Cambridge, MA Broadband Task Force Meeting

November 18, 2015

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Today's Agenda

1. Key findings from survey
2. Key findings from outreach meetings
3. Key findings from services inventory
4. Revisit goals
5. Key choices to make now and how they relate to future decisions
6. Next steps

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Decisions Now and Later

Future Decision Examples

- Does the City want to:
  - Build broadband infrastructure?
  - Operate a broadband network?
  - Enter into a public-private partnership?
  - Provide assistance to one or more groups in the community to get better broadband?
- How will the City pay for what it wants to do?

Present Decisions

- What are our goals?
- What gaps are we trying to fill?
- What *options* do we want to look at in more depth?

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Next Steps in the Study Process

- Scope out requirements for three levels of network solution options and provide high-level cost estimates

- Review business model options and provide guidance on potential challenges

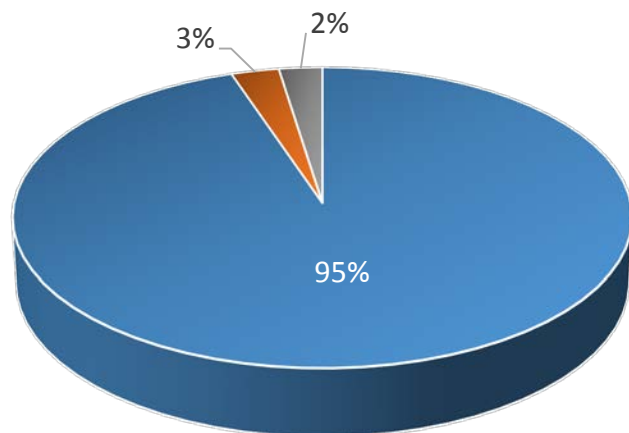- Analyze regulatory and public policy framework

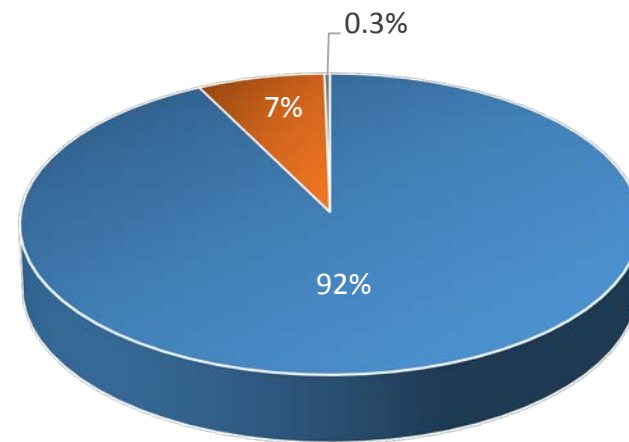**TILSON**

Opinion Dynamics Telephone Survey - Key Points

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Internet Service at Home & Cellular Data Plans

Internet Access at Home - *Excluding* Cellular Data Plans
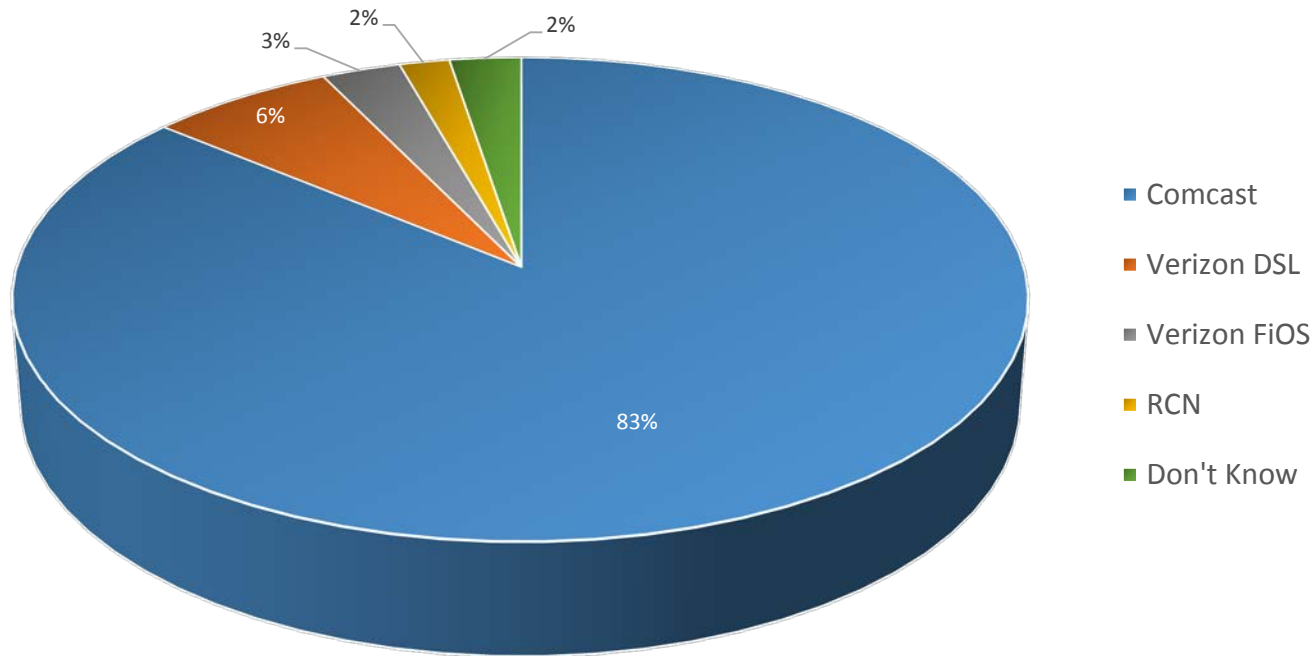
3% 2%

95%

- Yes
- No
- Don't Know

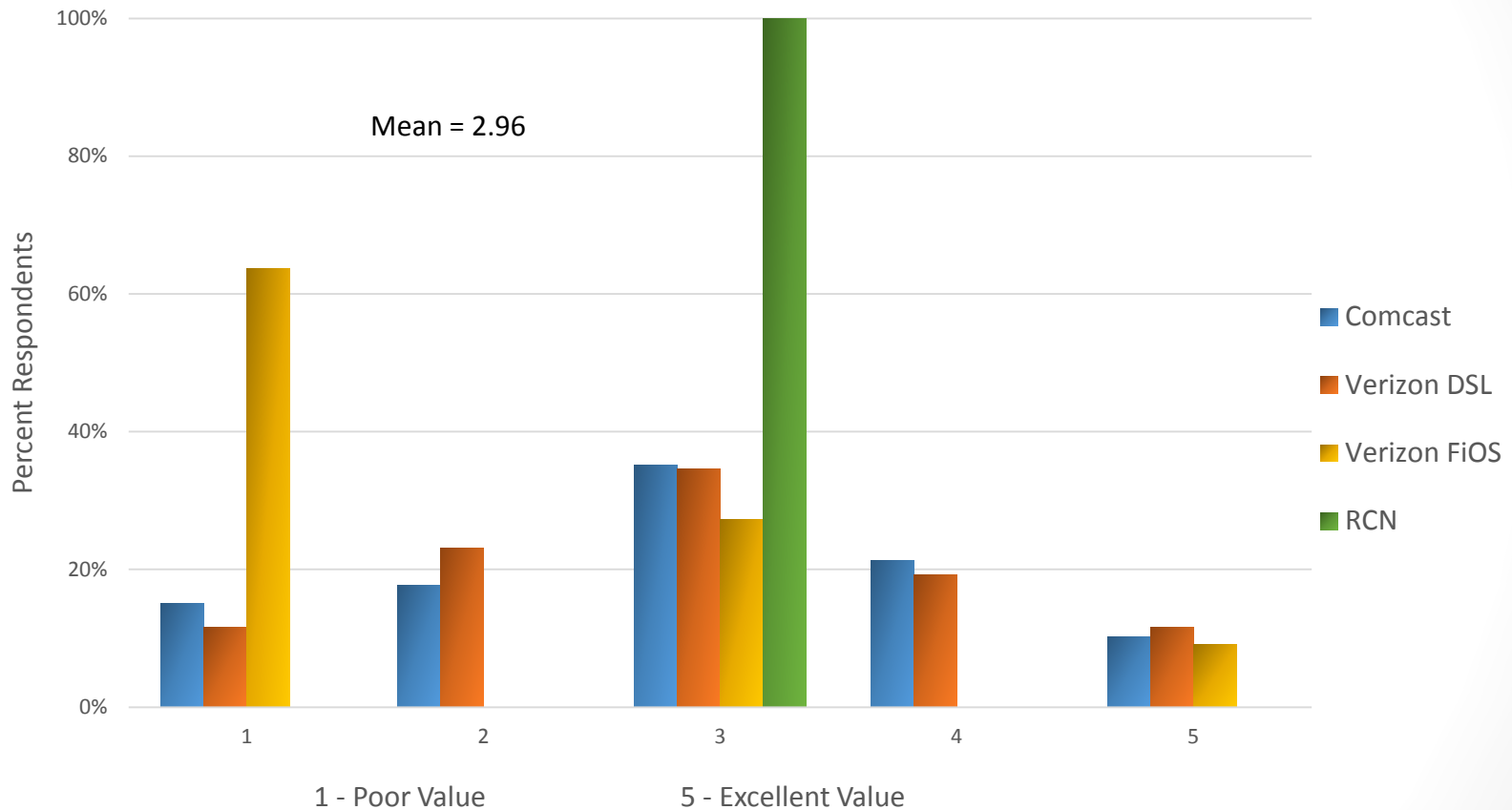**Internet Access - *Including* Cellular Data Plans**

0.3%

7%

92%

- Home Internet and Mobile Cellular Internet
- Only Mobile Cellular Internet
- Do not have Home-based Internet or Mobile Cellular Internet

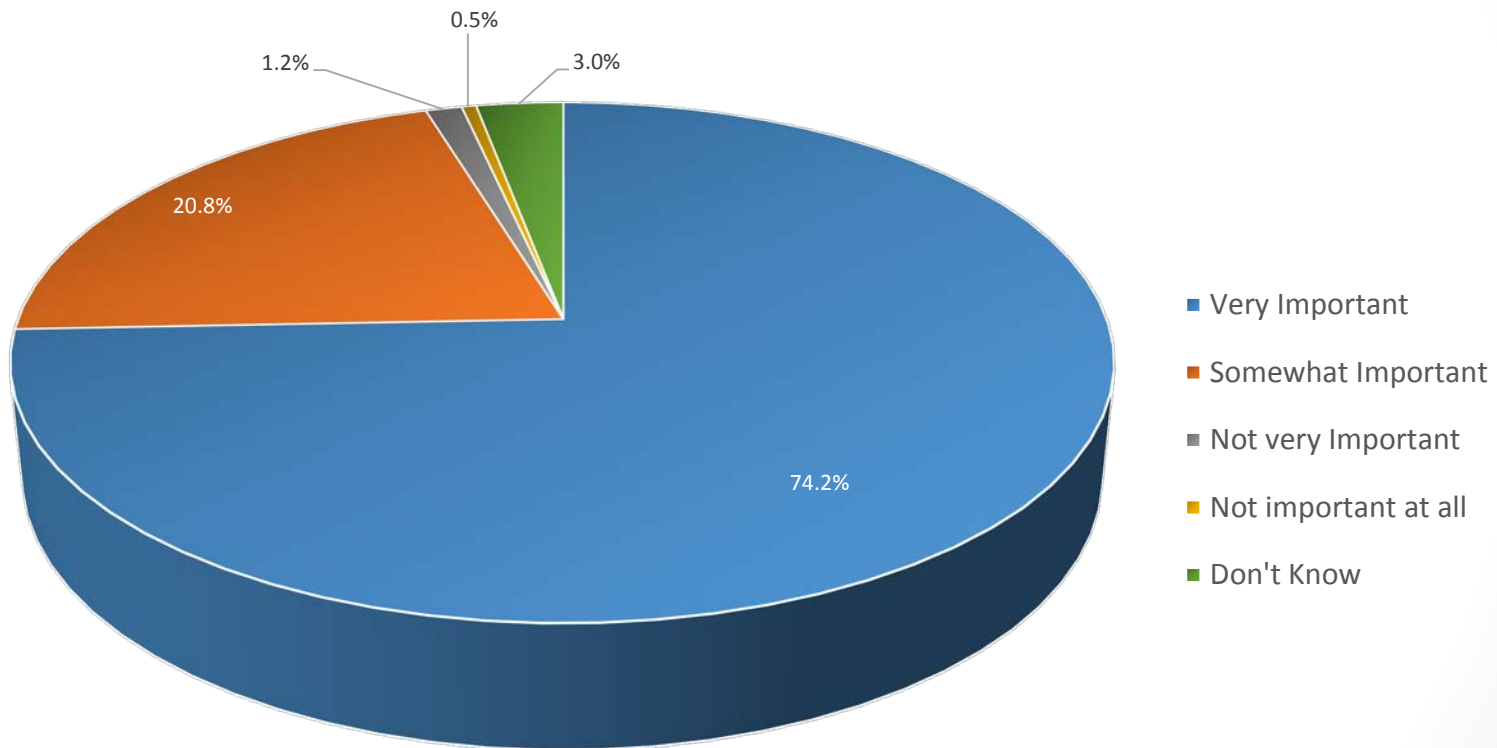TILSON

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Primary Internet Service Provider

- Comcast
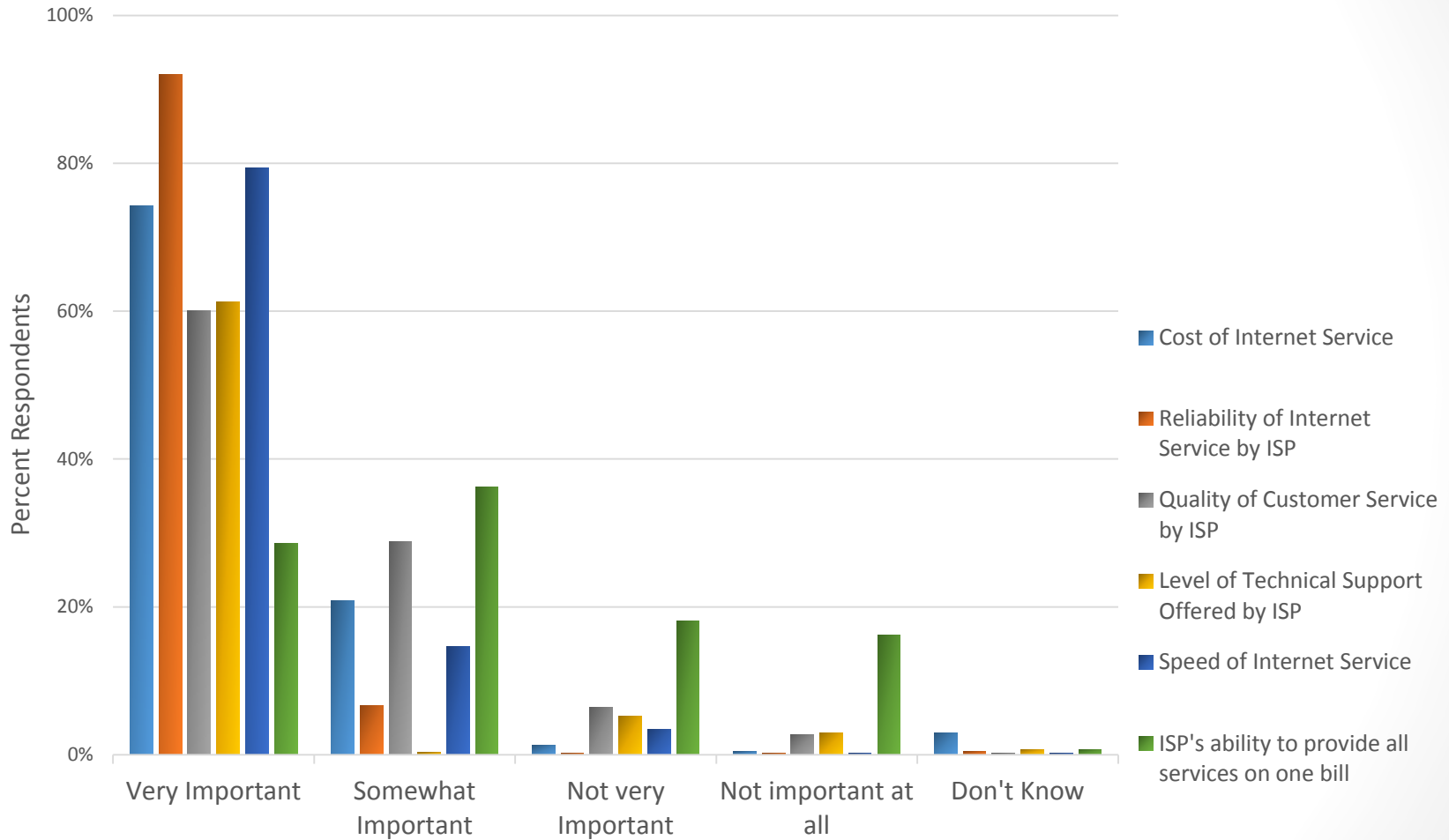- Verizon DSL
- Verizon FiOS
- RCN
- Don't Know

Values shown in chart: 83%, 6%, 3%, 2%, 2%

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Value of Internet Service

Satisfaction with Overall Quality of Internet Service by Neighborhood

Neighborhood	Satisfaction Level											
---	0	1	2	3	4	5	6	7	8	9	10	Mean
North Cambridge	2%	2%	5%	4%	23%	12%	7%	14%	7%	19%	4%	5.81
East Cambridge	0%	0%	2%	2%	2%	8%	3%	36%	25%	2%	22%	7.56
West Cambridge	0%	2%	2%	20%	5%	8%	20%	27%	3%	11%	3%	5.86
Porter Square	0%	2%	2%	13%	2%	6%	4%	62%	6%	2%	2%	6.19
Area 4	16%	0%	5%	0%	27%	0%	3%	41%	3%	5%	0%	4.89
Cambridgeport	19%	0%	3%	6%	6%	16%	10%	23%	13%	3%	3%	5.13
Riverside	0%	33%	0%	5%	0%	48%	0%	5%	10%	0%	0%	3.95
Agassiz	5%	0%	0%	5%	10%	20%	0%	5%	10%	50%	0%	7.20
Mid-Cambridge	0%	0%	15%	0%	23%	15%	8%	8%	23%	8%	0%	5.54
Central Square	11%	0%	11%	22%	0%	11%	0%	11%	11%	11%	0%	4.11
Kendall Square	0%	0%	0%	0%	0%	20%	20%	20%	20%	0%	20%	7.20

Overall Quality of Internet Service at Home

Mean = 5.96

Percent Respondents

0 - Totally Dissatisfied   10 - Totally Satisfied

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Cost of Internet Service

Very Important — 74.2%
Somewhat Important — 20.8%
Not very Important — 1.2%
Not important at all — 0.5%
Don't Know — 3.0%

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Internet Service Attributes

Work from Home Frequency

Pie chart legend:
- Mostly — 23%
- Some — 34%
- Hardly — 21%
- Never — 22%
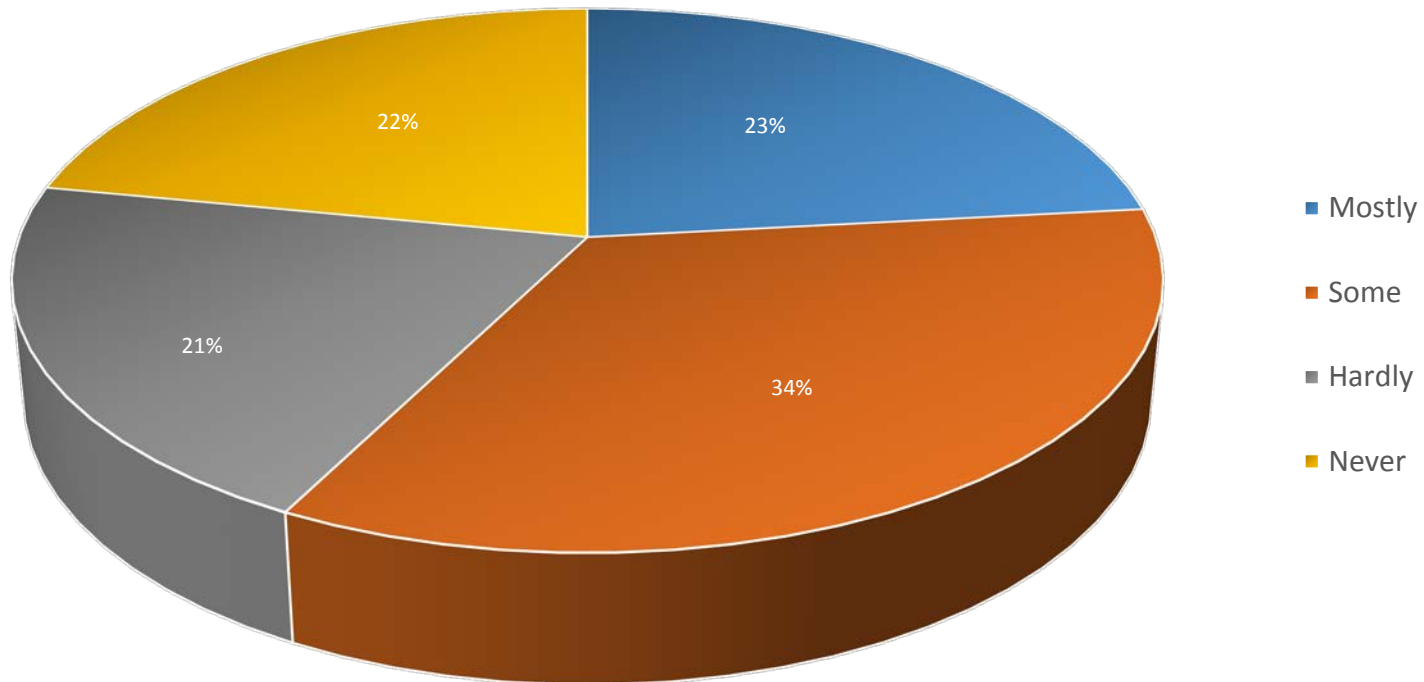
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Internet Download Speed Estimate by Residents

Legend:
- ■ < 10 Mb/s
- ■ 10 Mb/s > 25 Mb/s
- ■ 25 Mb/s > 100 Mb/s
- ■ > 100 Mb/s
- ■ Don't Know / Not Sure

Pie chart values: 4%, 5%, 15%, 1%, 75%
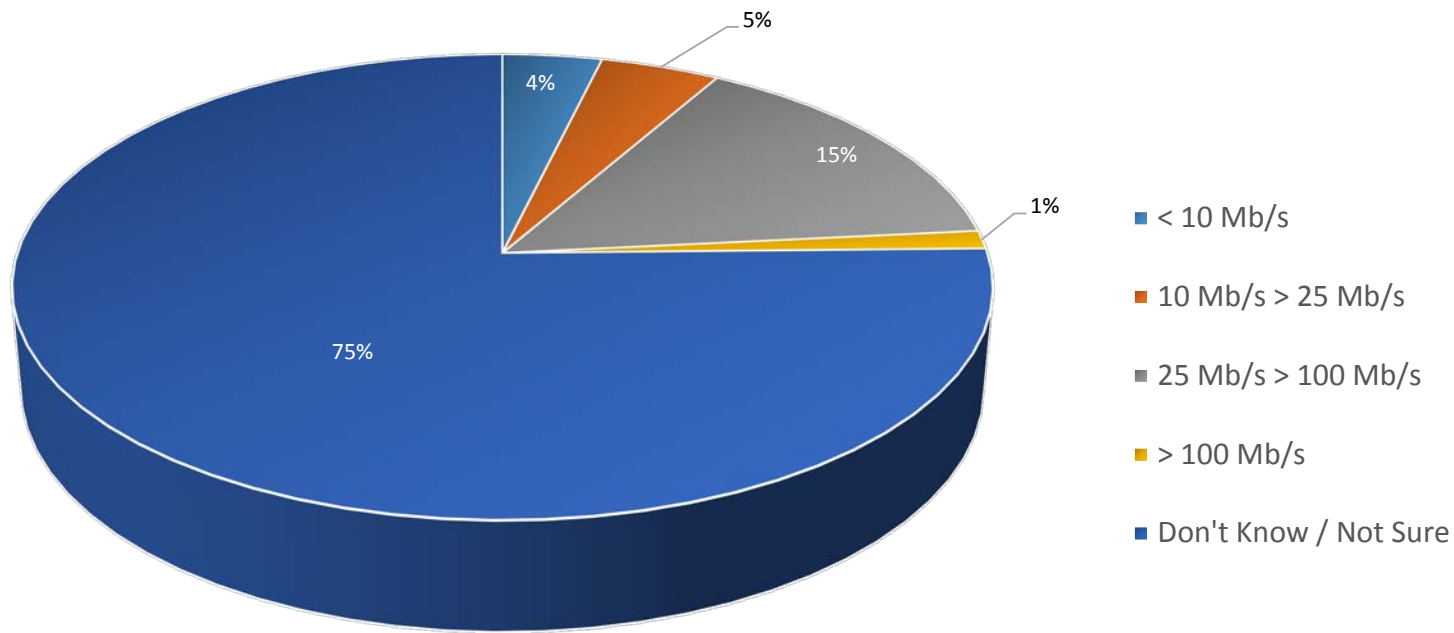
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Monthly Telecom Services Estimate

Monthly Telecom Services & Household Income

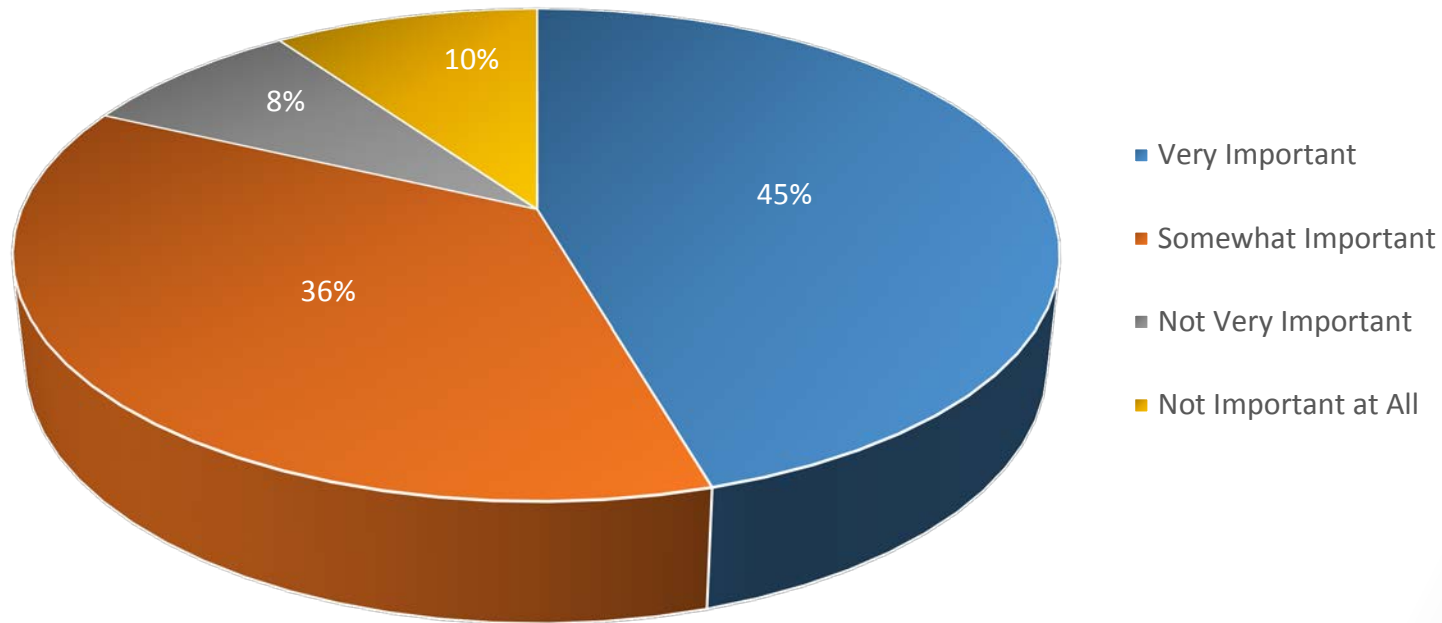| Estimate Range	Household Income Range			
	< $20,000	$20,000 - $49,999	$50,000 - $99,999	≥ 100,000
Don't Know / Not Sure	0%	21%	15%	7%
$0 - $49.99	12%	0%	0%	0%
$50 - 74.99	6%	2%	1%	1%
$75 - $99.99	0%	15%	3%	3%
$100 - $124.99	0%	21%	4%	8%
$125 - $149.99	41%	9%	3%	2%
$150 - $174.99	6%	9%	15%	14%
$175 - $199.99	0%	9%	25%	12%
$200 - $249.99	35%	4%	15%	20%
$300 - $349.99	0%	9%	3%	23%
$350 - $399.99	0%	0%	0%	6%
Over $400	0%	0%	1%	0%

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Willingness to Pay More for Faster Internet
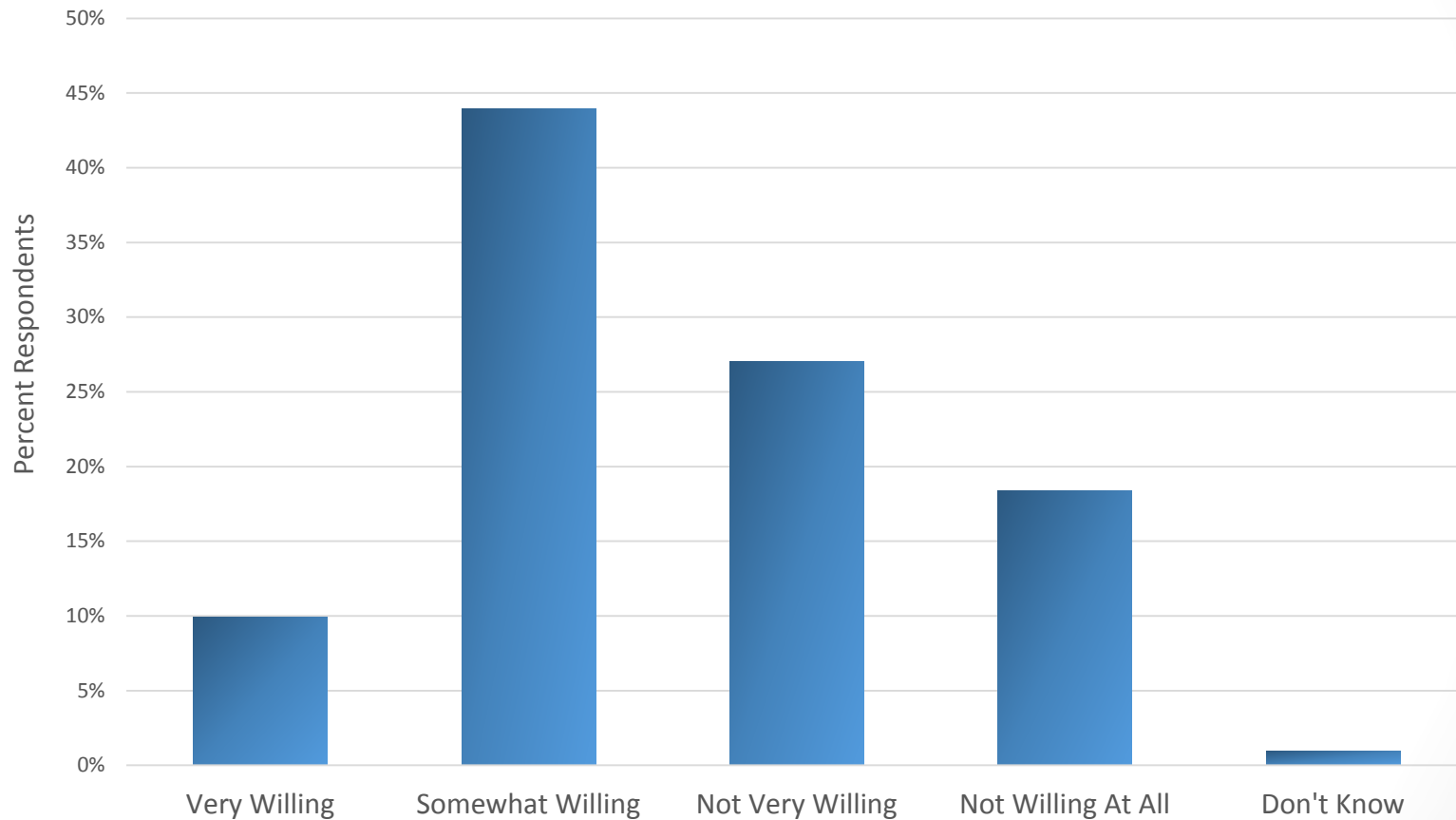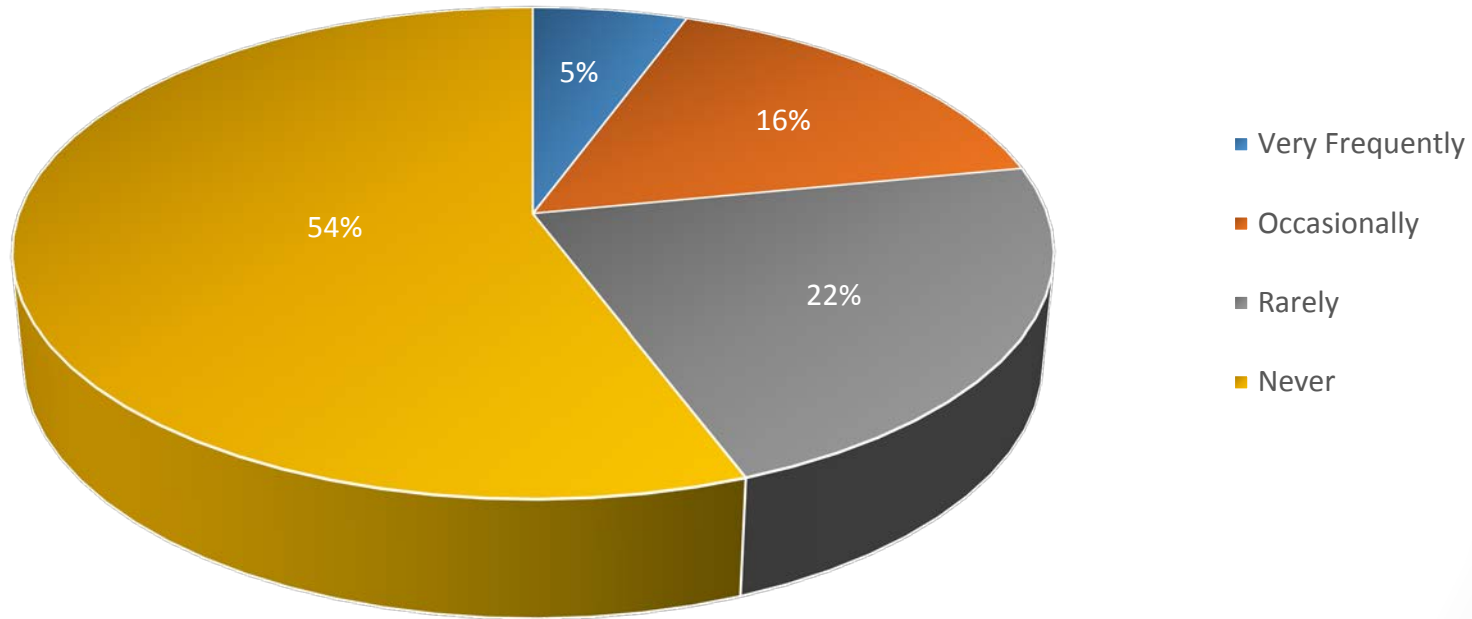
If you were moving, how important would the *quality of home Internet service* be in your decision of which house, apartment or condominium to live in?
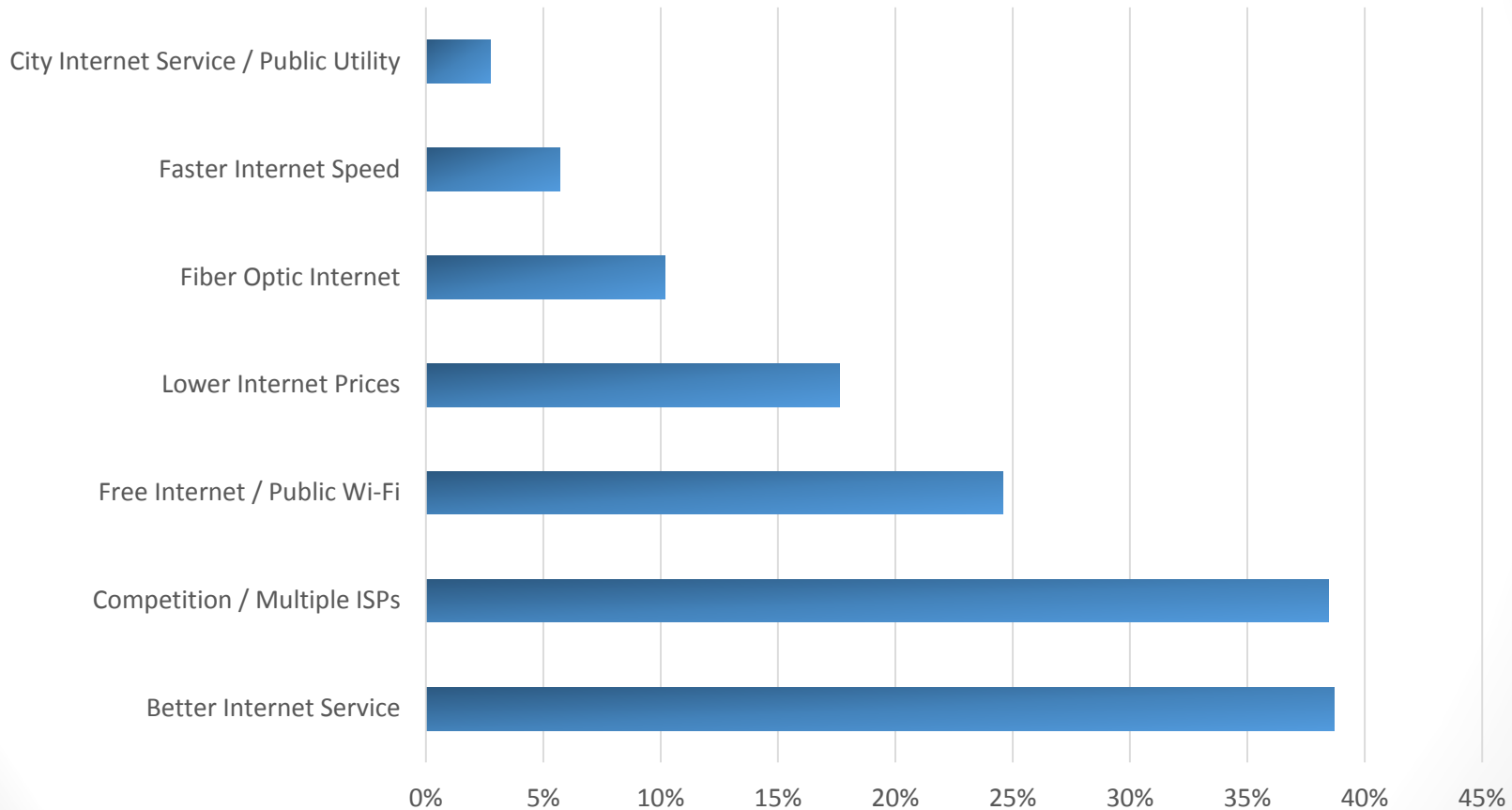

- Very Important — 45%
- Somewhat Important — 36%
- Not Very Important — 8%
- Not Important at All — 10%

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Frequency of Using the City's Public Wi-Fi System

Pie chart legend:
- Very Frequently
- Occasionally
- Rarely
- Never

Chart values: 5%, 16%, 22%, 54%

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Recommendations to Improve Overall Internet Services in the City

If you were speaking *directly* to the leaders of city government here in Cambridge, what are the two or three issues you would recommend **to improve overall Internet services in the city**?

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Themes

- Comcast dominates the market
- On average, people are only marginally satisfied with their Internet
- Reliability and speed are very important to most people, but most people don't know what their speed is
- The cost of internet is very important to ¾ of respondents, and a majority estimate they spend $150 or more per month on telecom services
  - But a majority say they would be somewhat or very likely to pay more to get better internet service
- A large proportion of respondents recommended that the City address "Better internet service," "Fiber optic internet" and/or "Faster internet speed"

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Community Outreach Meetings- Key Points

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Outreach Meeting #1

- Several dozen people
- Most participants identified as residents, very few as businesses or providers of public service
- Process:
  - Brainstorming issues
  - Discussion and clustering of similar issues in breakout groups
  - Multi-voting by all participants on most important issues

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Outreach Meeting # 1: Most Important Issues

1. "To address equity and autonomy issues, the City should own and manage its own broadband system." (22 votes)

2. Excellence—Speed (gigabit+)/Reliability/Customer Service—"Go Big" (16 votes)

3. Providing affordable access for certain groups of lower-income residents (13 votes)
   - Students
   - Seniors
   - Public housing residents
   - Other low-income residents

4. Providing access and equity, including price, availability, wireless availability, and a free tier of service (12 votes)

5. Need for a choice of providers (9 votes)

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Outreach Meeting #2

- Approx. 15 people
- Representatives from:
  - Lesley College
  - Novartis
  - Microsoft
  - Cambridge Innovation Center
  - Other local entrepreneurs and educators.
- Questions asked in two small groups:
  - How does better broadband across Cambridge support my organization?
  - What is/isn't the problem
  - "Blog post from the future"

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Examples of How Better Broadband Supports Organizations

- Supporting economic development and City's leadership in the tech economy
- Opportunities to collaborate with K12 schools
- Addresses digital divides (economic & geographic)
- Colleges are more attractive to students
- Supports quality of life
- Makes properties more marketable

- Access to great infrastructure without multiple digs
- Addresses City's affordability issues for residents
- More affordable options for bus.& institutions
- Applications—cloud apps, smart buildings, sensors, video, "homework at home"

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What is the problem summary

With Broadband to my Organization

- Inconsistent levels of access to best service
- Access to conduit between locations in the City
- Upload ability
- Number and diversity of devices
- 1 Summer St. vulnerability

With Broadband in the City

- Poor competitive choices
- Lost opportunities when digging up streets
- The Wi-Fi in many public spaces
- Planning for fiber and conduit in new construction

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What isn't the problem summary

With Broadband to my Organization

- Metro A Loop connectivity to Summer Street
- Good fiber options in some locations
- Working with the City
- Basic broadband access

With Broadband in the City

- Kendall & Harvard Sq. Wi-Fi Collaborations
- Comcast raising speeds w/out raising prices
- Use of city conduit (if available)

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Sample Reports from the Blog Post from the Future

Process

- "City talked to carriers and business partners to find out what they wouldn't do regarding broadband offerings."
- "A comprehensive plan was made."
- "Collaboration amongst public schools, private universities, providers, and local businesses (small, medium and large)."
- "Presented a compelling business case to carriers / business partners."
- "Spent time talking to residents and businesses alike regarding digital divide."

Outcomes

- "Public utility: City-owned conduit"
- "Decided that this was infrastructure with limited private business case."
- Services that are "more reliable," "high quality," "lower quality"
- "Broadband regardless of ability to pay"
- "Students have better, more equal opportunity"
- "Better employee recruitment"

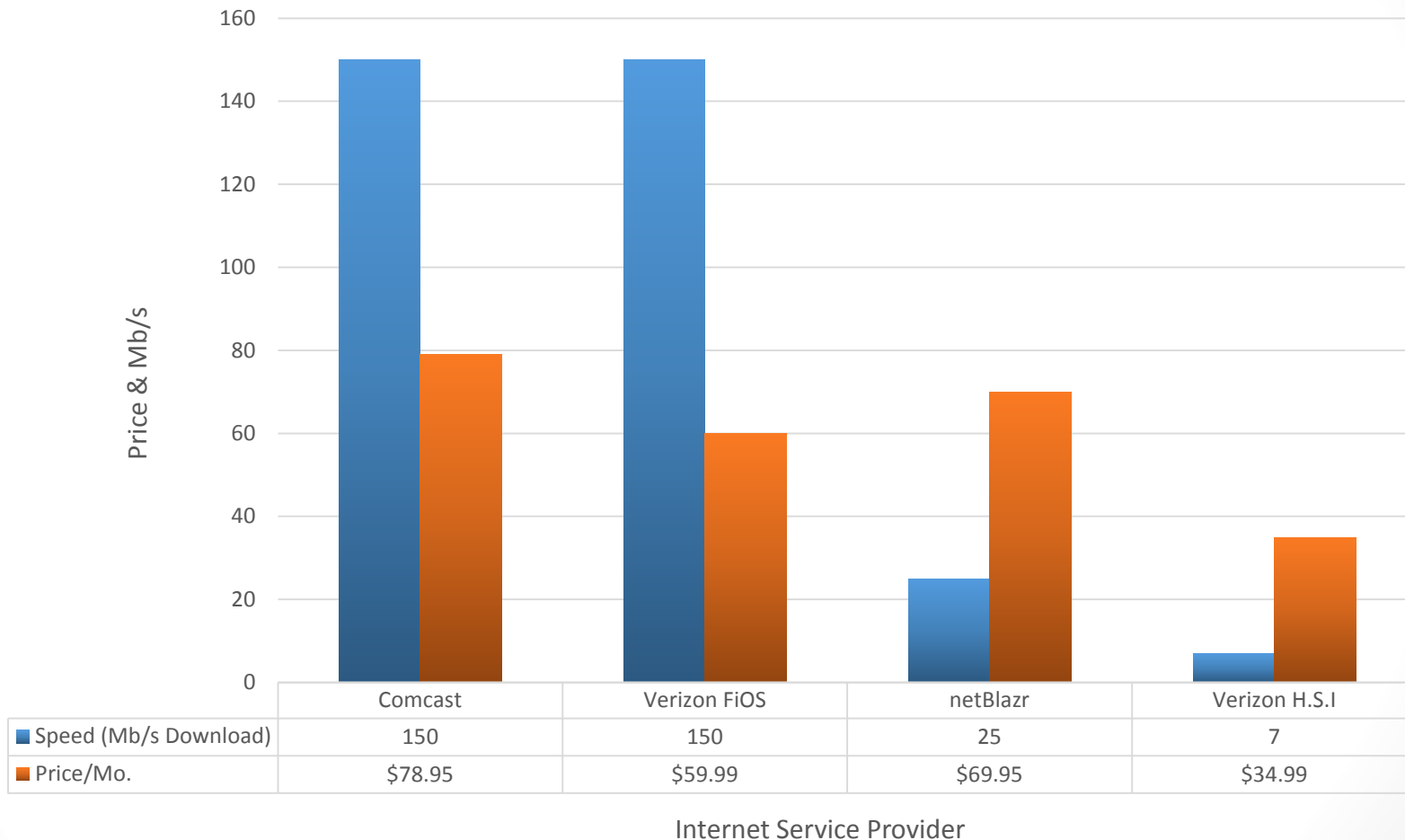TILSON

Carrier Offerings Analysis

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Broadband Service Offerings

- Residential and Small Business
  - Comcast
  - Verizon
  - NetBlazr
- Small Business
  - MegaPath
  - RCN
  - XO
  - Wicked Broadband
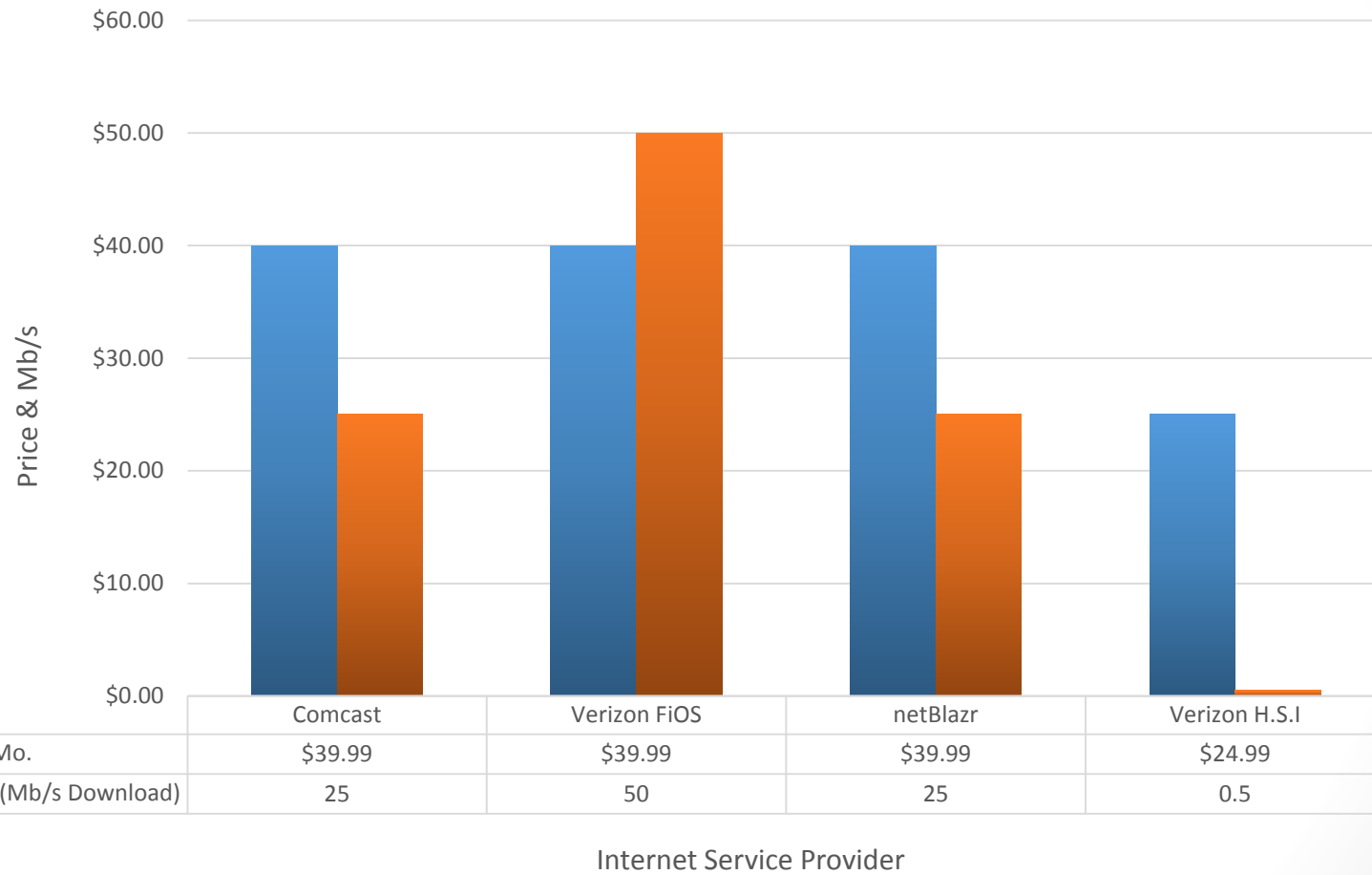- Enterprise/Institutional/Wholesale
  - Numerous

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Residential Internet – Highest Download Speed Offered

	Comcast	Verizon FiOS	netBlazr	Verizon H.S.I
Speed (Mb/s Download)	150	150	25	7
Price/Mo.	$78.95	$59.99	$69.95	$34.99

Internet Service Provider

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Residential Internet – Lowest Price Offered

	Comcast	Verizon FiOS	netBlazr	Verizon H.S.I
Price/Mo.	$39.99	$39.99	$39.99	$24.99
Speed (Mb/s Download)	25	50	25	0.5

Internet Service Provider

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Small Business Internet – Highest Speed Offered City-wide

	Comcast	Verizon	netBlazr
Speed (Mb/s Download)	150	10	50
Price/Mo.	$78.95	$74.99	$99.95

Internet Service Provider

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Small Business Internet – Lowest Price Offered City-wide

Chart title: Internet Service Provider (x-axis), Price & Mb/s (y-axis)

	Comcast	Verizon	netBlazr
Price/Mo.	$69.95	$29.99	$99.95
Speed (Mb/s Download)	16	1	50
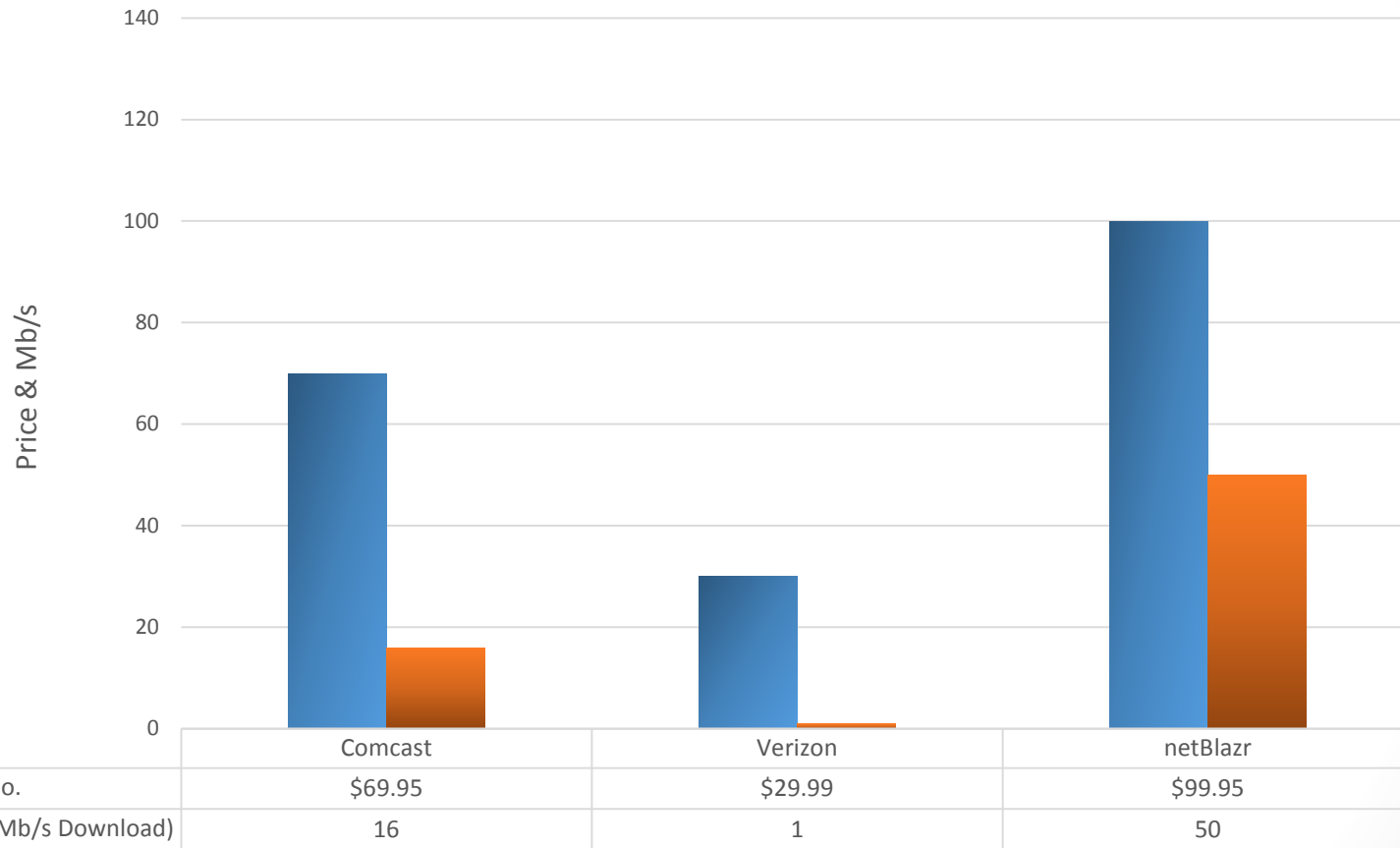
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Other Small Business Offers

- Megapath
  - DSL and Ethernet-based services, speeds top out at 15Mbps
- RCN
  - Similar speed tiers to Comcast, approx. $35-45/mo less in price
- XO
  - Lowest tier 1.5 Mbps/768 kbps @$447/mo
  - Highest tier 100 Mbps/100 Mbps @$2,128
- Wicked Bandwidth
  - 10 Mbps/10Mbps @$450/mo through
  - 1Gbps/1Gbps @ $2,000/mo

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Overview of Metro Networks
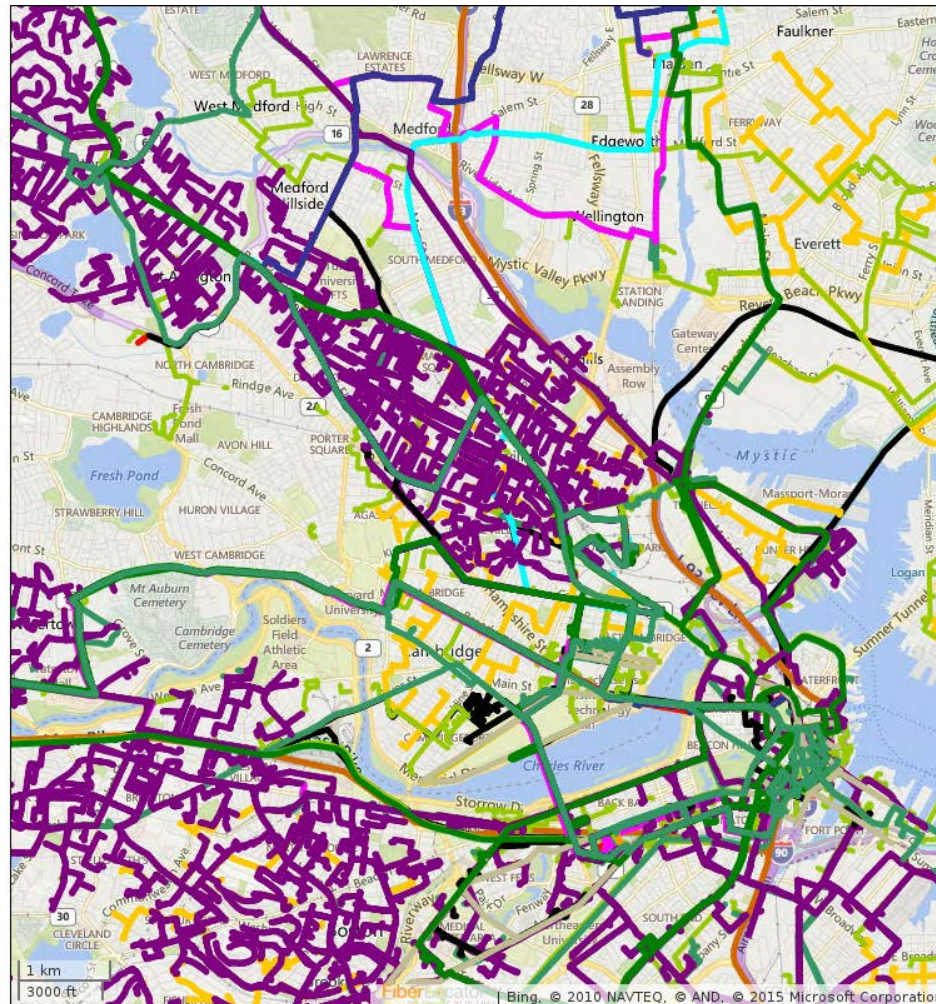
Fiber-Based Networks
with Small Business Offers
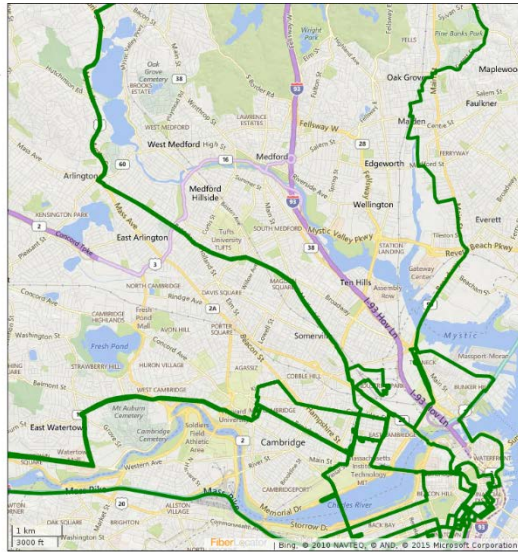
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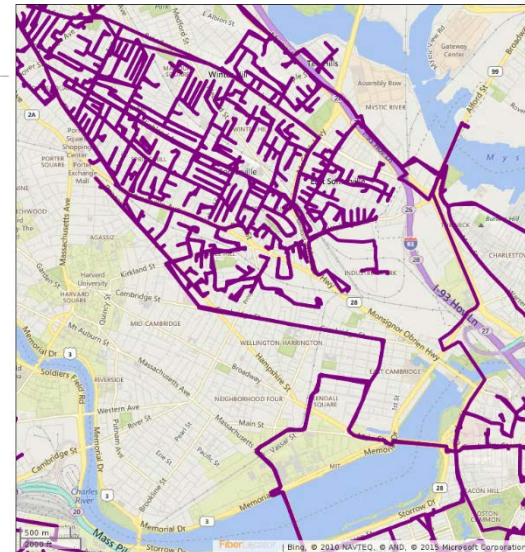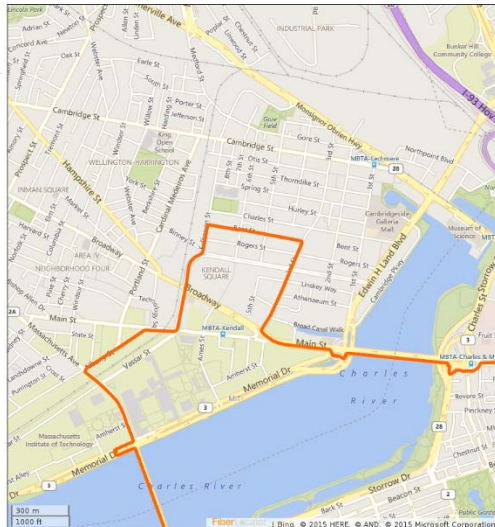
Selected Enterprise Metro Fiber Networks
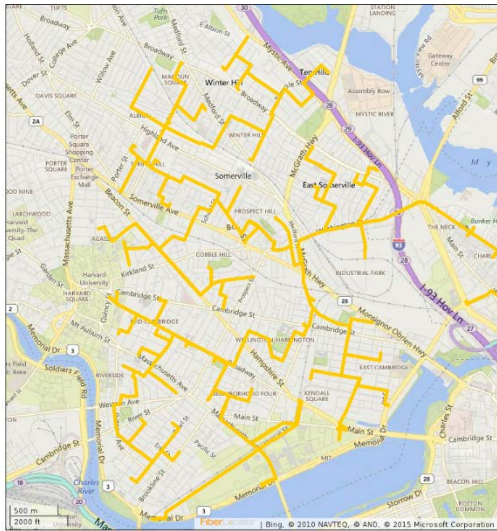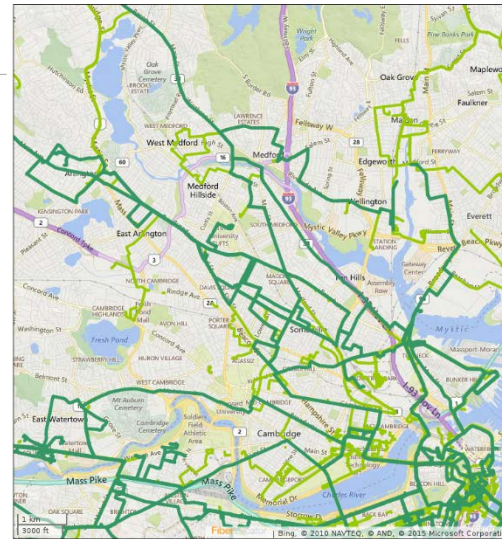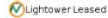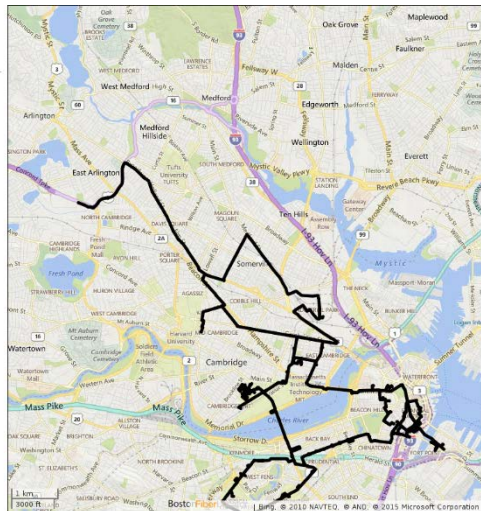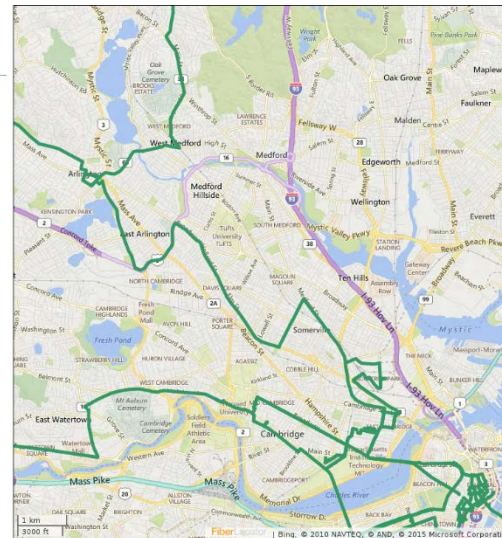
Enterprise Fiber:
Not for the average small user

Common Characteristics

- Low/no oversubscription
  - Dedicated capacity or facilities
- Prices often quoted on an individual case basis
- Sold to large businesses, institutions, wholesale customers
- May be sold as dark fiber, waves, Ethernet transport, Dedicated Internet Access

Sample Pricing: Zayo

- Dedicated Internet Access (DIA) - 10M $956-1,593
- DIA - 100 Mb $1,051-1,753
- DIA - 200 Mb $1,396-2,326
- DIA - 500 Mb $2,830-4,717
- DIA - 1Gb $3,937-6,562
- DIA - 10Gb $18,731-31,218
- Dark Fiber (Point to Point)* $2,855-6,684
- Dark Fiber (Ring)* $3,996-9,078

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Takeaways

- Mass-market services are available widely only from a handful of providers

- Many metro fiber providers are present in Cambridge, but are concentrated in the eastern and central parts of the City, and to a lesser extent in the north.

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Goals, Key Choices and Decisions on Next Steps

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Evidence Supporting Goal Themes

	Survey	Outreach Meeting 1	Outreach Meeting 2	Services Inventory
Affordability	X	X		?
Choice & competition	X	X		X
Supporting employers & small businesses			X	X
Innovation & excellence	X	X	X	X
Local control		X		

Does anything we've learned make us want to add, remove, or change goals in these areas?

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Ways to Think About City's Possible Broadband Activity

- Delivering a *program*

- Building a *platform*

- Providing a *utility*

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Delivering a Program

- Focuses on a targeted problem or issue with a discrete initiative focused on that problem or issue
- Likely to be an expense supported or subsidized by taxes

Example: Delivering improved, low-cost broadband services to lower-income households in Housing Authority buildings

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Providing a Utility

- Provides a common service broadly across the community
- Typically a service that everyone pays for through user fees

Example: Gigabit internet access delivered to every home and business location in the City

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Building a Platform

- Creates a common set of infrastructure that can be used in a variety of ways by entities other than the City to deliver services

- May be associated with user fees or provided as a "commons" supported by taxes

Examples: Shared conduit system or dark fiber

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Levels of a Platform--Example

Internet Access and Network Applications

Lit Transport Services

Dark Fiber

Conduit

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Network Solutions We Will Examine

- "Small": Fiber build-out to CHA buildings (a Program)
- "Large": City-wide Fiber-to-the-premise network (a Utility)
- "Medium": to be determined
  - A Platform?
  - Another Program?
  - A Smaller Utility?

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Platform Options for Consideration

- Option 1: Dark Fiber with frequent points of access for laterals or drops to individual users

- Option 2: Conduit (or underground dark fiber in conduit with spare innerduct)

- Targeted geographic focus (pick one or more)

  - Extended ring(s) around city

  - Neighborhoods with lower concentrations of metro fiber

  - Between key business or institutional locations not adequately served by existing conduit or dark fiber networks

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