Washington County Unorganized Territory

Fiber to the Premise Report

Presented to:

Washington County Commissioners

April 28, 2015
April 28, 2015

Washington County Commissioners
85 Court St.
Machias, ME 04654

Dear Commissioners Gardner, Crowley and Cassidy,

Thank you for giving Axiom Technologies the opportunity to quantify the challenges of bringing world class Internet solutions to the citizens of the Unorganized Territories (UT) of Washington County.

Providing last mile solutions to those homes and businesses that currently do not have access to broadband connectivity is our mission. Axiom has brought high-speed Internet service to over 100 regions (46 towns) with over 90 Wireless Access Points in Washington County, creating an umbrella that covers over 2,500 square miles. Axiom’s goal is “To provide broadband to the unserved homes and businesses in Washington County and Maine. We will not stop until this is accomplished.” Over the life of our company we have managed to serve close to 1200 customers who previously had no access to the Internet.

At Axiom, we are committed to creating jobs and building our economy. The Internet helps small businesses do that.

At Axiom, we are committed to giving our citizens educational opportunities to help them get the skills they need to compete in this economy. The Internet helps them do that.

At Axiom, we are committed to many of our regions’ most critical stakeholders, our farmers and fisherman; our healthcare workers and our artisans and creative economy that help build a strong community identity for Washington County and its people and businesses. The Internet helps us do that.

It is critical that a conversation begin, not just at the county level, but in each of the towns to discuss what they would like to see for service and how we might work as a team to create timely, cost effective projects that can help people get connected and spur economic growth. We have found a lot of misinformation about how the Internet delivery system works, and what people might do with it, once they are able to have Internet service.

We have seen Digital Literacy enrich people’s lives, small businesses learn new tools to help them succeed and skills increase. This should be a critical part of any deployment plan, which we can explain in greater detail.
Last, we believe that federal and state resources are available, but always difficult and never certain, to help defray costs. Axiom has a strong track record of attracting resources to help projects get funded.

Thank you again for the opportunity.

Sincerely,

Mark Ouellette, President & COO

cc: Susan Hatton, TIF Program Manager
    Dean Preston, UT Supervisor
    Betsy Fitzgerald, County Manager
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**Overview:**
Below you will find a summary of our findings, a synopsis of the detailed report that follows for Fiber to the Premise (FTTP) build-out to these areas:

- Trescott Township
- Edmonds Township
- Marion Township
- Cathance Township (No. 14 TWP)
- Berry Township (T18 ED BPP)
- T19 ED BPP
- Centerville Township

Along with the summary chart presented below, we also have given you our thoughts on cost, build out options and next steps. This overview is designed to give you some context to the rest of the report. Following the overview is a detailed examination of each territory; a brief description of the build out including a street level analysis and finally what the estimated cost would be to provide a FTTP type service to each of the selected territories.

We believe that this report is the beginning of a roadmap to High Speed Broadband upgrades to a critical part of our county and would welcome a detailed discussion of our recommended next steps.

**Cost:**
As you look through this document please keep a few things in mind:
- Fiber is the most advanced technology for Internet delivery, but it is also the costliest
- Hybrid solutions that include fiber, but might utilize other technologies like wireless, could bring down costs dramatically
- Federal and state funding sources, as well as your TIF funds could be available to help subsidize projects

The following chart provides a quick glance at the costs that are listed in this report as well as a breakdown of what the costs are per structure.

<table>
<thead>
<tr>
<th>Trescott TWP</th>
<th>Fiber Build</th>
<th>FDN Cost</th>
<th>FTTP Installs</th>
<th>Total</th>
<th># Structures</th>
<th>Avg Cost/Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT 180</td>
<td>$210,000.00</td>
<td>$53,000.00</td>
<td>$100,000.00</td>
<td>$363,000.00</td>
<td>50</td>
<td>$7,260.00</td>
</tr>
<tr>
<td>Old Cross Rd</td>
<td>$145,000.00</td>
<td>$-</td>
<td>$80,000.00</td>
<td>$225,000.00</td>
<td>40</td>
<td>$5,625.00</td>
</tr>
<tr>
<td>Dixie Rd</td>
<td>$210,000.00</td>
<td>$53,000.00</td>
<td>$100,000.00</td>
<td>$363,000.00</td>
<td>50</td>
<td>$7,260.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$565,000.00</strong></td>
<td><strong>$106,000.00</strong></td>
<td><strong>$280,000.00</strong></td>
<td><strong>$951,000.00</strong></td>
<td><strong>140</strong></td>
<td><strong>$6,792.86</strong></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Edmunds TWP</th>
<th>Fiber Build</th>
<th>FDN Cost</th>
<th>FTTP Installs</th>
<th>Total</th>
<th># Structures</th>
<th>Avg Cost/Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belveys Rd</td>
<td>$70,000.00</td>
<td>$53,000.00</td>
<td>$80,000.00</td>
<td>$203,000.00</td>
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<td>$5,075.00</td>
</tr>
<tr>
<td>River Rd</td>
<td>$15,000.00</td>
<td>$-</td>
<td>$10,000.00</td>
<td>$25,000.00</td>
<td>5</td>
<td>$5,000.00</td>
</tr>
<tr>
<td>Bunker Hill Rd</td>
<td>$26,000.00</td>
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<td>$36,000.00</td>
<td>$62,000.00</td>
<td>18</td>
<td>$3,444.44</td>
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<tr>
<td>Harrison Rd</td>
<td>$24,000.00</td>
<td>$-</td>
<td>$30,000.00</td>
<td>$54,000.00</td>
<td>16</td>
<td>$3,375.00</td>
</tr>
<tr>
<td>South Edmunds Rd</td>
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<td>$207,000.00</td>
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<td>$5,175.00</td>
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<tr>
<td>King St</td>
<td>$27,000.00</td>
<td>$-</td>
<td>$40,000.00</td>
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<td>20</td>
<td>$3,350.00</td>
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<td>Tide Mill Rd</td>
<td>$30,000.00</td>
<td>$-</td>
<td>$16,000.00</td>
<td>$46,000.00</td>
<td>8</td>
<td>$5,750.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$266,000.00</strong></td>
<td><strong>$106,000.00</strong></td>
<td><strong>$292,000.00</strong></td>
<td><strong>$664,000.00</strong></td>
<td><strong>146</strong></td>
<td><strong>$4,547.95</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>Marion TWP</th>
<th>Fiber Build</th>
<th>FDN Cost</th>
<th>FTTP Installs</th>
<th>Total</th>
<th># Structures</th>
<th>Avg Cost/Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Shore Dr</td>
<td>$145,000.00</td>
<td>$53,000.00</td>
<td>$16,000.00</td>
<td>$214,000.00</td>
<td>8</td>
<td>$26,750.00</td>
</tr>
<tr>
<td>Peninsula Rd</td>
<td>$92,000.00</td>
<td>$-</td>
<td>$14,000.00</td>
<td>$106,000.00</td>
<td>7</td>
<td>$15,342.86</td>
</tr>
<tr>
<td>RT 86</td>
<td>$85,000.00</td>
<td>$53,000.00</td>
<td>$32,000.00</td>
<td>$170,000.00</td>
<td>16</td>
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<tr>
<td>Marion Station Rd</td>
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<td>$7,000.00</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>$106,000.00</strong></td>
<td><strong>$96,000.00</strong></td>
<td><strong>$609,000.00</strong></td>
<td><strong>48</strong></td>
<td><strong>$12,687.50</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Cathance TWP (No. 14 TWP)</th>
<th>Fiber Build</th>
<th>FDN Cost</th>
<th>FTTP Installs</th>
<th>Total</th>
<th># Structures</th>
<th>Avg Cost/Structure</th>
</tr>
</thead>
</table>
Next steps:

- Host 3-5 facilitated meetings around Broadband deployment
  o What would the communities be interested in accomplishing
  o Are there critical infrastructure that connecting to would be important such as a community facility or public infrastructure

- Organize Digital Literacy tutorials
  o Classes held in the community or at Axiom facility in Machias
  o Axiom is a leading expert and has held many hours of classes that can help citizens understand how to use the Internet and the basic functions of computer technology

- Detail each region's Broadband assets
  o Limited parts of the region are currently being served by providers like Time Warner Cable and Fairpoint Communications
    - Locate, inventory and map telecommunication assets
      o Towers
      o Connection points, etc.

- Work closely with County and local leaders to develop and implement specific plans for deployment
  o Create detailed plan of deployment and timeline
  o Prioritize regions of focus

- Explore federal and state funding sources
  o Potential for funding in 2015

- Create customized plans that address local needs
  o Consider a variety of technologies
    - Fiber
    - Wireless
    - DSL
Report development:
The information for this report was obtained by using a combination of satellite aerial and street level mapping, as well as onsite observations of utility pole usage and placement. In determining estimated Make Ready costs, it is critical to know the number of vendors that are present on each pole as that can affect the build cost. When a project begins, each vendor is notified and subsequently reimbursed for any modifications to their installments on each utility pole.

Trescott Township

Trescott Township has an estimated count of 218 structures within its boundaries. This data was obtained by performing a visual count using online resources and programs such as Google Earth, Bing Maps and Panoramio. Actual structures were counted, although it does not indicate that 100% are homes or businesses. Street level mapping as well as onsite observations of utility pole usage and placement was also done in select locations.

The fiber build out for Trescott will be broken down into three road segments. From RT 1 where the fiber will interconnect with the Three Ring Binder (3RB), which has been marked as a blue line on the above image. A new fiber cable will be installed along RT 189 and extend up to the Dixie Rd for a total distance of 5.7 miles. From the intersection of the Dixie Rd and RT 189 another fiber cable will be installed along the Dixie Rd for a length of 6.75 miles. The final fiber segment will run a loop from RT 189 along the Old Cross Rd for a total distance of 5.4 miles.
The following sections will describe each road segment and provide an estimated cost for the FTTP build out.

RT 189:

This fiber for this segment will originate from RT 1 off of the 3RB and extend up to the intersection of the Dixie Rd. for a total length of 5.7 miles. It is estimated that this fiber cable would be able to reach approx. 50 structures that are within 1000 ft. from the road. This cable is also pivotal for providing service to the other two fiber segments on Old Cross Rd and Dixie Rd. In order to provide any broadband service to any of the structures along both RT 189 and the Old Cross Rd., there will need to be a location which will house the necessary equipment. This can be a small building structure or in this particular case will be a utility pole with an outdoor rated enclosure mounted to it; we’ll refer to the total product as the Fiber Distribution Node (FDN). The FDN will be located at the intersection of RT 1 and RT 189.

The following lists the estimated costs for providing service to this segment:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Build</td>
<td>$210,000.00</td>
</tr>
<tr>
<td>FDN</td>
<td>$53,000.00</td>
</tr>
<tr>
<td>FTTP Installs</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>Total</td>
<td>$363,000.00</td>
</tr>
</tbody>
</table>
Old Cross Rd:

This fiber segment will originate from the intersection of RT 189 and the Old Cross Rd. and will make a loop for a total length of 5.4 miles. It is estimated that this fiber segment would be able to reach approx. 40 structures that are within 1000 ft. from the road. This fiber segment would be fed from the FDN located at the intersection of RT 1 and RT 189.

The following lists the estimated costs for providing service to this segment:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Build</td>
<td>$145,000.00</td>
</tr>
<tr>
<td>FTTP Installs</td>
<td>$80,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$225,000.00</strong></td>
</tr>
</tbody>
</table>

Dixie Rd:

This fiber segment will originate from the intersection of RT 189 and the Dixie Rd and will run for approx. 6.75 miles. It is estimated that this fiber segment would be able to reach approx. 50 structures that are within 1000 ft. from the Dixie Rd. This fiber segment would need a pole mounted FDN established where it intersects with RT 189.

The following lists the estimated costs for providing service to this segment:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Build</td>
<td>$210,000.00</td>
</tr>
<tr>
<td>FDN</td>
<td>$53,000.00</td>
</tr>
<tr>
<td>FTTP Installs</td>
<td>$100,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$363,000.00</strong></td>
</tr>
</tbody>
</table>

The total cost for the entire fiber build of Trescott Township is estimated at $951,000.00.
There are areas that were excluded out of this build due to their distances from the proposed fibers and the additional costs that would be incurred by including them into this project. There are an estimated 60 structures that have been excluded. One such area is the shoreline along the Dixie Rd, the other being the northern most area of Trescott starting at Crows Neck Rd. If these areas were to be included in the final total it could easily double the existing cost.
with a segment extending from Bunker Hill Rd running the full length down Harrison Rd.

Another fiber will extend from Rt 1 down Bunker Hill Rd to the bridge boundary of Edmunds Township. Another fiber will extend from King St in Derryville which will extend towards the northern and the south Edmunds Rd as well as along the full length of the Delaware Rd which will proceed across and the south Edmunds Rd as well as along the full length of the Delaware Rd which will proceed across above image. New fiber cables will be installed along the north and south ends of both the River Rd and the River Rd. Fiber will be interconnection with the Three Ring Binder (3RB) which has been marked as a blue line on the fiber build out for Edmunds will be broken down into several road segments. From Rt 1 where the placement was also done in select locations.

Edmunds Township has an estimated count of 78 structures within its boundaries. This data was obtained by performing a visual count using online resources and programs such as Google Earth. The maps and panoramic actual structures were counted. Although it does not indicate that 100% are
The following sections will describe each road segment and provide an estimated cost for the FTTP build out.

**Belyea Rd:**

A fiber cable will extend from the intersection of RT 1 and the 3RB starting at the southern entrance of Belyea Rd extending for approx. 2.60 miles. It is estimated that this fiber segment will be able to reach approx. 40 structures within 1000 ft. of Belyea Rd. This fiber segment would be fed from a pole mounted FDN located at the start of the fiber segment on Belyea Rd.

The following lists the estimated costs for providing service to these two segments:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Build</td>
<td>$70,000.00</td>
</tr>
<tr>
<td>FDN</td>
<td>$53,000.00</td>
</tr>
<tr>
<td>FTTP Installs</td>
<td>$80,000.00</td>
</tr>
<tr>
<td>Total</td>
<td>$203,000.00</td>
</tr>
</tbody>
</table>

**River Rd:**

A fiber cable will extend from the intersection of Belyea Rd after it has crossed the river and extend south along Main St in Dennysville for a short distance where it will jump back over to River Rd running south for a total approx. distance of 0.50 miles. It is estimated that this fiber segment will be able to reach approx. 5 structures within 1000 ft. of River Rd. This fiber segment would be fed from the FDN located at the start of Belyea Rd.
The following lists the estimated costs for providing service to these two segments:

**Fiber Build:** $15,000.00  
**FTTP Installs:** $10,000.00  
**Total:** $25,000.00

**Bunker Hill Rd:**

A fiber cable will extend from the intersection of RT 1 extending west and ending at the bridge for a total approx. distance of 0.80 miles. It is estimated that this fiber segment will be able to reach approx. 18 structures within 1000 ft. of Bunker Hill Rd. This fiber segment would be fed from the FDN located at the start of Belyea Rd.

The following lists the estimated costs for providing service to these two segments:

**Fiber Build:** $26,000.00  
**FTTP Installs:** $36,000.00  
**Total:** $62,000.00

**Harrison Rd:**

A fiber cable will extend from the intersection of Bunker Hill Rd extending south until reaching the end for a total approx. distance of 0.80 miles. It is estimated that this fiber segment will be able to reach approx. 15 structures within 1000 ft. of Harrison Rd. This fiber segment would be fed from the FDN located at the start of Belyea Rd.

The following lists the estimated costs for providing service to these two segments:

**Fiber Build:** $24,000.00  
**FTTP Installs:** $30,000.00  
**Total:** $54,000.00
South Edmunds Rd (North and South Segments):

The South Edmunds Rd is unique in that the utility poles along this road segment do not actually meet, due to this a fiber will need to be run from both the north and south entrances of the road in order to facilitate the most ubiquitous coverage.

The northern segment of this fiber will originate from the intersection of RT 1 and the 3RB fiber and will run for approx. 2.20 miles. It is estimated that this fiber segment would be able to reach approx. 30 structures that are within 1000 ft. from the South Edmunds Rd. This fiber segment would be fed from a pole mounted FDN at the start of the road.

The southern segment of this fiber will also originate from the RT 1 and the 3RB and will run for approx. 0.60 miles. It is estimated that this fiber segment would be able to reach approx. 10 structures that are within 1000 ft. from the South Edmunds Rd. This fiber segment would be fed from the FDN that would be established at the start of the northern segment.

The following lists the estimated costs for providing service to these two segments:

-North Segment
Fiber Build: $58,000.00
FDN: $53,000.00
FTTP Installs: $60,000.00

-South Segment
Fiber Build: $16,000.00
FTTP Installs: $20,000.00
Total: $147,000.00
King St:

A fiber cable will extend from the point where Belyea Rd crosses the river; it will then intersect with King St running to the Edmunds Township boundary for a total approx. distance of 1.00 mile. It is estimated that this fiber segment will be able to reach approx. 20 structures within 1000 ft. of King St. This fiber segment would be fed from the FDN located at the start of Belyea Rd or a secondary feed could come from the Cathance Township FDN as will be described further in this report.

The following lists the estimated costs for providing service to these two segments:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Build</td>
<td>$27,000.00</td>
</tr>
<tr>
<td>FTTP Installs</td>
<td>$40,000.00</td>
</tr>
<tr>
<td>Total</td>
<td>$67,000.00</td>
</tr>
</tbody>
</table>
Tide Mill Rd:

The Tide Mill Rd is another unique road similar to the South Edmunds Road in that the utility poles along this segment do not actually meet, due to this a fiber will need to be run from both the north and south entrances of the road in order to facilitate the most ubiquitous coverage.

The northern segment of this fiber will originate from the intersection of RT 1 and the 3RB fiber and will run for approx. 0.40 miles. It is estimated that this fiber segment would be able to reach approx. 4 structures that are within 1000 ft. from the Road. This fiber segment would be fed from the FDN established at the start of the South Edmunds Rd.

The southern segment of this fiber will also originate from the RT 1 and the 3RB and will run for approx. 0.40 miles. It is estimated that this fiber segment would be able to reach approx. 4 structures that are within 1000 ft. from the road. This fiber segment would be fed from the FDN that would be established at the start of the South Edmunds Rd.

The following lists the estimated costs for providing service to these two segments:

-North Segment
  Fiber Build: $15,000.00
  FTTP Installs: $8,000.00
South Segment
Fiber Build: $15,000.00
FTTP Installs: $8,000.00
Total: $46,000.00

The total cost for the entire fiber build of Edmunds Township is estimated at $504,000.00.
Marion Township is a territory where the structure density is located in two distinct areas. The first is along RT 86 which bisects the eastern portion of Washington County from RT 191 to RT 1; and the second cluster is located on a peninsula located at the end of the Gardiner Lake Rd.

Marion Township has an estimated count of 62 structures within its boundaries. This data was obtained by performing a visual count using online resources and programs such as Google Earth, Bing Maps and Panoramio. Actual structures were counted, although it does not indicate that 100% are homes or businesses. Street level mapping as well as onsite observations of utility pole usage and placement was also done in select locations.

The fiber build out for Marion will be broken down into several road segments. From RT 1 where the fiber will interconnect with the Three Ring Binder (3RB), which has been marked as a blue line on the above image. New fiber cables will be installed along the Gardiner Lake Rd where the poles will make a short cut through the trees over to the Sand Beach Rd before intersecting with the Tech Camp Rd. From here the fiber will split off, one direction heading down Lake Shore Rd and the other continuing up Tech Camp Rd until joining with Peninsula Rd. and continuing on to the end of Peninsula Rd. The other fiber segment will be contingent on the completion of the Edmunds Township portion of this project as the fiber will continue from King St and extend to the western boundary of Marion; along with this a short fiber segment will run from RT 86 down the Marion Rd.
The following sections will describe these road segments and provide an estimated cost for the FFTP build out.

**Lake Shore Dr:**

Due to how the boundaries have been created in order to reach the cluster of structures located on this peninsula, a fiber run will have to be built out along roads that do not solely exist inside of the Marion Township territory.

A fiber cable will start at the intersection of RT 1 and the Gardiner Lake Rd and extend up the Gardiner Lake Road but will cut over to Sand Beach Rd due to the existing layout of the utility poles. From Sand Beach Rd it will intersect with Lake Shore Rd and the Tech Camp Rd further to the north for a total approx. distance of 3.50 mile. From this intersection another fiber cable will extend along Lake Shore Rd until the end of the utility poles for another approx. distance of 0.60 miles. It is estimated that this fiber segment will be able to reach approx. 8 structures within 1000 ft. of Lake Shore Dr. This fiber segment would be fed from an FDN located at the start of the Gardiner Lake Rd.

The following lists the estimated costs for providing service to this segment:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Build</td>
<td>$145,000.00</td>
</tr>
<tr>
<td>FDN</td>
<td>$53,000.00</td>
</tr>
<tr>
<td>FTTP Installs</td>
<td>$16,000.00</td>
</tr>
<tr>
<td>Total</td>
<td>$214,000.00</td>
</tr>
</tbody>
</table>
Peninsula Rd:

A fiber cable will continue from the end of the Sand Beach Rd along the Tech Camp Rd for approx. 1.10 miles where it will break off and follow Peninsula Rd to its end for an approx. distance of 2.30 miles. It is estimated that this fiber segment will be able to reach approx. 7 structures within 1000 ft. of Peninsula Rd. This fiber segment would be fed from the FDN located at the start of the Gardiner Lake Rd.

The following lists the estimated costs for providing service to this segment:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Build</td>
<td>$92,000.00</td>
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<tr>
<td>FTTP Installs</td>
<td>$14,000.00</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$106,000.00</strong></td>
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</tbody>
</table>

RT 86:

As was mentioned in the start of the Marion Township section of this report; this particular segment of the fiber build relies on the King St segment being built out in Edmunds Township.

A fiber cable will start from the boundary of the Edmunds Township from King St and proceed westward along RT 86 to the boundary of Marion Township for a total approx. distance of 6.00 miles. It is estimated that this fiber segment will be able to reach approx. 16 structures within 1000 ft. of RT 86. This fiber segment would be fed from an FDN located along RT 86 near the intersection to the Marion Station Rd.
The total cost for the entire fiber build of Marion Township is estimated at $609,000.

<table>
<thead>
<tr>
<th>Total</th>
<th>$1,119,000.00</th>
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<tbody>
<tr>
<td>FTT/Installs</td>
<td>$344,000.00</td>
</tr>
<tr>
<td>Fiber Build</td>
<td>$850,000.00</td>
</tr>
</tbody>
</table>

The following lists the estimated costs for providing service to this segment:

Marion Station Rd:

<table>
<thead>
<tr>
<th>Total</th>
<th>$1,270,000.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTT/Installs</td>
<td>$322,000.00</td>
</tr>
<tr>
<td>FDN</td>
<td>$533,000.00</td>
</tr>
<tr>
<td>Fiber Build</td>
<td>$850,000.00</td>
</tr>
</tbody>
</table>

The following lists the estimated costs for providing service to this segment:

[Rest of the text]

[Additional information]

[Details of the project or service provided]
Cathance Township is a territory that completely relies on the build out of the Marion Township and subsequently the Edmunds Township fiber in order to be viable.

Cathance Township has an estimated count of 91 structures within its boundaries. This data was obtained by performing a visual count using online resources and programs such as Google Earth, Bing Maps and Panoramio. Actual structures were counted, although it does not indicate that 100% are homes or businesses. Street level mapping as well as onsite observations of utility pole usage and placement was also done in select locations.

The fiber build out for Cathance will be broken down into several road segments. From RT 86 where the fiber will interconnect with the fiber build previously discussed in the Marion Township section a new fiber cable will be installed along the E. Ridge Rd for an approx. distance of 1.90 miles. Heading north along RT 191 the fiber will pick up from the western termination of the Marion Township fiber and continue up towards Cathance Lake for a total approx. distance of 5.77 miles. A final fiber segment will start from RT 191 and head down W. Shore Rd for an approx. distance of 0.56 miles. A pole mounted FDN will be installed at the intersection of RT 191 and W. Shore Rd.
The following sections will describe these road segments and provide an estimated cost for the FTTP build out.

**E. Ridge Rd:**

A fiber run will start at the intersection of RT 86 and the E. Ridge Rd and run for a total approx. distance of 1.90 miles. It is estimated that this fiber segment will be able to reach approx. 16 structures within 1000 ft. from the E. Ridge Rd. This fiber segment would be fed from the FDN located near the start of the Marion Station Rd.

The following lists the estimated costs for providing service to this segment:

- **Fiber Build:** $43,000.00
- **FTTP Installs:** $32,000.00
- **Total:** $75,000.00
RT 191:
A fiber run will continue from RT 86 where the cable terminates from the Marion Township project and run a short distance where it will intersect with RT 191 and run north for an approx. distance of 5.77 miles. It is estimated that this fiber segment will be able to reach approx. 46 structures within 1000 ft. from RT 191. This fiber segment would be fed from an FDN located near the intersection of RT 191 and W. Shore Rd.

The following lists the estimated costs for providing service to this segment:

Fiber Build: $155,000.00
FDN: $53,000.00
FTTP Installs: $92,000.00
Total: $300,000.00

W. Shore Rd:
A new fiber will start at the intersection of RT 191 and W. Shore Rd running down the W. Shore Rd for an approx. distance of 3.56 miles. It is estimated that this fiber segment will be able to reach approx. 29 structures within 1000 ft. of W. Shore Rd. This fiber segment would be fed from the FDN located near the intersection of RT 191 and W. Shore Rd.
The following lists the estimated costs for providing service to this segment:

- Fiber Build: $15,000.00
- FTTP Installs: $58,000.00
- Total: $73,000.00

The total cost for the entire fiber build of Cathance Township is estimated at $448,000.00.
Berry Township is a territory that has very few structures within its boundaries with a fair amount of geographic separation between structures, it is estimated that there are 16 structures within the Berry Township boundary. This data was obtained by performing a visual count using online resources and programs such as Google Earth, Bing Maps and Panoramio. Actual structures were counted, although it does not indicate that 100% are homes or businesses. Street level mapping as well as onsite observations of utility pole usage and placement was also done in select locations. In this particular case, many are most likely seasonal dwellings with little to no land line utilities available.

This section of the report will focus primarily on the structures located close to RT 191 but there will still be a cost analysis provided for running a fiber up the 18th Rd.

RT 191:

A fiber will run from the intersection of RT 86 and RT 191 extending to the south west for an approx. distance of 2.40 miles. It is estimated that this fiber segment will be able to reach approx. 6 structures within 1000 ft. of RT 191. This fiber segment would be fed from either the FDN located in Marion Township or the one located in Cathance Township.
The following lists the estimated costs for providing service to this segment:

- Fiber Build: $60,000.00
- FTTP Installs: $12,000.00
- Total: $72,000.00

18th Rd:

This segment (shown in red on the map above) is primarily to show what the estimated cost would be to run fiber the length of the 18th Rd to supply service to an estimated 3 structures within 1000 ft. of the 18th Rd, it is estimated that the distance of this segment is 4.93 miles. The majority of the costs associated with this fiber build are due to the lack of utility poles for the majority of this road. This build assumes that poles will need to be installed approx. every 250 – 500 ft.

- Fiber Build: $339,000.00
- FDN: $53,000.00
- FTTP Installs: $6,000.00
- Total: $398,000.00

The total cost for the entire fiber build of Berry Township is estimated at $470,000.00.
T19 ED BPP is another territory that has very few structures within its boundaries with a fair amount of geographic separation between structures, it is estimated that there are 17 structures within its boundaries. This data was obtained by performing a visual count using online resources and programs such as Google Earth, Bing Maps and Panoramio. Actual structures were counted, although it does not indicate that 100% are homes or businesses. Street level mapping as well as onsite observations of utility pole usage and placement was also done in select locations. In this particular case, many are most likely seasonal dwellings with no land line utilities available.

This territory also relies on the Berry Township fiber to be constructed along the 18th Rd to accommodate this project.

Wesley Rd:

This segment (shown in red on the map above) is primarily to show what the estimated cost would be to run fiber the length of Wesley Rd within the boundary of this territory, the distance is estimated at approx. 7.23 miles. It is estimated that this fiber segment will be able to reach approx. 6 structures within 1000 ft. of the Wesley Rd. The majority of the costs associated with this fiber build are due to the lack of utility poles for the majority of this road. This build assumes that poles will need to be installed approx. every 250 – 500 ft.

Fiber Build:   $555,000.00  
FTTP Installs: $12,000.00  
Total:         $567,000.00

The total cost for the entire fiber build for T19 ED BPP is estimated at $567,000.00.
The Centerville territory is another unique area where due to its geographic boundaries it will require a fiber build that extends through another town in order to reach the majority of the structures within its territory borders. This fact along will increase the initial cost to reaching these structures. It is estimated that there are 26 structures within its boundaries. This data was obtained by performing a visual count using online resources and programs such as Google Earth, Bing Maps and Panoramio. Actual structures were counted, although it does not indicate that 100% are homes or businesses. Street level mapping as well as onsite observations of utility pole usage and placement was also done in select locations.
**Columbia Falls Rd:**

This fiber segment is primarily construction required in order to reach the Mitton Mountain Rd and Caler Rd. The fiber will start at the intersection of RT and the Columbia Falls Rd in Columbia Falls and will interconnect with the 3RB. It will run for an approx. distance of 4.00 miles before intersecting with the Mitton Mountain Rd. It is estimated that this fiber segment will be able to reach approx. 2 structures within 1000 ft. of the Columbia Falls Rd. This fiber segment would be fed from an FDN located near the intersection of the Mitton Mountain Rd and the Columbia Falls Rd.

The following lists the estimated costs for providing service to this segment:

- Fiber Build: $90,000.00
- FDN: $53,000.00
- FTTP Installs: $4,000.00
- Total: $147,000.00

**Mitton Mountain Rd:**

This fiber segment continues on from where it intersects with the Columbia Falls Rd and continues in a northerly direction for a distance of approx. 2.11 miles. It is estimated that this fiber segment will be able to reach approx. 7 structures within 1000 ft. from the Mitton Mountain Rd. This fiber segment would be fed from the FDN previously established at the intersection of the Mitton Mountain Rd and the Columbia Falls Rd.
Fiber Build: $52,000.00  
FTTP Installs: $14,000.00  
Total: $66,000.00

Caler Rd:

This new fiber segment starts from the intersection of the Mitton Mountain Rd and proceeds north for an approx. distance of 1.27 miles. It is estimated that this fiber segment will be able to reach approx. 10 structures within 1000 ft. from the Caler Rd. This fiber would be fed from the FDN previously established at the intersection of the Mitton Mountain Rd and the Columbia Falls Rd.

Fiber Build: $28,000.00  
FTTP Installs: $20,000.00  
Totals: $48,000.00

The total cost for the entire fiber build for Centerville is estimated at $261,000.00.