



Comprehensive Community Infrastructure **Budget Narrative Template**

Applicant Name: Massachusetts Technology Collaborative

EasyGrants Number: 4722

Organization Type: State Agency

Proposed Period of Performance: October 1, 2010 to June 1, 2013

Total Project Costs: \$71,645,444

Total Federal Grant Request: \$45,445,444

Total Matching Funds (Cash): \$23,088,647

Total Matching Funds (In-Kind): \$3,111,353

Total Matching Funds (Cash + In-Kind): \$26,200,000

Total Matching Funds (Cash + In-Kind) as Percentage of Total Project Costs: 36.57%

1. Administrative and legal expenses - \$1,871,195

- Provide a breakout of position(s), time commitment(s) such as hours or level-of-effort, and salary information/rates with a detailed explanation, and additional information as needed.

Included in this category are the costs of staff, consultants, auditors, and outside legal firms providing assistance with application preparation, general project and award implementation and oversight, compliance, and other required services to insure a successful implementation of all of the objectives of this project.

1. Proposal Preparation-Release of NOFA through submission of Proposal

A. Staff costs of \$109,992 are included in this category. These costs consist of (i) direct salaries related to the portions of time that the applicant's MBI Director, Construction Project Manager, MBI Deputy Director, and compliance staff are performing direct services related to preparing the application for the period from the release of the NOFA through submission of the proposal, (ii) fringe benefits, based upon a fringe benefits rate of 35.23%, which is the actual current fringe rate for benefits provided to applicant's employees, and (iii) indirect corporate services charge at the rate of 76.02% of personnel costs (salaries and fringe), a rate that federal agencies recently approved for use by the applicant, most notably in January 2010 when the Department of Commerce awarded MBI a State Broadband Data and Development Grant. All personnel costs are based upon the actual hourly rates for each existing staff



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position or the projected rate for any new positions, plus an estimated 3% increase per year. A more detailed breakdown of the staff time and other charges is set forth in the following table.

Staff	%of effort	Months	Annual Salary	Total Cost
MBI Director	75%	2	140,000	17,500
MBI Deputy Director	50%	2	95,000	7,917
Construction Project Manager	80%	2	95,000	12,667
Compliance Staff	50%	2	97,500	8,125
Total Proposal Preparation Salaries				46,209
Fringe Benefits (35.23%)				16,279
Indirect Costs (76.02% of salaries and fringe)				47,504
Total Proposal Preparation Staff Costs				\$109,992

B. Professional and consulting fees of \$632,780 are included in this category. This consists of proposal preparation services performed by contractors and consulting firms, including assistance with network design and engineering, budgeting, mapping, sustainability modeling, legal advice, environmental due diligence, construction and procurement planning, and other required services to prepare the application and detailed project plan. The services were performed by various consulting firms and contractors between the period of the release of the NOFA and proposal submission. The budget is based upon actual fixed price contracts where applicable and an estimate of the number of hours worked and to be worked by non-fixed price contractors and consulting firms during the period and an estimate of the blended hourly rate of these contractors and consulting firms. We know the applicable hourly rates of these contractors and consulting firms, as they are specified in the contracts and work orders we have entered into with these firms; the estimate we are making relates to an estimated blended hourly rate

2. Compliance and Other Costs-Post Proposal Submission through End of Construction

A. Staff costs of \$628,424 are included in this category. These costs consist of (i) direct salaries related to the portions of time that the applicant's compliance staff are performing direct services related to all legal, federal and state compliance, as well as with all construction and procurement matters associated with the MassBroadband 123 project, (ii) fringe benefits and (iii) indirect corporate services costs based on the rates described above. All personnel costs are based upon the actual hourly rates for each existing staff position or the projected rate for any new positions, plus an estimated 3% increase per year. A more detailed breakdown of the staff time and other charges is set forth in the following table.

Staff	% of effort	Months	Annual Salary	Total Cost
Compliance Staff (Project Yr 0)	50%	6	98,963	24,741
Compliance Staff (Project Yr 1)	100%	12	101,178	101,178
Compliance Staff (Project Yr 2)	75%	12	104,214	78,160
Compliance Staff (Project Yr 3)	75%	9	106,541	59,929
Total Compliance Salaries				264,008
Fringe Benefits (35.23%)				93,010



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Indirect Costs (76.02% of salaries and fringe)	271,405
Total Compliance Staff Costs	\$ 628,424

B. Included in this category are Audit Services for A-133 Compliance Requirements budgeted at \$25,000 per year for the three year award period. This is based upon an estimate from MTC's audit firm, Deloitte and Touche. The total budget for this activity is \$75,000.

C. Included in this category are Legal Services for construction procurement, permitting, IRU and lease negotiation, and other required legal matters related to the project. The costs are budgeted to be \$425,000 over the three year period at an estimated blended rate of \$500 per hour for 850 hours. This blended rate is consistent with, and reflects, the rates charged by applicant's attorneys on similar matters pursuant to competitively procured legal services contracts.

- Provide detailed description, calculation, and basis of evaluation for each Cash Matching Funds source.

The cash matching for this category is based upon prorating the source of cash match {Massachusetts Broadband Institute (MBI), Commonwealth of Massachusetts, Executive Office of Public Safety and Security (EOPSS), or Commonwealth of Massachusetts, Information and Technology Division (ITD)} over total cash match for the project (not including the cash match portion attributable to the I-91 costs, which is handled separately in the Construction Category of this Budget Narrative) multiplied by the category total. For this category, the resulting amounts are:

Cash Source 1: MBI funds will be used for 22.6962% of this category, for a total of \$424,690

Cash Source 2: EOPSS funds will be used for 4.6401% of this category, for a total of \$86,826.

Cash Source 3: ITD funds will be used for 4.6401% of this category, for a total of \$86,826.

- Provide detailed description, calculation, and basis of evaluation for each In-Kind Matching Funds source.

None

2. Land, structure, rights-of-way, appraisals, etc. - \$0

3. Relocation expenses and payment - \$0



4. Architectural and engineering fees - \$9,317,023

- Provide description of estimated fees, rates, explanation of proposed services, and additional information as needed.

Architectural and engineering services will be provided by an architecture engineering firm procured through a competitive request for proposal process following the applicable Commonwealth of Massachusetts design and construction rules. Services to be procured include the detailed engineering, design build contractor, and Project Management/Construction Management.

Architectural and engineering fees are based on the staffing plan provided on the following page.

The staffing plan was developed by Jacobs Engineering Group Inc. Loaded hourly rates are based on actual average category rates for each of the engineering and design labor categories. These labor rates are consistent with the labor rates of architectural engineering firms in Massachusetts.

Level of effort estimates are based on route miles of the network, the network design and the number of community anchor institutions served. The engineering effort is based on the number of plan sheets (C-Size) required to depict the cable running line at 200:1 scale. This is a customary scaled and plan presentation for outside plant design.

Architectural and engineering services include the following:

ENGINEERING

- Network Engineering (\$142,836) – Development of final network engineering details and specifications for procurement documents, development of IP addressing schema and completion of network details coordinated with the network operator. The work includes development of the cable management plan working with the network operator that will integrate with a GIS based asset management system.
- Outside Plant Engineering (\$2,357,632)
 - Base Plan Development – An estimated 730 base plans will be prepared from Mass GIS photogrametry. Base plans will be prepared at 200:1 scale. Two hours of CAD time are estimated for the development of each plan sheet.
 - Permitting and Licensing – Completion of the environmental assessment and attainment of the finding of no significant impact; completion of all required environmental permits; and completion and submission of utility pole attachment licenses. Approximately 35,000 pole attachment licenses will be required.
 - Survey and field reseach - Work includes inventory of pole numbers; survey for placement transitions from aerial to underground, aerial to bridge attachment; entry to the major and local facility nodes; development of new pole line; geospatial data collection; environmental data collection and delineation; and other field data collection efforts.
 - Detailed Engineering – Completion of the engineering plans, construction details, specifications and estimate for construction procurement. The base plans provide the starting point for the preparation of the plans. Information obtained during the field research is placed on the plans. Site specific construction details are prepared. Tabulation of units is prepared. A complete plan set is prepared.



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WORK PLAN	PM								Engineering				Construction			Total Hours	Estimated Fee	Average Hourly Rate
	Project Principal	Program Manager	Project Scheduler/Supply Chain Manager	Safety Officer	Quality Assurance Manager	Engineering Manager	Senior Engineer	Engineer	Senior Designer	Designer/CADD	Construction Project Manager	Resident Engineer/Superintendent	Construction Inspector					
ENGINEERING																		
Network Engineering						140	40	528	216	212					1136	\$ 142,836	\$125.74	
OSP Engineering																		
Base Plan Development							120	4248		1460					1580	\$ 156,960	\$99.34	
Permitting and Licensing						672	1640	4248							6560	\$ 820,552	\$125.08	
Survey and field research						480	600	960		2880					4820	\$ 560,640	\$113.95	
Detailed Engineering						360	1080	3840		1920					7200	\$ 819,480	\$113.82	
Building (Inside Plant) Engineering																		
Base Plan Development						24		80		600					704	\$ 71,032	\$100.90	
Survey						24		64		504					592	\$ 60,104	\$101.53	
Site Acquisition							40	40							80	\$ 9,880	\$123.50	
Permitting						84	252	168							504	\$ 70,308	\$139.50	
Detailed Engineering						64	528	572		704					1868	\$ 215,700	\$115.47	
PROGRAM MANAGEMENT/CONSTRUCTION MANAGEMENT																		
Pre-Construction Activities																		
Construction Document Preparations (3 regional builds)						240	720								960	\$ 149,520	\$155.75	
Bid/Award Support Services						240	720								960	\$ 149,520	\$155.75	
Construction Activities																		
Construction Related Services (CRS)		4800													9600	\$ 1,584,000	\$165.00	
RFI Submission Reviews and Approvals						96	1760	960							2816	\$ 368,608	\$130.90	
Quality Assurance Program											1200				1200	\$ 180,000	\$150.00	
Safety Program											1580				1580	\$ 237,000	\$150.00	
TESTING																		
Network Elements								10,128							10128	\$ 1,083,696	\$107.00	
IT System Elements								2,784							2784	\$ 297,888	\$107.00	
Total	0	4,800	4,800	1,580	1,200	2,424	7,500	24,372	216	8,280	0	0	0	55,172	\$ 6,977,724	\$ 126.47		
Loaded Rate	\$225.00	\$105.00	\$105.00	\$150.00	\$150.00	\$203.00	\$140.00	\$107.00	\$148.00	\$96.00	\$205.00	\$158.00	\$100.00					



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- Building (Inside Plant) Engineering (\$427,024)
 - Base Plan Development – Plans are prepared for the rooms at 1 Federal Street and for a typical Community Anchor Institution hosting either a Major Centralized Facility node or a Local Centralized Facility Node.
 - Survey – Field survey will be performed of the 22 major and local centralized facility nodes to determine cable entry and inside construction requirements.
 - Site Acquisition – Completion of agreements for placing indoor equipment and outdoor equipment cabinets with the Community Anchor Institution hosting centralized and local facility nodes. These agreements will incorporate information from the survey and detailed engineering plans.
 - Detailed Engineering – Completion of the plans, construction details and typicals, specifications and engineers estimate of inside plant construction requirements. Four plan sheets are anticipated for each facility node. These sheets will include layout plan and details to include electrical service, rack layout, risers, quantity tabulations and other information as required to facilitate the construction of the inside plant.

PROGRAM MANAGEMENT / CONSTRUCTION MANAGEMENT

- Pre-Construction Activities (\$299,040)
 - Construction Document Preparations – A design build unit price contract is anticipated for the construction of the network. The work in this task represents the preparation of work release packages to the design build contractor. Packages will be released for construction as all permits and licenses are obtained. Three regional builds are anticipated and packages will be released within each region. These builds will be concurrent.
 - Bid/Award Support Services – This task includes the review of bid submissions for compliance with the detailed plans and specifications of the project. The work includes review of proposals submitted by design build contractors. In addition, once the contract is awarded there will be additional work packages issued to the design build contractor for pricing. This effort includes the review of the work package pricing for conformance with the design build agreement and its unit pricing.
- Construction Activities (\$2,369,608)
 - Construction Related Services (CRS) – This line item in the budget encompasses the PM/CM contract's project manager and associated project management activities to include project schedule maintenance, contracts management, invoice validation, document control; meetings and coordination, et al. This effort is estimated to require 2 full time equivalents (FTEs) over 30 months.
 - Response to Design/Build Contractor submitted RFIs, Submission Reviews and Approvals – Throughout the course of construction the design build contractor will submit to MBI requests for information (RFIs) to clarify the construction requirements and to address field conditions. The RFIs will be reviewed by project engineers and responses developed as required. This work item also includes the review of as-built drawing and other submissions by the design build contractor in the normal course of project construction and completion.
 - Quality Assurance Program – The work effort for the quality assurance program corresponds to the work of the quality manager who is responsible for auditing the project on a regular basis to check that the project plan developed by the PM/CM contractor is consistently



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followed, that the document management and control system is uniformly implemented and to ensure that the project is properly documented from detailed engineering plans to as-built drawings. The effort estimated for this work element is 0.25 FTEs over a 30 month period.

- o Safety Program – The work effort for the safety program corresponds to the effort of the project safety officer. The project safety officer is responsible for overseeing conformance of the project to the safety plan that is part of the project management plan. The safety officer has the authorization to stop work in the event that safety violations are identified and not immediately remedied. The effort estimated for this work element is 0.33 FTEs over a 30 month period.
- Construction Engineering and Inspection (CEI) - Field Services (\$2,218,560)
 - o The CEI effort corresponds to one full time Resident Engineer/Superintendent and four (4) full time construction inspectors. The work of the CEI program is to inspect and validate the construction against the detailed engineering plans and project specifications. Construction inspectors will be assigned to spot inspect multiple design build contractor crews working concurrently. The records maintained by the inspectors will be used to validate invoices submitted by the design build contractor and to provide field information to the project scheduler regarding work completed on a daily basis.

TESTING

- Network Elements (\$1,083,696) – The PM/CM contractor will review and approve test plans prepared and submitted by the design build contractor. The PM/CM contractor oversees all tests and validates that the test procedures were properly implemented and that the test results are correctly recorded. Fiber optic cables will be tested on the reel as well as after installation, splicing and termination. Optical Time Domain Reflectometer (OTDR) and power testing of 300 links estimated.
- IT System Elements (\$297,888) - PM/CM contractor will review and approve test plans prepared by the design build contractor and oversee all tests. PM/CM contractor will oversee all network equipment tests to include factor acceptance test/certification, stand alone installation test; system test and network test as a minimum. These tests are conducted at major and local central facility nodes and at Community Anchor Institutions. Four hours per site installation is assumed for testing.

OTHER STAFFING AND SERVICES

Also included in this category are the staffing, services, and consulting fees incurred by the Massachusetts Broadband Institute for the MassBroadband 123 program during the post submission phase which are not included in the services described in this category or the work plan above.

MBI Staff costs of \$1,788,288 are included in this category. These costs consist of direct salaries related to the portions of time that the applicant's staff are performing direct services related to post submission activities for the MassBroadband 123 project, and fringe benefits and indirect costs based on the rates described in Section 1 of this Budget Narrative. All personnel costs are based upon the actual hourly rates for each existing staff position or the projected rate for any new positions, plus an estimated 3% increase per year. A more detailed breakdown of the staff time and other charges is set forth in the following table.

Staff	Year	%of effort	Months	Annual Salary	Total Cost
MBI Director	0	50%	6	142,100	35,525
MBI Director	1	30%	12	145,282	43,584
MBI Director	2	20%	12	149,640	29,928
MBI Director	3	20%	9	152,983	22,947
MBI Deputy Director	0	50%	6	96,425	24,106
Construction Project Manager	0	80%	6	96,425	38,570



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Construction Project Manager	1	100%	12	98,584	98,584
Construction Project Manager	2	100%	12	101,541	101,541
Construction Project Manager	3	100%	9	103,810	77,857
Clerk of the Works	1	100%	12	101,178	101,178
Clerk of the Works	2	100%	12	104,213	104,213
Clerk of the Works	3	92%	9	106,541	73,246
Total Salaries					751,281
Fringe Benefits (35.23%)					264,676
Indirect Costs (76.02% of salaries and fringe)					772,331
Total Post-Submission Staff Costs					\$1,788,288

Other Professional and consulting services fees of \$551,010 are included in this category. This consists of services to be performed by contractors and consulting firms, including assistance with network engineering, environmental due diligence, construction and procurement planning, and other required services between the period of proposal submission and through the construction period as needed. These services also include initial field survey efforts, environmental assessments and compliance, as well as negotiations with pole owners for access. The service area will require negotiations with the incumbent local exchange carrier (ILEC) and 2 utilities. There will also have to be agreements negotiated with nine municipal electric companies. All consulting cost categories are inclusive of allowable expenses which will be billed through to the project including project management and field offices and telecommunications, gas, tolls, parking and other miscellaneous expenses. The budget is based upon the estimated hourly rates based upon similar services competitively procured by the applicant in the past and the estimated number of hours for each of the consultants procured/to be procured.

- Provide detailed description, calculation, and basis of evaluation for each Cash Matching Funds source.

The cash matching for this category is based upon prorating the source of cash match (MBI, EOPSS, or ITD) over total cash match for the project (not including the cash match portion attributable to the I-91 costs, which is handled separately in the Construction Category of this Budget Narrative) multiplied by the category total. For this category, the resulting amounts are:

Cash Source 1: MBI funds will be used for 22.6962% of this category, for a total of \$2,114,614

Cash Source 2: EOPSS funds will be used for 4.6401% of this category, for a total of \$432,319.

Cash Source 3: ITD funds will be used for 4.6401% of this category, for a total of \$432,319.

- Provide detailed description, calculation, and basis of evaluation for each In-Kind Matching Funds source.

None

5. Other architectural and engineering fees - \$0



6. Project inspection fees - \$2,218,560

- Provide description of estimated fees, rates, explanation of proposed services, and additional information as needed.

This work element incorporates the Construction Engineering and Inspection line item from the Staff Plan developed by Jacobs Engineering Group Inc. The work involved includes the routine inspection of the construction to assure compliance with the project detailed engineering plans and project specifications. The work effort includes a Resident Engineer over a 27 month period and four Inspectors over a period of 24 months. Hourly labor rates are based upon prevailing wage.

Level of effort and fee estimate are developed as follows

WORK PLAN	Construction			Total Hours	Estimated Fee	Average Hourly Rate
	Construction Project Manager	Resident Engineer/ Superintendent	Construction Inspector			
Construction Engineering and Inspection (CEI) - Field		4320	15360	19680	\$ 2,218,560	\$112.73
Total	0	4,320	15,360	19,680	\$ 2,218,560	\$ 112.73
	Loaded Rate	\$205.00	\$158.00	\$100.00		

- Provide detailed description, calculation, and basis of evaluation for each Cash Matching Funds source.

The cash matching for this category is based upon prorating the source of cash match (MBI, EOPSS, or ITD) over total cash match for the project (not including the cash match portion attributable to the I-91 costs, which is handled separately in the Construction Category of this Budget Narrative) multiplied by the category total. For this category, the resulting amounts are:

Cash Source 1: MBI funds will be used for 22.6962% of this category, for a total of \$503,528

Cash Source 2: EOPSS funds will be used for 4.6401% of this category, for a total of \$102,944.

Cash Source 3: ITD funds will be used for 4.6401% of this category, for a total of \$102,944.

- Provide detailed description, calculation, and basis of evaluation for each In-Kind Matching Funds source.

None

7. Site work - \$0



8. Demolition and removal - \$0

9. Construction - \$51,193,858

- Provide description of estimated fees, rates, explanation of proposed services, state whether the work is being completed by the applicant or an outside contractor, and additional information as needed.

MBI anticipates that the construction work will be executed by a Design Build Contractor. Procurement of the contractor will be based upon applicable Massachusetts and applicant procurement regulations.

Construction costs are summarized as follows:

Construction Item	Estimated Cost
<u>Outside Plant Construction</u>	\$ 50,137,468
Cables - Includes material, make ready, police details, and installation labor	\$ 38,466,713
Conduit	\$ 1,041,360
Poles and Attachments	\$ 3,819,840
Other – Includes splice cases, butt splices, fiber terminations and panels, handholes and manholes, and CAI drop splices	\$ 2,683,980
IRU Purchase (NEREN and UMass MITI)	\$ 4,125,575
<u>Building (Inside Plant Construction)</u>	\$ 1,056,390

Development of the construction cost estimate followed a build-up methodology that included the development of unit prices for materials, make ready work, police details and installation labor.

Unit costs for materials was based on material costs quotes received from vendors and local area contractors as referenced in the Reasonableness column on the Detailed Budget. When materials quotes were not available, similar project bid information was used from the Massachusetts Department of Transportation's I-91 ITS Design Build project that is constructing a portion of the MassBroadband 123 network and from other similar telecommunications projects recently bid in Vermont, New Hampshire and Maine.

Cable materials costs are as follows:

<u>Cable Type</u>	<u>Cost per ft.</u>
288 SM ADSS Fiber	\$2.27772
144 SM ADSS Fiber	\$1.3778



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96 SM ADSS Fiber	\$1.0004
48 SM ADSS Fiber	\$0.6862
12 SM ADSS Fiber	\$0.5641

Installation and other cable costs were developed as follows:

<u>Cable Installation Component</u>	<u>Cost per ft.</u>
Make Ready Cost	\$2.63
Site Survey	\$0.35
Installation Labor (Aerial)	\$1.69
Installation Labor (Conduit)	\$2.19
Yard, Storage, Security, Trailer	\$0.0443

Make ready work is conducted by the local utilities and charged back to MBI based on the licence application submitted by MBI to the utility. The work includes development of the installation location on the pole and may require the replacement of the pole when the pole condition is adequate to support additional cable. Make ready costs were developed based on an actual aerial fiber optic installation of a 53 mile network in western Massachusetts for Five Colleges Net, LLC as well as other relevant quotes and benchmarks.

Site survey costs work is performed by the design build contractor in preparation for the installation work and verification of the detailed engineering plans. This unit cost was verified by regional contractors.

Installation labor costs are based on prevailing wage for Journeyman Lineman of \$54.66 per hour and Groundsman / Truckdriver of \$41.55 effective Aug 2008. This rate is inflated \$2.00 per year from Union rate tables based on the current labor agreement. Included in the labor costs is also the cost of police details required by the Commonwealth of Massachusetts at \$50.00 per hour and the cost of the lineman truck at \$50 per hour. Crews include the Lineman and Groundsman/Truck Driver and have a productivity rate of 2,000 ft. per day.

Conduit installation costs includes rod and roping of the existing conduits to validate the feasibility for cable installation.

The cost of the contractor's yard includes storage security and a trailer to be located with the service area. Total cost of the yard and trailer is estimated to be \$250,000 over the construction period. The cost was developed from the yard costs for a similar project in Maine for the Department of Information Technology.

The resulting aggregate cost information was validated with personnel from internet service providers with physical assets in New England and regional contractors.

Quantities of materials were developed from a fully designed cable route. This route was field viewed to validate the availability and suitability of poles for aerial installation, the requirement for new poles, the availability of existing conduit, and the requirement for new conduit. The objective of this design effort was to minimize risk that new pole or conduit installation would be required and to more accurately forecast the costs of fiber deployment. In addition, the network design effort included the



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determination of cable strand counts by route segment to ensure that there would be adequate fiber strands for the services sold to CAIs and last mile providers based on customer up-take assumptions from the sustainability model.

The results of this design effort is as follows:

Installation Type	Fiber Optic Cable Route Miles by Type (No. of Strands)						Total	Percent
	12	48	72	96	144	288		
Existing Pole	8.53	239.55	27.99	44.33	333.34	214.88	868.62	85.79%
New Pole	0	1.32	0.75	0.65	5.02	0.71	8.45	0.83%
New Conduit	0	0	0	0	0	0.66	0.66	0.07%
Existing Conduit	0	1.09	0	3.43	3.88	11.64	20.04	1.98%
I-91 Build Post 1/10/10						36.58	36.58	3.61%
Drops to CAIs	78.10						78.10	7.71%
Total	86.63	241.96	28.74	48.41	342.24	264.47	1012.45	100.00%
Percentage	8.6%	23.9%	2.8%	4.8%	33.8%	26.1%	100.0%	

IRU costs were developed differently for NEREN and UMass MITI. NEREN provided MBI with a price quote for 15 years, included in their letter. UMass MITI currently has a current five year lease for an IRU with rights to renew. MBI plans to work with UMass MITI to convert this into a 19 year IRU for MBI's use, with UMass MITI becoming an MBI customer for that route. The cost was estimated based on the NPV of the UMass MITI contract with the fiber owner.

- Provide detailed description, calculation, and basis of evaluation for each Cash Matching Funds source.

The cash matching for this category is calculated in two steps. First, the cash matching for this category includes \$1,725,691 of funds from MBI to cover 100% of the costs budgeted to complete the 55 mile I-91 fiber network that are expected to be incurred from the date of the NOFA through completion of the project. The second calculation involves prorating the source of cash match (MBI, EOPSS, or ITD) over total cash match for the project (not including the MBI specific cash match portion attributable to the I-91 costs referred to in the preceding sentence) multiplied by the category total (again, not including all I-91 related costs which are applied as matching funds separately). For this category, the resulting amounts are:

Cash Source 1: \$1,725,691 of MBI funds will be used as matching for 100% of the costs for the I-91 55 mile fiber network incurred from the date of the NOFA through completion. In addition, \$10,521,227 of MBI funds will be used for 22.6962% of the remaining costs in this category. The total of these two amounts of MBI cash match for this category is \$12,246,918.

Cash Source 2: EOPSS funds will be used for 4.6401% of this category, for a total of \$2,151,019.

Cash Source 3: ITD funds will be used for 4.6401% of this category, for a total of \$2,151,019.

- Provide detailed description, calculation, and basis of evaluation for each In-Kind Matching Funds source.



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In-Kind Source 1: MBI will provide a total in-kind matching funds related to the partial completion of the I-91 project of \$3,111,353. MBI had incurred costs prior to the date of the NOFA release for construction of 18.9 miles of the 55 mile I-91 fiber network that will become part of the MassBroadband 123 project once it completed. The 55 miles of fiber and conduit installed in the I-91 project will be a major component of the proposed project and therefore the associated costs incurred prior to the release of the NOFA are being considered in-kind match provided from the proceeds of state bond funds allocated to MBI. The costs included in the in-kind match are the costs associated with installing conduit and approximately 18.9 miles of fiber plus the costs associated with engineering, field review, and construction oversight.

10. Equipment - \$ 7,044,808

- Provide a list of equipment in the form of a table with description, number of units, unit cost, state whether it is being purchased or leased, and additional information as needed.

Equipment costs were developed by receiving quotations from multiple vendors, using the state discount off manufacturer list prices. Fully detailed bill of materials are available for each item described below. Since MBI is a state entity, competitive procurement and state "buying power" will yield favorable discounts.

Network equipment can be grouped into three categories that include:

- Switching for Carrier Ethernet;
- Transport – DWDM;
- Transport – SONET;
- Access – SONET; and
- Customer Premise Equipment

Equipment costs were developed by receiving quotations from multiple vendors, using the existing state discount off manufacturer list prices. Fully detailed bill of materials are available for each item described below.

All equipment is being purchased. Costs shown below include installation services.

Switching:

Carrier Ethernet (EPL and EVPL) is the predominant service delivery methodology for MassBroadband 123. Ethernet switches are located at each Centralized Facility node with one or more 10 Gigabit uplinks and a sufficient number of 1 Gigabit ports for delivering service to the region served by that node. The switches are sized to accommodate some growth, but have been "right" sized for the region they serve. All switches are carrier class with redundant power and high reliability.

Following is a breakdown of the ports counts and costs for the Carrier Ethernet switches at each node:

ETHERNET SWITCHING	SWITCH	ETHERNET
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Broadband Technology Opportunities Program (BTOP)

Node	10 Gig	1G Optical	CLASSIFICATION	SWITCH COST
SPRINGFIELD	4	240	Core	\$ 204,989.41
GREENFIELD	2	192	Core	\$ 204,989.41
NORTHAMPTON	2	144	Core	\$ 204,989.41
PITTSFIELD	2	144	Core	\$ 204,989.41
HOLYOKE	2	96	Large	\$ 135,805.12
NORTH ADAMS	2	96	Large	\$ 135,805.12
GREAT BARRINGTON	1	48	Large	\$ 135,805.12
ORANGE	2	96	Large	\$ 135,805.12
WESTFIELD	2	96	Large	\$ 135,805.12
BELCHERTOWN	1	48	Large	\$ 135,805.12
LEE	1	48	Large	\$ 135,805.12
SANDISFIELD	1	48	Large	\$ 135,805.12
CHARLEMONT	1	24	Small	\$ 36,317.32
HINSDALE	1	24	Small	\$ 36,317.32
WESTMINSTER	1	24	Small	\$ 36,317.32
PLAINFIELD	1	24	Small	\$ 36,317.32
GOSHEN	1	24	Small	\$ 36,317.32
NEW BRAINTREE	1	24	Small	\$ 36,317.32
RUSSELL	1	24	Small	\$ 36,317.32
BECKET	1	24	Small	\$ 36,317.32
AYER	1	24	Small	\$ 36,317.32
SAVOY	1	24	Small	\$ 36,317.32
STURBRIDGE	1	24	Small	\$ 36,317.32
BOSTON	4	48	Large	\$ 135,805.12
TOTAL				\$ 2,441,694.24

Transport – DWDM

Reconfigurable Optical Add-Drop Multiplexers (ROADM) are used at strategic locations throughout the network to deliver DWDM capacity over wavelengths where needed. Each ROADM can support up to 40 unique 10 Gigabit wavelengths (lambdas), but will initially be configured to support two wavelengths. ROADMs are also specified in 2 Degree or 3 Degree, depending on where they are located in the network. These devices are highly reliable, highly scalable, and adequate to deliver the services required by the CAIs and last mile ISPs. As with all components an effort has been made to “value engineer” the appropriate components for the specific site and requirements.

CORE NODES	ROADM		ROADM
Node	Y/N	Degrees	COST
SPRINGFIELD	Y	2	\$ 154,789.54
GREENFIELD	Y	3	\$ 258,761.30
NORTHAMPTON	Y	2	\$ 154,789.54



Broadband Technology Opportunities Program (BTOP)

PITTSFIELD	Y	2	\$ 154,789.54
HOLYOKE	Y	2	\$ 154,789.54
NORTH ADAMS	N	-	
GREAT BARRINGTON	N	-	
ORANGE	N	-	
WESTFIELD	N	-	
BELCHERTOWN	N	-	
LEE	N	-	
SANDISFIELD	N	-	
CHARLEMONT	N	-	
HINSDALE	N	-	
WESTMINSTER	Y	2	\$ 154,789.54
PLAINFIELD	N	-	
GOSHEN	N	-	
NEW BRAINTREE	N	-	
RUSSELL	N	-	
BECKET	N	-	
AYER	Y	3	\$ 258,761.30
SAVOY	N	-	
STURBRIDGE	N	-	
BOSTON	Y	3	\$ 258,761.30
TOTAL			\$ 1,550,231.60

An additional 3 ROADMs are required to “light” the UMass MITI IRU, connecting the MassBroadband 123 core network from Ayer to One Summer Street carrier hotel in Boston.

MITI IRU	ROADM		ROADM
Node	Y/N	Degrees	COST
UMass MITI IRU ROADM 1	Y	2	\$ 154,789.54
UMass MITI IRU ROADM 2	Y	2	\$ 154,789.54
UMass MITI IRU ROADM 3	Y	2	\$ 154,789.54
TOTAL			\$ 464,368.62

Line Card and Optics upgrades are required to “light” the NEREN IRU, connecting back to Boston via a diverse path. The costs of these cards is as follows

NEREN IRU			
Description	QTY	UNIT	COST
10 Gigabit Line Card with 2x DWDM Lasers	2	\$ 52,326.00	\$ 104,652.00
TOTAL			\$ 104,652.00



Transport – SONET

In addition to supporting DWDM wavelengths and native Ethernet, the MassBroadband 123 network needs to support full SONET capability, with a focus on offering TDM (DS-1, DS-3, OC-3) and Ethernet over SONET for bandwidth critical applications. The principle driver for this need are timing sensitive Public Safety Radio systems and PBX trunking.

Each node has been configured with a specific Multiservice Provisioning Platform (MSPP) to provide the proper port requirements for the area served by that node. The MSPP's are interconnected on an OC-48 ring, and can offer OC-3 or OC-12 out to a mini MSPP for network Access

Node	SONET PORTS		SONET
	EoSONET	SONET	MSPP COST
SPRINGFIELD	16	8	\$ 83,272.21
GREENFIELD	12	8	\$ 86,134.75
NORTHAMPTON	8	8	\$ 66,287.81
PITTSFIELD	8	8	\$ 60,362.66
HOLYOKE	8	4	\$ 57,654.02
NORTH ADAMS	4	4	\$ 55,816.45
GREAT BARRINGTON	2	4	\$ 42,556.43
ORANGE	2	4	\$ 54,591.41
WESTFIELD	4	4	\$ 55,816.45
BELCHERTOWN	4	4	\$ 55,816.45
LEE	4	4	\$ 55,816.45
SANDISFIELD	4	4	\$ 55,816.45
CHARLEMONT	4	4	\$ 55,816.45
HINSDALE	4	4	\$ 55,816.45
WESTMINSTER	6	4	\$ 57,654.02
PLAINFIELD	2	4	\$ 42,556.43
GOSHEN	2	4	\$ 42,556.43
NEW BRAintree	8	4	\$ 58,879.06
RUSSELL	2	4	\$ 42,556.43
BECKET	2	4	\$ 42,556.43
AYER	4	4	\$ 55,816.45
SAVOY	2	2	\$ 42,556.43
STURBRIDGE	2	1	\$ 41,202.11
BOSTON	16	8	\$ 79,209.25
AVERAGE MSPP			\$ 56,129.90
TOTAL			\$ 1,347,117.48



Broadband Technology Opportunities Program (BTOP)

The MSPP's are "right sized" for each node, based on the number of SONET ports required and the number of Ethernet ports required. The Detailed Project Budget (18.9) uses an average cost per node. The cost difference between nodes is relatively minimal, despite several different port configurations. A detailed configuration / bill of materials has been developed for each MSPP and is available for review.

Access – SONET

MiniMSPP's have been specified for SONET access at CAI 41 locations. Each of the carrier class mini MSPP's support multiple DS-3's and DS-1's.

Mini-MSPP

Description	QTY	UNIT	COST
SONET mini MSPP DS-3 and DS-1	41	\$ 15,894.18	\$ 651,661.23
TOTAL			\$ 651,661.23

Customer Premise Equipment (CPE) (\$485,083)

There are 1392 community anchor institutions that are served by 1064 drops from the network into the customer premise. Multit-customer drops are terminated at single carrier Ethernet switch configured with the number of ports required to meet site requirements. There are 201 multi-customer drops Single customer drops are terminated at a managed media converter providing an Ethernet port. There are 863 single customer drops.

CPE

Description	QTY	UNIT	COST
CAI Carrier Ethernet Switch for multi-tenant CAI Site locations	201	\$ 15,516.00	\$ 304,716.00
CAI Media Converter Optic to RJ45 for single tenant CAI Site Locations	863	\$ 209.00	\$ 180,367.00
TOTAL			\$ 485,083.00

- Provide detailed description, calculation, and basis of evaluation for each Cash Matching Funds source.

The cash matching for this category is based upon prorating the source of cash match (MBI, EOPSS, or ITD) over total cash match for the project (not including the cash match portion attributable to the I-91 costs, which is handled separately in the Construction Category of this Budget Narrative) multiplied by the category total. For this category, the resulting amounts are:

Cash Source 1: MBI funds will be used for 22.6962% of this category, for a total of \$1,598,902.

Cash Source 2: EOPSS funds will be used for 4.6401% of this category, for a total of \$326,889.

Cash Source 3: ITD funds will be used for 4.6401% of this category, for a total of \$326,889.

- Provide detailed description, calculation, and basis of evaluation for each In-Kind Matching Funds source.



Broadband Technology Opportunities Program (BTOP)

None

11. Miscellaneous - \$0

13. Contingencies - \$0

15. Project (program) income - \$0

- The value for this line-item on the SF-424C is \$0. Please do not provide an estimated Project (program income) on the SF-424C.

Massachusetts Technology Park Corporation
By: *Cliff B. Adams*
CFO

General Budget Overview

Budget	Federal Funding Request	Matching Funds (Cash)	Matching Funds (In-Kind)	Budget TOTAL	Last Mile Allocation	Middle Mile Allocation	Allocated TOTAL
Network & Access Equipment (switching, routing, transport, access)	\$4,462,158	\$2,097,567	\$0	\$6,559,725		\$6,559,725	\$6,559,725
Outside Plant (cables, conduits, ducts, poles, towers, repeaters, etc.)	\$30,814,956	\$16,211,159	\$3,111,353	\$50,137,468		\$50,137,468	\$50,137,468
Buildings and Land (new construction, improvements, renovations, lease)	\$718,594	\$337,796	\$0	\$1,056,390		\$1,056,390	\$1,056,390
Customer Premise Equipment (modems, set-top boxes, inside wiring, etc.)	\$329,971	\$155,112	\$0	\$485,083		\$485,083	\$485,083
Billing and Operational Support Systems (IT systems, software, etc.)	\$0	\$0	\$0	\$0		\$0	\$0
Operating Equipment (vehicles, office equipment, other)	\$0	\$0	\$0	\$0		\$0	\$0
Engineering/Professional Services (engineering design, project management, consulting, etc.)	\$7,247,228	\$3,406,771	\$0	\$10,653,999		\$10,653,999	\$10,653,999
Testing (network elements, IT system elements, etc.)	\$939,802	\$441,782	\$0	\$1,381,584		\$1,381,584	\$1,381,584
Site Preparation	\$0	\$0	\$0	\$0		\$0	\$0
Other	\$932,736	\$438,460	\$0	\$1,371,195		\$1,371,195	\$1,371,195
TOTAL BROADBAND SYSTEM:	\$45,445,445	\$23,088,647	\$3,111,353	\$71,645,445	\$0	\$71,645,445	\$71,645,445
Cost Share Percentage:	63.43%	32.23%	4.34%				

Massachusetts Technology Park Corporation
 By: *Cliff R. Adams*
 CFO

DETAIL OF PROJECT COSTS

PLEASE COMPLETE THE TABLE BELOW FOR THE DIFFERENT CATEGORIES OF EQUIPMENT THAT WILL BE REQUIRED FOR COMPLETING THE PROJECT. EACH CATEGORY SHOULD BE BROKEN DOWN TO THE APPROPRIATE LEVEL FOR IDENTIFYING UNIT COST

SERVICE AREA or COMMON NETWORK FACILITIES:		Match (Cash/In kind)	Cash Match Percentage	Unit Cost	No. of Units	Total Cost	Last Mile Allocation	Middle Mile Allocation	Allocated Total	SF-424C Budget Category	Support of Reasonableness
NETWORK & ACCESS EQUIPMENT						\$6,559,725	\$0	\$6,559,725	\$6,559,725		
Switching	Carrier Ethernet - 10 Gbps and 1 Gbps (Major Centralized Facility Node)	Cash Match	31.98%	\$204,989.41	4	\$819,958		\$819,958	\$819,958	10. Equipment	The MassBroadband 123 fiber optic network is designed to be robust and resilient. With 24 centralized facility nodes for housing equipment, the network is designed to provide services ranging from 50 Mbps Ethernet to 10 Gbps WDM services as well as SONET services at OC-48 data rates.
	Carrier Ethernet - 10 Gbps and 1 Gbps (Local Centralized Facility Node - Large)	Cash Match	31.98%	\$135,805.12	9	\$1,222,246		\$1,222,246	\$1,222,246	10. Equipment	
	Carrier Ethernet - 10 Gbps and 1 Gbps (Local Centralized Facility Node - Small)	Cash Match	31.98%	\$36,317.32	11	\$399,491		\$399,491	\$399,491	10. Equipment	
Routing											Equipment quotes based on the proposed network design were provided by multiple vendors and includes state discounts.
Transport	ROADM - 10 Gbps - 2 Degree	Cash Match	31.98%	\$154,789.54	5	\$773,948		\$773,948	\$773,948	10. Equipment	Quotes include equipment cost, installation, configuring, testing and commissioning.
	ROADM - 10 Gbps - 3 Degree	Cash Match	31.98%	\$258,761.30	3	\$776,284		\$776,284	\$776,284	10. Equipment	
	SONET MSPP OC-48	Cash Match	31.98%	\$56,129.90	7	\$392,909		\$392,909	\$392,909	10. Equipment	MBI is an entity of the Commonwealth of Massachusetts and subject to rigorous competitive procurement processes.
	SONET MSPP OC-48	Cash Match	31.98%	\$56,129.90	17	\$954,208		\$954,208	\$954,208	10. Equipment	
	ROADM - 10 Gbps - 2 Degree to Support UMass MITI IRU	Cash Match	31.98%	\$154,789.54	3	\$464,369		\$464,369	\$464,369	10. Equipment	
	LINE CARD and OPTICS Upgrade to Support NEREN IRU	Cash Match	31.98%	\$52,326.00	2	\$104,652		\$104,652	\$104,652	10. Equipment	
Access	SONET mini MSPP	Cash Match	31.98%	\$15,894.18	41	\$651,661		\$651,661	\$651,661	10. Equipment	
Other											
OUTSIDE PLANT						\$50,137,468	\$0	\$50,137,468	\$50,137,468		
Cables (includes material, make ready, police details, and installation labor)	288 SM Fiber ADSS	Cash Match	31.98%	\$6.86	1,340,982	\$9,196,480		\$9,196,480	\$9,196,480	9. Construction	The MBI fiber optic cable will be installed primarily on existing utility poles in the public right of way. All cable costs include material, make ready, police escorts (details), and installation labor. Cable quantities and types were developed based on a complete field survey of all routes.
	144 SM Fiber ADSS	Cash Match	31.98%	\$6.06	1,987,725	\$12,049,553		\$12,049,553	\$12,049,553	9. Construction	

	96 SM Fiber ADSS	Cash Match	31.98%	\$5.60	448,163	\$2,510,797		\$2,510,797	\$2,510,797	9. Construction	Unit prices for cable were developed and confirmed through the use of vendor quotes. Unit costs for fiber installation were developed and confirmed by three independent contractors with recent experience constructing aerial cable networks in western Massachusetts.
	48 SM Fiber ADSS	Cash Match	31.98%	\$5.39	1,405,252	\$7,574,542		\$7,574,542	\$7,574,542	9. Construction	Labor was calculated using prevailing wage rates and production rates of 2,000 ft per day per crew. The outside plant design includes 10% slack and slack loops (snow shoes) placed on average every 1/4 mile throughout the service area.
	12 SM Fiber ADSS	Cash Match	31.98%	\$5.06	454,601	\$2,298,297		\$2,298,297	\$2,298,297	9. Construction	
	I-91 Project Infrastructure	Cash Match	100.00%	\$8.93	193,142	\$1,725,691		\$1,725,691	\$1,725,691	9. Construction	Costs to complete the I-91 Fiber Build (36.6 miles of fiber) includes construction costs incurred after the release of the NOFA for BTOP Round 2.
	I-91 Project Infrastructure	In-kind Match		\$3,111,353	1	\$3,111,353		\$3,111,353	\$3,111,353	9. Construction	Actual costs to begin the I-91 Fiber Build (18.9 miles of fiber) incurred prior to the release of the NOFA for BTOP Round 2. Initial build includes conduit, handholes, etc.
Conduits (Includes material, make ready, police details, and installation labor)	1.5" FRE or HDPE Direct Burial	Cash Match	31.98%	\$20.40	40,508	\$826,370		\$826,370	\$826,370	9. Construction	Field surveys determined some locations where it is necessary to place the MBI cable underground. The majority of underground cable placement is in existing conduit between the POP at One Federal Street, Springfield, MA and I-91 to the west. Additional cable in conduit is required for bridge attachments and to get between the pole line and the CAI building entrances. This has been kept to a minimum and confirmed during the field survey.
	4" RGS / RMC with 2 - 1.5" HDPE Inner Duct	Cash Match	31.98%	\$33.00	3,485	\$114,990		\$114,990	\$114,990	9. Construction	Bridge attachments, field verified.
	HDD (4" with inner duct pull back)										Horizontal direction drill for crossings as needed. Included in cable installation cost above

	Existing Conduit Break Outs	Cash Match	31.98%	\$2,000.00	50	\$100,000		\$100,000	\$100,000	9. Construction	Required for transitions between aerial and underground installations. Number of transitions is based on field survey. Unit price is based on similar builds in western Massachusetts
Ducts											
Poles (Includes material, pole details, and installation labor)	New 35' Pole (CL 5-35)	Cash Match	31.98%	\$2,110.00	315	\$664,650		\$664,650	\$664,650	9. Construction	The field survey confirmed locations where existing poles are not available. These are new, class 5, 35 foot poles spaced at 142 ft. Material and labor unit costs were validated by local contractors.
	Cable attachment hardware and snow shoes for slack coils	Cash Match	31.98%	\$90.00	35,058	\$3,155,190		\$3,155,190	\$3,155,190	9. Construction	Material quote. Snow shoe spacing averages 1/4 mi across the entire network. Spacing will be closer as CAI, business and resident density increases.
Towers											None required
Repeaters											None required
Other	Splice Case	Cash Match	31.98%	\$430	1,404	\$603,720		\$603,720	\$603,720	9. Construction	Assumes 17,000 ft cable spools plus additional splice cases for drops to CAIs. Quotes received
	Butt Splices	Cash Match	31.98%	\$20	50,940	\$1,018,800		\$1,018,800	\$1,018,800	9. Construction	Quoted rate is \$20 per splice which includes set-up costs of \$250 per splice. All strands are spliced.
	Terminations (Fiber Strands)	Cash Match	31.98%	\$15	25,840	\$387,600		\$387,600	\$387,600	9. Construction	Quoted rate is \$15 per termination
	Fiber Termination Panels	Cash Match	31.98%	\$2,250	46	\$103,500		\$103,500	\$103,500	9. Construction	Material quote
	Handholes, manholes and junction boxes	Cash Match	31.98%	\$2,100	150	\$315,000		\$315,000	\$315,000	9. Construction	Located at breakouts, transitions, CAI Nodes, cabinets. Quoted material price.
	CAI Splices	Cash Match	31.98%	\$20	12,768	\$255,360		\$255,360	\$255,360	9. Construction	1064 drops (12 strand cable) to 1392 CAIs. Splice quote received.
	NEREN 15 Year IRU	Cash Match	31.98%	\$1,350,000	1	\$1,350,000		\$1,350,000	\$1,350,000	9. Construction	Quote from NEREN.
UMass MITI 19 Year IRU	Cash Match	31.98%	\$2,775,575	1	\$2,775,575		\$2,775,575	\$2,775,575	9. Construction	Fair market value estimate based on costs provided by UMass MITI.	

SERVICE AREA or COMMON NETWORK FACILITIES:			Unit Cost	No. of Units	Total Cost	Last Mile Allocation	Middle Mile Allocation	Allocated Total	SF-424C Budget Category	Support of Reasonableness	
OPERATING EQUIPMENT					\$0	\$0	\$0	\$0			
Vehicles											
Office Equipment / Furniture											
Other											
PROFESSIONAL SERVICES					\$10,653,999	\$10,653,999	\$10,653,999				
Engineering Design	Network Design										
	Detailed Engineering	Cash Match	31.98%	\$126	1,136	\$142,836	\$142,836	\$142,836	4. Architectural and engr.	Work includes development of specifications for procurement documents, development of IP addressing schema and completion of network details coordinated with the RTNO.	
	As built (by Design Build Contractor)										Staffing plan and labor rates provided in Budget Narrative
	Outside Plant Engineering (OSP)										
	Base Plan Development	Cash Match	31.98%	\$99.34	1580	\$156,960	\$156,960	\$156,960	4. Architectural and engr.	Based on 200:1 scale plans for cable running line and two running lines per sheet. 730 base plans are estimated. 2 hrs CAD time per sheet	
	Permitting and Licensing	Cash Match	31.98%	\$125.08	6,560	\$820,552	\$820,552	\$820,552	4. Architectural and engr.	Work includes environmental permitting; right of way acquisition for new pole lines, and pole licensing. 2.3 FTE for 18 months	
	Survey and field research	Cash Match	31.98%	\$113.95	4,920	\$560,640	\$560,640	\$560,640	4. Architectural and engr.	Work includes inventory of pole numbers; survey for placement transitions from aerial to underground, aerial to local facility nodes; development of new pole line; geospatial data collection; environmental data collection and other field data collection efforts. 2.3 FTE over 1 year.	
	Detailed Engineering	Cash Match	31.98%	\$113.82	7,200	\$819,480	\$819,480	\$819,480	4. Architectural and engr.	3.75 FTE full time over 12 months to complete and issue plans and develop specifications for design build procurement.	
	As built										As-Built drawings will be prepared by Design Build Contractor and included in OSP costs
	Building (Inside Plant Design)										Staffing plan and labor rates provided in Budget Narrative
	Base Plan Development	Cash Match	31.98%	\$100.90	704	\$71,032	\$71,032	\$71,032	4. Architectural and engr.	Based on 24 sites, 4 sheets per site, 5 hrs per sheet plus quality check	
	Survey	Cash Match	31.98%	\$101.53	592	\$60,104	\$60,104	\$60,104	4. Architectural and engr.	Based on 24 sites, 2 men, 8 hrs ea site plus site stake-out for cable entry and cabinet placement	
	Site Acquisition	Cash Match	31.98%	\$123.50	80	\$9,880	\$9,880	\$9,880	4. Architectural and engr.	Agreement development for placing equipment cabinets using detailed engineering plans	
	Permitting	Cash Match	31.98%	\$139.50	504	\$70,308	\$70,308	\$70,308	4. Architectural and engr.	Based on 16 hrs ea for 22 locations. Includes 2 public hearings. Permit plans use the detailed engineering plans.	
Detailed Engineering	Cash Match	31.98%	\$115.47	1,868	\$215,700	\$215,700	\$215,700	4. Architectural and engr.	Issue plans and specification as design build.		

	As built											As-Built drawings will be prepared by Design Build Contractor and included in OSP costs
Program Management (MBI)												
MassBroadband 123	Director MBI/Construction Oversight; Deputy Director MBI, Construction Project Manager	Cash Match	31.98%	\$123.04	14,534	\$1,788,289		\$1,788,289	\$1,788,289	4	Architectural and engr.	Staff costs for the period from the submission through completed construction for a total of approximately 2.2 FTE's, including actual salary, benefit rate of 35.23%, and indirect costs of 76.02%, the rate that has been accepted for use under applicant's other federal grant awards. Activities to be performed will be directly related to the permitting, construction, and deployment of the network. These costs are further detailed in the budget narrative.
PM/CM Services	Pre-Construction Activities											Staffing plan and labor rates provided in Budget Narrative
	Construction Document Preparations (3 regional builds)	Cash Match	31.98%	\$155.75	960	\$149,520		\$149,520	\$149,520	4	Architectural and engr.	Assumes sequential release of construction packages to build the eastern, southern and northern portions of the network. Includes procurement management for cable and equipment.
	Bid/Award Support Services	Cash Match	31.98%	\$155.75	960	\$149,520		\$149,520	\$149,520	4	Architectural and engr.	Bid compliance review of procurements associated with each regional build
	Construction Activities											Staffing plan and labor rates provided in Budget Narrative
	Construction Related Services (CRS)	Cash Match	31.98%	\$165.00	9,600	\$1,584,000		\$1,584,000	\$1,584,000	4	Architectural and engr.	PM, Project schedule maintenance, contracts management, invoice validation, document control; meetings and coordination, et al; 2 FTEs over 30 months
	Response to DB Contractor submitted RFIs, Submission Reviews and Approvals	Cash Match	31.98%	\$130.90	2,816	\$368,608		\$368,608	\$368,608	4	Architectural and engr.	1.5 Engineer FTEs over 12 months
	Construction Engineering and Inspection (CEI) - Field Services											Staffing plan and labor rates provided in Budget Narrative
	Construction Engineering and Inspection (CEI) - Field Services	Cash Match	31.98%	\$112.73	19,680	\$2,218,560		\$2,218,560	\$2,218,560	6	Inspection fees	1 Resident Eng. (27 mo) and 4 inspectors (24 mo)
	Quality Assurance Program	Cash Match	31.98%	\$150.00	1,200	\$180,000		\$180,000	\$180,000	4	Architectural and engr.	0.25 FTE assigned to oversee quality control
	Safety Program	Cash Match	31.98%	\$150.00	1,580	\$237,000		\$237,000	\$237,000	4	Architectural and engr.	0.33 FTE Safety Officer
Consulting	A133 Single Audit	Cash Match	31.98%	\$25,000.00	3	\$75,000		\$75,000	\$75,000	1	Admin and Legal	Estimated cost of annual single A133 audit as required on federal grants. Cost based on estimates from audit firm.
	Legal Services	Cash Match	31.98%	\$500.00	850	\$425,000		\$425,000	\$425,000	1	Admin and Legal	1126 hours of outside legal assistance for in matters relating to the construction procurement, permitting, IRU, lease, and other required areas for the period of submission through the end of the project period. The hourly rate is estimated based on blended hourly rates of several law firms and various levels of attorneys at an average hourly rate of \$500.

SERVICE AREA or COMMON NETWORK FACILITIES:				Unit Cost	No. of Units	Total Cost	Last Mile Allocation	Middle Mile Allocation	Allocated Total	SF-424C Budget Category	Support of Reasonableness
OTHER UPFRONT COSTS						\$1,371,195	\$0	\$1,371,195	\$1,371,195		
Site Preparation											None required
Other	Director MBI/Construction Oversight; Construction Project Manager; MBI Deputy Director; Compliance Staff	Cash Match	31.98%	\$124.43	884	\$109,992		\$109,992	\$109,992	1. Admin and Legal	Employee cost for approximately 2 FTE's during the period from the NOFA announcement through application submission, including blended actual salary costs, benefit rate of 35.23%, and an indirect cost rate of 76.02%, the rate that has been accepted for us
	Professional and Consulting Services	Cash Match	31.98%	\$250.00	2,531	\$632,780		\$632,780	\$632,780	1. Admin and Legal	Costs include consulting fees for application preparation support, engineering, environmental and procurement assistance incurred or planned for the period from the NOFA announcement until the application submission. Cost represents estimated 2531 hours
	Compliance Staff	Cash Match	31.98%	\$117.90	5,330	\$628,424		\$628,424	\$628,424	1. Admin and Legal	Compliance Staff assumes a total of 1 FTE in YR 1 and .75 FTE in Yrs 2 & 3 to manage all legal, federal and state compliance, and compliance with all construction and procurement matters. Costs include a salary \$97,500, benefit rate of 35.23%, and indirect cost rate of 76.02%. Assumptions includes a 3% cost of living adjustment per year. The activities includes participation in all legal, financial and general compliance requirements for federal, state, and internal policies.
PROJECT TOTAL:						\$71,645,445	\$0	\$71,645,445	\$71,645,445		

Massachusetts Technology Park Corporation
 By: *[Signature]*
 CFO

BUDGET INFORMATION - Construction Programs

OMB Approval No. 4040-0008
Expiration Date 07/30/2010

NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.

COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for Participation	c. Total Allowable Costs (Columns a-b)
1. Administrative and legal expenses	\$ 1,871,195.00	\$	\$ 1,871,195.00
2. Land, structures, rights-of-way, appraisals, etc.	\$	\$	\$ 0.00
3. Relocation expenses and payments	\$	\$	\$ 0.00
4. Architectural and engineering fees	\$ 9,317,023.00	\$	\$ 9,317,023.00
5. Other architectural and engineering fees	\$	\$	\$ 0.00
6. Project inspection fees	\$ 2,218,560.00	\$	\$ 2,218,560.00
7. Site work	\$	\$	\$ 0.00
8. Demolition and removal	\$	\$	\$ 0.00
9. Construction	\$ 51,193,858.00	\$	\$ 51,193,858.00
10. Equipment	\$ 7,044,808.00	\$	\$ 7,044,808.00
11. Miscellaneous	\$	\$	\$ 0.00
12. SUBTOTAL (sum of lines 1- 11)	\$ 71,645,444.00	\$ 0.00	\$ 71,645,444.00
13. Contingencies	\$	\$	\$ 0.00
14. SUBTOTAL	\$ 71,645,444.00	\$ 0.00	\$ 71,645,444.00
15. Project (program) income	\$	\$	\$ 0.00
16. TOTAL PROJECT COSTS (subtract #15 from #14)	\$ 71,645,444.00	\$ 0.00	\$ 71,645,444.00
FEDERAL FUNDING			
17. Federal assistance requested, calculate as follows: (Consult Federal agency for Federal percentage share.) Enter eligible costs from line 16c Multiply X 63.431 % Enter the resulting Federal share.			\$ 45,445,444.00

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Massachusetts Technology Park Corporation
By: *Cliff B. Athas*
CFO