developed a business model for construction and operation that links the knowledge of its regional stake holders and anchor tenants with the technical and business knowledge of RCN Metro Optical Networks. In this model, OpenCape Corporation is the applicant and owner of the physical plant. It will license RCN Metro Optical Networks to operate the network. This model was selected because it will ensure the long term sustainability of the system and the continued input of the community into the system’s development.



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

OpenCape Corporation and RCN Metro will work in tandem to create the detailed network designs, and construct the network, again, with OpenCape providing the regional perspective and RCN Metro providing its extensive technical knowledge and construction experience.

OpenCape Corporation created a competitive process to select RCN Metro as its operating partner through its “Network Service Provider Information and Input on Participation in a Public-Private Partnership Supporting OpenCape Corporation’s ARRA Application” request for information (RFI) of May 15, 2009. The RFI was sent to large experienced builders and operators of regional backhaul networks. Responses were received on June 23, 2009, and OpenCape assessed potential partnership relationships from the respondents. Two finalists emerged and RCN Metro Optical Networks was selected as the future licensed operator of the network, as well as the prime contractor in the design and construction of the network.

The legal representatives of OpenCape Corporation and RCN Metro Optical Networks are negotiating the details of the relationship in anticipation of a grant award. The basis for the relationship is broadly outlined in a letter from OpenCape to RCN of July 17, 2009. In the interim, OpenCape and RCN are working diligently together in the planning of the network construction and operation. RCN has invested extensive time, effort and resources to aid OpenCape in designing the network and building a sustainable business model.

During the construction phase, OpenCape will rely heavily on RCN Metro’s in house engineering, design, construction, and project management staff, and will work together with RCN to ensure that when needed subs are selected through a fair and competitive process to produce the best result and the lowest cost.

OpenCape has also established a contributing partner relationship with Barnstable County. The partnership will provide to OpenCape a 25-year indefeasible right to use (IRU)/lease to the county public safety building as its contribution to the effort consistent with its goals to establish a regional umbrella services model for governments in the region. OpenCape will renovate the building to create a regional collocation center to serve the region.

Other negotiations that are underway relate to right of way. OpenCape and RCN Metro are intent on selecting the optimum path for fiber in the region and there are many factors that will



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

contribute to the final path selection. Discussions are underway with the Massachusetts Broadband Institute as the Commonwealth's authority on access to communications portions of the highway right of way.

OpenCape is conducting negotiations with NSTAR regarding both its high tension public utility right of way and its pole electric space. There is synergistic value to collaboration in OpenCape's broadband effort and NSTAR's Department of Energy smart grid goals. Negotiations are ongoing.

OpenCape has made a formal request of the Army Corps of Engineers for a license to place two four inch utility conduits on the Sagamore and Bourne bridges. OpenCape is also pursuing crossing the canal via the rail road bridge, NSTAR high tension towers, directional boaring, and undersea conduit.

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:

OpenCape has been an ongoing concern for nearly three years. The organization has already engaged in the processes of stakeholder development, identifying regional need, developing initial engineering and business plans and modeling, and has executed on initial proof-of-concept link. It has plans in place to move forward with its next phase of active execution of network build and launch along with its primary operating partner, RCN Metro Optical Networks (RCN).

The organization developed initial engineering plans for a fiber and microwave backhaul network and began active outreach to gather ongoing needs data and further solidify regional understanding. It also developed a business plan for ongoing sustainability and project plans for execution of the project's build stages. Lastly, it executed and deployed a proof-of-concept microwave link across the water between Woods Hole and Dartmouth.



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Thousands of hours of conversation and investigation with organizations and individuals across the region shaped the project plan. Broadband solutions in regions with similar needs from across the country were explored and feedback from those projects were gathered as well, as part of understanding what had and had not worked previously.

It also became clear that a primary operating partner – a private sector company with proven expertise in building and operating a wholesale data communications network – would enable the speedy deployment of the planned OpenCape network.

In May, 2009 OpenCape issued an RFI and a dozen firms responded. Based on specific experience requirements, two finalists were selected and further discussions followed. In July 2009 RCN Metro Optical became OpenCape's Primary Operating Partner. RCN Metro Optical Networks is a division of RCN; the division has a proven track record of successfully building and operating middle mile networks, dark fiber, and institutional wholesale bandwidth in markets across the northeast and midwest.

By partnering with a company that has proven it can build and deliver Ethernet, SONET, wavelength, transport, and other services, and that holds unique rights of way spanning from Maine to Virginia to Illinois, OpenCape can quickly build and deploy its regional network and leverage existing operational expertise to price and deliver compelling services to clients in order to ensure ongoing sustainability.

The four-member OpenCape Executive Committee has a wealth of management experience in both technical development and business skills. Dan Gallagher (president/chair) comes from an IT management background, in both military and educational environments. Teresa Martin (vice chair) has a track record of taking technology ventures from concept through launch and exit. Gary Delius (treasurer) has extensive technology management experience in profit, nonprofit, and government entities. Art Gaylord has more than 40 years of research and university computing design, deployment, and operations experience.

The remainder of the board has vertical expertise: John Campbell, IT systems and technology needs in the health care industry and liaison to the region's health care organizations; Ellen Driscoll, technology in K-12 and liaison to the region's school districts; Dr. Robert Green, computer services and support in post secondary education; John Kennan, economic



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

development and liaison to the region’s selectmen; Sean O’Brien, emergency planning and public safety and liaison to police, fire, EMT, and energy planning; Charles Sumner, municipal management and liaison to the region’s town administrators; and Craig Weigand, regional services and liaison to the water district managers.

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:

OpenCape began to develop relationships across the region at its first Broadband Summit in 2006 when over 100 participants converged on Cape Cod Community College. OpenCape has maintained close ties with many that attended, including the 15 municipalities, 13 school districts, and a wide variety of interested stakeholders and strategic partners. All have voiced strong support and continue to actively participate in the overall development of the OpenCape system.

The OpenCape Board plays a critical coordinating role. Its board members represent school districts, healthcare, research, higher education, municipal government, economic development, and several other constituencies in the region.

Since 2006 OpenCape's Board of Directors have met with many regional entities, committing over 964 man hours to these meetings. Meetings have been held with the Cape and Islands Selectmen, Town Administrators, Superintendents, Police Chiefs, and Fire Chiefs Associations, and the Barnstable County Regional Emergency Planning Committee. The County Government has chosen to be a key partner in the system by providing a facility for the collocation center where towns and the county can share resources and participate in collaborative efforts.



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

OpenCape held a second Broadband Summit in 2008 that was attended by over 140 interested parties from a variety of stake holder communities. This gathering offered another opportunity for the exchange of ideas among stake holders in the region from the smallest municipal group to the highest level of the federal government through the participation of FCC Commissioner Michael Copp as keynote speaker.

Letters of support from many of the groups that have participated in the development of the OpenCape project are attached to the application as supplemental information.

42. Recovery Act and Other Governmental Collaboration.

The OpenCape project will provide enabling telecommunications infrastructure to support local, regional, state, and federal government goals in the Southeast Massachusetts region.

Barnstable County and the local communities of Cape Cod have invested themselves in this project because they recognize its economic development, civic engagement, and public safety value. The wide area network and collocation center enable a government regional umbrella services model to provide better common services at lower cost to citizens. The Cape Cod Region Comprehensive Economic Development Strategy (CEDS) identifies OpenCape as a priority project for the region that underpins goals in many areas. The Barnstable County Economic Development Committee awarded OpenCape a \$50,000 grant to develop the concept. The Barnstable County Commissioners have established a partnership with OpenCape whereby OpenCape will receive a 25 year lease to a county building for the creation of the collocation center, a contribution of \$1 million in value.

The Commonwealth of Massachusetts has also recognized the value of the OpenCape middle mile network to its goals. The Commonwealth and its agencies have engaged OpenCape in discussions about specific opportunities for the OpenCape network to support the creation of a state-wide communications network for public safety, disaster, smart highways, and other government activities. The Commonwealth is considering OpenCape as the southeastern ring of its three ring network for state government.

OpenCape was awarded a \$150,000 grant by the John Adams Innovation Institute and a \$50,000 award from the Massachusetts Broadband Institute (MBI) to aid OpenCape in the development of the concept. Both are quasi-public state funded entities. In 2008, Governor



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Deval Patrick signed into law “An Act Establishing and Funding the Massachusetts Broadband Institute” that created a \$40 million general obligation bond “Incentive Fund” for the purpose of addressing unserved and underserved communities in Massachusetts. OpenCape shall receive \$5 million from the fund as a portion of its BTOP match.

OpenCape is also supportive of federal goals in the region. The Woods Hole Oceanographic Institution, Marine Biological Laboratory, and other research institutions located in the region will directly benefit from the creation of the OpenCape network, offsetting necessary expenditures by the National Science Foundation. The Department of Transportation Volpe Center recently asked OpenCape to participate in a discussion of regional transportation needs. OpenCape will serve the backbone needs of the Cape Cod National Seashore, smart highways, and hurricane evacuation communications.

OpenCape has also had discussions with a representative of the Defense Information Services Agency (DISA) regarding the ability of OpenCape to connect, via dedicated fiber, the Homeland Security entities on Otis Air Force base with the broader homeland security information architecture through Rhode Island.

OpenCape is negotiating rights of way with the regional power supply company, NSTAR, that may offer a significant opportunity for Department of Energy Smart Grid objectives. NSTAR is seeking \$28 million in federal stimulus funds to further its smart grid efforts. NSTAR and OpenCape see a path to common objectives through the exchange of NSTAR right of way access to support OpenCape, and an allotment of fiber strands from the OpenCape network to NSTAR to support its smart grid objectives.

Community Involvement (BTOP Applicants Only)

43. Partnering with Disadvantaged Businesses

OpenCape has not established any agreements to contract with socially and economically disadvantaged small businesses at this time, but continues to search for possible alignments that may find common interest with a small or disadvantaged business (SDB).

It is worth noting that OpenCape has begun a conversation with the leadership of the Mashpee



**Broadband Infrastructure Application
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Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
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Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Wampanoag, a federally recognized sovereign Native American nation. The Wampanoag are developing areas of Mashpee for the economic and cultural benefit of the tribe and broadband service may play a role in their success. In addition, there is a desire to create greater connectivity between the Mashpee Wampanoag and the Wampanoag Tribe of Gay Head (Aquinnah) on Martha's Vineyard. The OpenCape network could offer opportunities to both tribes and conversations with the tribes will continue.

H. Project Budget

44. General Overall Budget



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

Submitted Date: 8/19/2009 4:34:08 PM		Easygrants ID: 1174	
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program		Applicant Organization: OpenCape Corporation	
Task: Submit Application - Infrastructure Programs		Applicant Name: Mr. Daniel Joseph Gallagher	

Budget	Loan Request	Grant Request	Equity	Debt	Bond	Other
Network & Access Equipment (switching, routing, transport, access)		2,225,359				
Outside Plant (cables, conduits, ducts, poles, towers, repeaters, etc.)		24,632,714				6,500,000
Buildings and Land – (new construction, improvements, renovations, lease)		3,983,020				1,000,000
Customer Premise Equipment (modems, set-top boxes, inside wiring, etc.)						
Billing and Operational Support Systems (IT systems, software, etc.)						
Operating Equipment		44,000				



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

Submitted Date: 8/19/2009 4:34:08 PM		Easygrants ID: 1174	
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program		Applicant Organization: OpenCape Corporation	
Task: Submit Application - Infrastructure Programs		Applicant Name: Mr. Daniel Joseph Gallagher	

(vehicles, office equipment, other)						
Engineering/ Professional Services (engineering design, project management, consulting, etc.)		1,367,000				500,000
Testing (network elements, IT system elements, user devices, test generators, lab furnishings, servers/computers, etc.)						
Site Preparation						
Other						339,300
TOTAL BROADBAND SYSTEM		32,252,093				8,339,300



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

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Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Total Budget: \$ 40,591,393

45. Detailed Budget:

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

Sustainability

46. Reasonableness

OpenCape specifically selected its operating partner, RCN Metro Optical Networks (RCN), in advance of submitting its BTOP application because there is great advantage to planning the network with an experienced builder and operator of middle mile networks. OpenCape has also chosen to make capital investments in core infrastructure that can serve current needs and technologies, and grow and adjust to demand over time.

OpenCape must deliver a variety of services, including Ethernet, SONET, and wavelength services to the users of the middle mile fiber optic network, as well as collocation services. Appendix G identifies all project costs necessary to build the infrastructure to deliver these services by item, required quantity, price per unit, and total cost. The project costs estimated in Attachment G were developed by RCN's expert staff in collaboration with the OpenCape Executive Committee.

The quantity identified for each item was determined by the geographic area to be covered and the types of services to be offered. Prices were determined by canvassing several vendors with whom RCN has had experience with in the past, current "street price" estimates, and extensive practical experience in construction of middle mile networks.

Routes and rights of way were selected to try and minimize the cost of the network, while still preserving the greatest possible effect. Making use of aerial cabling to the greatest extent possible provides the lowest possible cost and minimizes the effect on wetlands and other sensitive environmental areas on the Cape. In addition, the timely installation of about 350 miles of cable via existing structures will help insure completion within the allotted time frame.

The strategic use of underground cabling into the collocation center, POPs and microwave systems allows for the use of some of the existing underground infrastructure and utility



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

entrances into buildings.

Towers are required for the installation of the proposed microwave network, which will primarily provide broadband service for public safety and emergency services between the Cape and Islands. Existing water towers will be used as the primary hosting tower platform to reduce costs.

In order to provide broadband services on the above fiber optic backbone, electrical and optronic hardware has to be installed. Switching hardware allow us to offer Ethernet transport services. The installation of three 10Gb/s Ethernet rings will enable the efficient transport of lower rate Ethernet services around the Cape and off of the Cape to Boston and Providence. The rings will provide access to/from the Barnstable Collocation Facility and will bring open and cost effective Ethernet transport to last mile providers.

The installation of a 44 wavelength ROADM (reconfigurable optical add drop multiplexer) devices brings high capacity wavelength services to the Cape. This network supports 1, 2.5, 10, 40, & 100 Gb/s wavelength services throughout the Cape.

The installation of 65 Ethernet switches at educational facilities and libraries will provide day one broadband connectivity between facilities.

The Data Center provides an open access collocation facility on the Cape. The Data Center provides a neutral facility to access the OpenCape middle mile network. The data center is to be built in a renovated county building. This will allow an abandoned building to be placed into useful service. Also, the time saved in not building a new structure will help keep the project within the allotted time frame.

The Central Offices (CO) provide access to last mile facilities throughout the Cape. The COs also provide critical regeneration locations for the ROADM network.



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

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

OpenCape has identified over eight million dollars in matching cash or in-kind contributions toward its \$40 million grant application. This amount represents 21% of the project cost. OpenCape intends to use four resources as match and to use the funding for infrastructure construction and working capital:

1. The Massachusetts Broadband Institute (MBI) will contribute five million dollars (\$5,000,000) in cash match using general obligation bonds of the Commonwealth of Massachusetts as a component of the Incentive Fund established by the Broadband Bill of 2008. The Broadband Bill created a capital outlay program to achieve the deployment of affordable and ubiquitous broadband access for every citizen of the commonwealth.
2. RCN Metro Optical Networks will contribute two million dollars (\$2,000,000) in cash match as the selected primary operating partner of the OpenCape network.
3. Barnstable County will contribute one million dollars (\$1,000,000) as an in-kind contribution of a twenty-five (25) year capital lease of the Barnstable County Public Safety building for the purposes of creating a regional collocation and data center.
4. Volunteer Time of the OpenCape Board of Directors is valued at \$340,000.

BTOP Requirements



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

52. Matching Funds:

- a. Cash: \$ 7,000,000.00
- b. In-Kind: \$ 1,339,300.00
- c. Percent of Total Project Cost: 21

53. Demonstration of Financial Need:

The region has seen limited investment in broadband infrastructure. This is largely due to a business model that identifies densely populated areas as those areas which will provide suitable levels of financial return to justify an investment in infrastructure from the private sector. This model is driven by capital markets that reward short term returns and discourage longer term investments such as that required in infrastructure in less-densely populated regions such as southeastern Massachusetts, the Cape, and the Islands. For example, Verizon has stated that at this time, they do not intend to bring FiOS service to Cape Cod and the Islands.

The end result is that, although residential cable and telephone DSL services are available in some areas, there are service gaps across the region and significantly higher costs for business class services than one would find in metro-Boston.

OpenCape has determined that the creation of an open access vendor neutral middle mile solution in the region, with low rates and no local loop charges, will remove barriers to entry for new last mile providers. However, the construction of this middle mile network is also viewed as lacking in return for a private sector investor. For example, RCN Metro Optical Networks has stated, "Although we look forward to building and operating this network on your behalf and we expect to operate the network in an economically viable fashion, today's tight capital markets coupled with the high demands for return on capital would have prohibited RCN Metro from speculatively building this network on its own."

OpenCape has also looked to the Commonwealth of Massachusetts for funding of the \$40 million project in a formal request. The Massachusetts Broadband Institute (MBI), as the designated agent for the state in delivering ubiquitous broadband to unserved and underserved areas, rejected OpenCape's request due to limited funds and a constrained state fiscal environment. However, the MBI has committed to providing \$5 million to OpenCape as a



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Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

match in its BTOP application.

It is clear that this project would not take place but for a BTOP award. Neither the private sector, nor local, regional, or state government can commit the resources needed. However, the private sector, state government, county government, and local government, as well as volunteers who have contributed thousands of hours of their time are willing to contribute their best to see the project to completion.

54. Unjust Enrichment

OpenCape is receiving no federal support and has applied for no federal support for non-recurring costs.

55. Disclosure of Federal and/or State Funding Sources

OpenCape has not received or requested any federal funding for activities or projects to which the application relates.

The Massachusetts Broadband Institute (MBI), a quasi-public, state funded organization, will contribute five million dollars (\$5,000,000) in cash match using general obligation bonds of the Commonwealth of Massachusetts as a component of the Incentive Fund established by the Broadband Bill of 2008. The Broadband Bill created a capital outlay program to achieve the deployment of affordable and ubiquitous broadband access for every citizen of the commonwealth. This funding has been requested and approved by the MBI only as a match for the OpenCape BTOP application.

I. Self Scoring – BIP Only Self Scoring

56. Self Scoring Sheet



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

Submitted Date: 8/19/2009 4:34:08 PM		Easygrants ID: 1174	
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program		Applicant Organization: OpenCape Corporation	
Task: Submit Application - Infrastructure Programs		Applicant Name: Mr. Daniel Joseph Gallagher	

Criteria	Method	Points	Self Scores
<u>PROJECT PURPOSE</u>			
Proportion of Rural Residents Served in Unserved Areas	1 point for every 10,000 unserved households	Up to 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	
Remote Area targeting	1 point for every 50 miles a service area is located from a non-rural area	Up to 5	
Title II Borrower	If you are or were a Title II borrower	5	
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	
<u>PROJECT BENEFITS</u>			
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	
Affordable of services offered	Points awarded based on the proposed rate structure and the logistics of the proposed service area	Up to 5	



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Task: Submit Application - Infrastructure Programs		Applicant Name: Mr. Daniel Joseph Gallagher	

Choice of service provider	If the proposed infrastructure is available to be used by multiple service providers	5	
Critical Community Facilities	If discounted rate packages at least 25% lower than advertise rates are available to critical facilities	5	
<u>PROJECT VIABILITY</u>			
Applicant's organizational capability	Points will be awarded on the strengths and accomplishments of key management	Up to 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	
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	
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	
<u>PROJECT BUDGET AND SUSTAINABILITY</u>			
Reasonableness of the budget	Points will be awarded based the	Up to 5	



**Broadband Infrastructure Application
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Task: Submit Application - Infrastructure Programs		Applicant Name: Mr. Daniel Joseph Gallagher	

	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	
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	
Total Points		100	



**Broadband Infrastructure Application
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Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

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



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

- 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

Massachusetts - 10

2. State the Congressional District for each area covered by the Project.

Massachusetts - 3

Massachusetts - 4

Massachusetts - 9

Massachusetts - 10

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.
--



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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:**

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

Middle Mile Span Name: OpenCape Network

Census Blocks in Middle Mile Span: The OpenCape network proposed funded service area consists of the entirety of Barnstable, Dukes and Nantucket counties plus the towns of Plymouth, Carver, Kingston, Plympton, Middleboro, Bridgewater, Halifax, East Bridgewater, Brockton, Wareham, Marion, and Mattapoisett in Plymouth County.

The OpenCape service area does not include the communities of Bristol County along what is commonly referred to as the South Coast of Massachusetts. However, OpenCape must run fiber through this area to establish its connection with Providence, RI. The communities of the South Coast will be able to exploit the OpenCape fiber to their own advantage in developing a comprehensive solution for this region similar to that fashioned for Cape Cod and the Islands. The University of Massachusetts Dartmouth is leading an effort to do just that. In light of the economic challenges faced by this region, particularly in New Bedford and Fall River, with unemployment in excess of 14%, OpenCape could prove a vital underpinning resource for economic development in the region.

The OpenCape service area consists of over 15,000 census blocks. The census blocks have been consolidated into a list in Supplement 1.



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There are over 175 unserved or underserved census blocks within the OpenCape service area. These census blocks are listed in Supplement 1. The OpenCape network will provide termination points in at least the unserved census blocks in Truro (census tract 010200, block group 4, block 400) and in Edgartown (census tract 200300, block group 1, block 1020) and the underserved census block on Penikese Island (census tract 200400, block group 6, block 6043).

At least 70 anchor institutions will be connected to the OpenCape network via laterals as part of the build out. These institutions are:

Community Evacuation Shelters (12)
Upper Cape Regional Technical School
Falmouth High School
Mashpee High School
Oak Ridge School
Barnstable High School
Cape Cod Regional Technical School
Chatham High School
Nauset Regional Middle School
Nauset Regional High School
Wellfleet Elementary School
Truro Central School
Veterans Memorial School

Higher Education and Research Institutions(11)
Cape Cod Community College
Woods Hole Oceanographic Institution
Marine Biological Laboratory
Woods Hole Research Center
US Geological Survey
National Marine Fisheries Service
Sea Education Association
Massachusetts Maritime Academy
Massasoit Community College
Bridgewater State College



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Bristol Community College

Town Government Facilities (18)

Each of 18 towns will provide a list of its buildings in priority order. OpenCape will connect at least one priority building in each town along the final fiber path.

Libraries (30)

Cape Cod Community College Library
Centerville Public Library
Chatham/Eldredge Public Library
Cotuit Public Library
Dennis Public Library
Falmouth Public Library
Falmouth East Public Library
Hyannis Public Library
Jonathan Bourne Public Library
Marstons Mills Public Library
Mashpee Public Library
Osterville Free Library
Snow Library (Orleans)
South Yarmouth Library
West Dennis Free Public Library
West Falmouth Library
West Yarmouth Library
Eastham Public Library
Harwich/Brooks Free Library
South Dennis Free Public Library
Truro Public Library
Wellfleet Public Library
Barnstable/Sturgis Library
Brewster Ladies Library
Dennis Memorial Library
East Dennis Library (Jacob Sears)
Provincetown Public Library



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W.Barnstable/Whelden Memorial Library
Yarmouthport Library
Woods Hole Public Library

Also, the Penikese Island School for Boys on the state owned Penikese Island.

The OpenCape path is specifically intended to connect these vital institutions. Also, the path permits many additional anchor institutions the ability to rapidly obtain service from the network including six hospitals, two additional higher education institutions, eight additional libraries, ten county, state or federal institutions, five commercial/industrial centers, and potentially 270 public safety and education facilities. These institutions include:

Hospitals (7)

Falmouth Hospital
Cape Cod Hospital
Outer Cape Health Care
Jordon Hospital
Martha's Vineyard Hospital
Nantucket Cottage Hospital
South Coast Hospital

Higher Education (2)

University of Massachusetts Dartmouth
School of Marine Science and Technology

Public Safety

The OpenCape network will create the opportunity for over 150 public safety buildings to be connected to the network.

County, State and Federal (10)

Wampanoag Tribal Center - Mashpee
Massachusetts State Police
County Sheriff Department
Barnstable County Emergency Planning



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

Submitted Date: 8/19/2009 4:34:08 PM	Easygrants ID: 1174
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	Applicant Organization: OpenCape Corporation
Task: Submit Application - Infrastructure Programs	Applicant Name: Mr. Daniel Joseph Gallagher

Otis Air Force Base
 US Coast Guard – Falmouth and Provincetown
 National Academy of Science
 Cape Cod National Seashore
 Cape Cod Education Collaborative
 Highland Center – Cape Cod National Seashore

Industrial/Commercial (5)
 Falmouth Technology Park
 Raymond Technology Park
 Plymouth Rock Studios
 Mashpee Commons Shopping Center
 Mashpee Industrial Park

Libraries (8)
 Sandwich Public Library
 Plymouth Public Library
 Brockton Public Library
 CLAMS Office
 Edgartown Free Public Library
 Nantucket Atheneum
 Oak Bluffs Public Library
 Vineyard Haven Public Library

Last Mile Service Area Name: OpenCape Network
Community Name: Cape Cod
Rural Classification of the Community: Non-Rural
BIP – Service Status:

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

BTOP - Service Status: Underserved

BTOP - If Service Status is "Underserved" please select at least one applicable option from this list.
No more than 50% of the households in the proposed funded service area have access to facilities-based, terrestrial broadband service at greater than the minimum broadband transmission speed;



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The rate of broadband subscribership for the proposed funded service area is 40% of households or less.

Total Square Miles of Service Area: 1,206
Total Population : 515,648
Total Number of Households: 321,204
Total Number of Businesses: 62,129
Total Number of Critical Community Facilities, Anchor Institutions and Public Safety Entities: 552

N. Uploads

In order to improve system performance and help ensure that all applicants are able to complete their applications by the deadline, we have changed the way your application PDF is created. This PDF contains all of the information you entered throughout the Easygrants data entry screens. PDF copies of all documents that have been uploaded can be viewed and printed separately from the **Main page of the application after you submit**. These will continue to be available to you in read-only format after your application has been submitted.