



## **Budget Narrative**

**Applicant Name: Virginia Tech Foundation**

**EasyGrants Number: 248**

**Organization Type (from Question 1D on BTOP application): Non-Profit Corporation**

**Proposed Period of Performance: 30 months following commencement date**

**Total Project Costs: \$6,925,000**

**Total Federal Grant Request: \$5,540,000**

**Total Matching Funds (Cash): \$1,385,000**

**Total Matching Funds (In-Kind): \$0**

**Total Matching Funds (Cash + In-Kind): \$1,385,000**

**Total Matching Funds (Cash + In-Kind) as Percentage of Total Project Costs: 20%**

### **1. Administrative and legal expenses**

**Total \$150,000 (Cash match \$30,000, Request \$120,000)**

**Virginia Tech Foundation has not included any Indirect Costs on this proposal. In lieu of Indirect Costs, the project has budgeted a nominal amount for administrative and legal expenses significantly below typical indirect cost allowances.**

### **2. Land, structure, rights-of-way, appraisals, etc.**

**Total \$300,000 (Cash match \$60,000, Request \$240,000)**



**Node Shelters (\$225,000 total, Cash match \$45,000, Request \$180,000) – MBC’s current network has 22 nodes strategically placed throughout its network. These shelters contain the fiber optic transport equipment described in the equipment section. The extension of the backbone from Bedford to Blacksburg will require three additional nodes to house the transport equipment. The unit cost is based on current vendor pricing. Shelters are not available for leasing and are considered to be a permanent fixed asset for their service life.**

**30 KW Backup Generators (\$75,000 total, Cash match \$15,000, Request \$60,000) - Each node will require a generator to provide backup AC power in the event of a commercial power failure to ensure the network remains operational. The unit cost is based on current vendor pricing. This equipment is not available for leasing and is considered to be a permanent fixed asset for its service life.**

### **3. Relocation expenses and payment**

**None.**

### **4. Architectural and engineering fees**

**Total \$362,500 (Cash match \$72,500, Request \$290,000)**

**In order to construct the proposed fiber route, detailed OSP engineering plans must be developed. MBC uses contract engineering firms to produce these construction drawings and to apply for all necessary easements for the node structures, and public right-of-way and railroad permits. The cost for this project was based on MBC’s estimated cost of \$3,356.48 per route mile (108 miles) which takes into consideration the relatively remote and mountainous location for much of the proposed path.**

### **5. Other architectural and engineering fees**

**Total \$20,000 (Cash match \$4,000, Request \$16,000)**

**Network design and engineering costs are related to the provision of electronics within the network, to include assessment of OTDR trace results, db loss between spans and the correct amplifiers/modulators needed for effective optical transport, and the engineering design for power to the individual electronics components. This cost was based on MBC historical cost ratio of equipment costs vs. network component cost. This ratio is 6.66666667%**



## **6. Project inspection fees**

**Total \$135,000 (Cash match \$27,000, Request \$108,000)**

**In order to ensure that the project is planned, engineered, and constructed in a quality and timely manner, MBC will be required to engage project managers and project inspectors. The cost of these resources is based on an historical percentage of overall construction and equipment costs. Personnel performing these tasks will be a combination of MBC employees and subcontractors.**

## **7. Site work**

**Total \$90,000 (Cash match \$18,000, Request \$72,000)**

**Each node described in Land & Structures requires site preparation consisting of minor grading, driveway and parking conditioning, etc. The unit cost is based on MBC historical averages. The work will be performed by MBC contractors.**

## **8. Demolition and removal**

**None**

## **9. Construction**

**Total \$5,500,000 (Cash match \$1,100,000, Request \$4,400,000)**

**Fiber cable (\$662,523 total, Cash match \$132,504.60, Request \$530,018.40) – Cost of fiber cable based on best available current vendor pricing.**

**Hand holes (\$71,390 total, Cash match \$14,278, Request \$57,112) – Hand holes are required at strategic locations such as major intersections and at all splice points where cable is coiled in the hand hole below the surface to provide access to the fiber cable. Unit cost was based on current vendor pricing.**

**Pole line hardware/strand (\$1,189 total, Cash match \$237.80, Request \$951.20) – For the aerial route segments, 6M support strand is required to which the fiber is lashed, and each pole requires DA bolts, 3 bolt clamps, and other hardware to support the cable and strand. For cost estimating purposes, this is typically**



calculated on a linear foot cost basis based on past build costs.

**Cable route markers (\$19,686 total, Cash match \$3,937.20, Request \$15,748.80) - are required to prevent damage to underground facilities. Typically markers are placed at all hand holes, and at other strategic locations where potential excavation may occur. Unit cost was based on current vendor pricing.**

**Splice cases (\$34,675 total, Cash match \$6,935, Request \$27,740) - large are required where ever there is a fiber splice required on higher strand count fiber cables. Unit cost was based on current vendor pricing.**

**Buried cable placement (\$4,473,488 total, Cash match \$894,697.60, Request \$3,578,790.40) - this cost represents an average historical cost for buried fiber cable placement on a per linear foot basis. The work will be performed by MBC contract construction crews.**

**Aerial cable placement (\$9,251 total, Cash match \$1,850.20, Request \$7,400.80) - this cost represents an average historical cost for aerial fiber cable placement on a per linear foot basis. The work will be performed by MBC contract construction crews.**

**Splicing labor (\$227,798 total, Cash match \$45,559.60, Request \$182,238.40) - represents an average cost per splice based on historical averages. Examples of splice locations are at reel ends, cuts where some road crossings are made, and at customer locations. The work will be performed by MBC contract splicing crews.**

## **10. Equipment**

**Total \$300,000 (Cash match \$60,000, Request \$240,000)**

**Optical MultiService Edge 6500 (\$242,920 total, Cash match \$48,584, Request \$194,336) - The Nortel 6500s are required in the three proposed node shelters where the MBC fiber backbone is being extended as part of this project, and at the VT node. The 6500s are the electronics required to carry traffic across the fiber cables. Each 6500 will contain optical cards and multiplexing cards that allow for dropping of services in the local loop, and for protecting services through SONET ring technology. This equipment is not available for leasing and is considered to be a permanent fixed asset for its service life.**



**DC power systems (\$9,800 total, Cash match \$1,960, Request \$7,840) - are required to convert the input AC power to DC power at the three nodes and at the Virginia Tech campus location. The Nortel 6500 units run on -48 volts DC, so the DC power systems are required to convert 220 volts AC to -48 volts DC. This equipment is not available for leasing and is considered to be a permanent fixed asset for its service life.**

**NSB 170 Ah Batteries (\$9,780 total, Cash match \$1,956, Request \$7,824) - Eight batteries are required at each node location for DC power backup. Even though each node will have generator backup for AC power, batteries are required since when there is a commercial power failure, there is a momentary interruption of AC power when the switch to generator is made. If there is no battery backup available, all the Nortel equipment resets itself causing an eight minute service outage. The batteries also provide a measure of backup time in the event of generator failure during a commercial power outage. This equipment is not available for leasing and is considered to be a permanent fixed asset for its service life.**

**DC-AC Inverters (\$10,000 total, Cash match \$2,000, Request \$8,000) - DC-AC inverter is required to power the site router. Since the router is a critical network component and is AC powered, to prevent service interruption in a commercial power failure, the AC power is provided through the DC power system and the DC-AC inverter. If the Inverter were not present, the router would be subject to reset and subsequent service interruption whenever there was a commercial power failure. This equipment is not available for leasing and is considered to be a permanent fixed asset for its service life.**

**Nortel Ethernet Routers (\$15,175 total, Cash match \$3,035, Request \$12,140) - routers are required at each node location and at the Virginia Tech campus location for network management functions.**

**AFL Splice Panels (\$2,200 total, Cash match \$440, Request \$1,760) - Fiber panels are needed for terminating OSP fiber cables at each node location and at the Virginia Tech campus.**

**SC Fiber jumpers (\$480 total, Cash match \$96, Request \$384) - Fiber panels are needed for terminating OSP fiber cables at each node location and at the Virginia Tech campus.**

**Installation Labor for Nortel 6500s (\$9,645 total, Cash match \$1,929, Request \$7,716) - cost for installing testing and turning up the Nortel 6500 units in the three new nodes and at the Virginia Tech campus location.**



## **11. Miscellaneous**

**Total \$67,500 (Cash match \$13,500, Request \$54,000)**

**Vehicles (\$40,000 total, Cash match \$8,000, Request \$32,000) - Two vehicles will be required for added employees to make construction site visits, attend construction milestone meetings, etc. Consideration was given to a lease, but the anticipated high mileage requirement would make purchase more attractive. The cost basis for the vehicles is based on average new mid-sized vehicle.**

**Computers (\$4,500 total, Cash match \$900, Request \$3,600) - Each new employee will require a new computer and is based on current vendor pricing.**

**Desks/Furnishings (\$3,000 total, Cash match \$600, Request \$2400) - Each new employee will require office furniture for his or her work space; cost basis is current vendor pricing estimate.**

**Testing (\$20,000 total, Cash match \$4,000, Request \$16,000) - This covers the cost of testing all network elements.**