



PULSE BROADBAND, LLC
FTTH FEASIBILITY STUDY REPORT

LYNDON TOWNSHIP, MI

April 29, 2016

Pulse Broadband LLC has been engaged by Lyndon Township to complete a detailed feasibility study for building a fiber-to-the-home network and offering double play telecom services (Internet and VoIP Telephone) offered to its entire area.

Pulse completed an on-site field review by Pulse technical outside plant staff. We utilized this visit to evaluate some of the initial assumptions built into the model and review the condition of the plant. We completed a bandwidth analysis to determine the availability of internet hand-off points and pricing. We conducted a thorough field assessment, analyzed aerial and underground construction, defined cost differences, and determined real-world costs for Lyndon's footprint. Finally, we completed detailed financial modeling to evaluate economic feasibility. It is our pleasure to provide the results of this independent feasibility study.

The feasibility study provides details for all of our calculations, but the highlights include:

1. Fiber plant miles. We received PDF maps provided by Consumers Energy and cross referenced the calculated miles with Washtenaw Road Commissions shape files. We calculated 64.6 miles for your fiber plant. This figure was discussed with the Broadband Cooperative and some roads were removed to bring the final assumption to 62.8 miles. This mileage was used in both construction method models.
2. Aerial construction using Consumers Energy poles. The cost of construction to Lyndon Township (not including ISP costs) is \$5,931,816. This includes \$107,765 of pole assessment fees to Consumers Energy and \$2,682,354 make ready estimates based on preliminary information from Consumers Energy. Final make ready costs can only be determined by Consumers Energy. Pulse Broadband used its best efforts at estimating those costs based on a conversation with Consumers energy.
3. 100% underground construction. If Lyndon Township decides to bypass Consumers Energy and builds all underground, then the total cost of construction increases to \$6,295,086.
4. ISP partner. Our model projects \$659,214 as startup costs for the ISP. Based on \$46.50 core offer prices, we believe the ISP can operate at breakeven. Lyndon Township might have a tough time generating interest with only 600 estimated customers. We suggest vetting ISP's as part of next steps.

We look forward to working with Lyndon Township on this important strategic, regional infrastructure project which will bring the capability of gigabit broadband access to your residents and communities. We've included a paragraph at the beginning of the report to provide credibility for any reader unfamiliar with Pulse. Please free to distribute our report for any required business purposes and include my contact information as needed.

Sincerely,



Eric Freesmeier, CEO
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ABOUT PULSE BROADBAND

Pulse was formed with the sole purpose of partnering with rural America to bring fiber technology to underserved areas. Since our formation in 2008, we have partnered with electric cooperatives, municipal entities, and private groups to build over 5,000 miles in successful FTTH projects. In addition to our fiber design and construction management expertise, we offer a full suite of telecom services, from feasibility studies of a new network to back office support services for existing companies. This 360° view of the industry, along with our years of hands-on experience, give Pulse the distinction of being one of the true leaders in the rural Fiber-to-the-Home industry.

There is no project too small, or too large, which is outside the scope of our expertise. Our projects have ranged in size from 25 miles with 900 passings to 1,800 miles with 26,500 passings. Each project has been unique and our collaborative approach with every owner has brought a customized solution. The variations and complexities of each project have given us invaluable real-world experience. These experiences enable us to take a deep-dive with each new client to ask the right questions, inspect critical areas, and discover hidden problems to ensure our studies, models, and designs produce the most accurate outcomes.

Pulse Broadband is a full-service firm offering feasibility studies, financial modeling, fiber design, technology selection, construction management, vendor (bandwidth, VoIP, video and network management) negotiations, and back office support. Our working knowledge in each of these critical areas allows us to make more informed decisions. Whichever service our clients need; this holistic approach gives them the confidence that they are setup for success.

BANDWIDTH ANALYSIS

ANALYSIS OF PROVIDERS

Terie Hannay, our VP of Planning and Integration, conducted a thorough investigation of all local providers. She gathered their initial pricing, terms and connection points. Terie is happy to report that bandwidth is readily available at competitive prices.

The below quotes were received for the Township Hall at 17751 N. Territorial Road. We have requested additional quotes for the Dexter fire station at 12088 N. Territorial Road and also the Chelsea Library at 221 S. Main Street. Based on preliminary responses from vendors the pricing and availability for these two alternative locations will be the same or similar to the schedule below.

The top quote received for the Lyndon Township is from Birch Communications, a strong mid-tier provider. Their pricing for a 500MB circuit is \$2,199 and a 1GB is \$2,499. The ISP model reflects \$3,300 so the ISP has flexibility to choose their provider. Refer to the chart below outlining the available carriers and their preliminary pricing and terms (3 years).

Summary of Provider Offerings				
Provider	500 MB	1 GB	Installation	Term
Cogent	\$3,287	\$5,035	\$2,000	3 yrs.
ATT	\$3,144	\$4,336	\$0	3 yrs.
XO Communications	\$4,107	\$8,633	\$0	3 yrs.
Level 3	\$4,873	\$6,000	\$0	3 yrs.
Birch	\$2,199	\$2,499	\$0	3 yrs.
ACC	\$2,944	\$4,136	\$1,500	3 yrs.
US Signal	\$3,665	\$5,554	\$0	3 yrs.
123.Net	\$3,639	\$4,999	\$0	3 yrs.
TelNet WW	\$2,545	\$3,945	\$0	3 yrs.
Century Link	\$6,086	\$8,569	\$0	3 yrs.
ComLink	\$3,285	\$4,630	\$0	3 yrs.

CONCLUSION

Multiple providers have provided reasonable quotes and guidance that other locations would be similar. Bandwidth pricing could be negotiated further. We are confident that the ISP can provide adequate service with these prices.

ELECTRIC PLANT DATA

Consumers Energy supplied Pulse Broadband with information about the electric plant in Lyndon Township's footprint. Consumers Energy supplied 36 PDF prints of the electric plant. These maps visually showed the layout of the plant and pole locations. These maps, however, were lacking critical pieces of data:

- Total number of poles
- Span lengths for aerial and underground
- Defined scale
- All prints drawn to the same scale

In order to determine the number of utility poles in Lyndon's footprint, Pulse manually added the number of poles from the 36 PDF files. The number of calculated utility poles is 1,936. Since there was no scale, nor were prints drawn to the same apparent scale, Pulse estimated a scale for each print. This was accomplished by taking each individual print, finding a scaled map of the same real-world location, and transferring this scale to the print. The lengths of electric spans were then measured and totaled for each print.

CONSUMERS ENERGY MAP CALCULATION

The number of utility poles (1,936) used for aerial construction were calculated as described above. The proposed path for aerial construction utilized the path of Consumers Energy's electric plant. The path and maps (36 PDF prints) were supplied by Consumers Energy. The length of aerial spans was calculated using the following steps:

- Identify scale on each map, reference point on Google Earth
- Define sections of Consumers Energy plant used for construction
- Measure each line on each map
- Sum spans on each map
- Sum total spans from 36 prints

The path for underground construction was determined by a combination of Alan's on-site visit, Consumers Energy's plant, and Washtenaw Road Commission data. The path and length of underground construction was calculated using the following steps:

- Identify scale on each map, reference point on Google Earth
- Define possible path along roads following power
- Identify path along roads that do not follow power
- Measure each line on each map
- Sum underground path on each map
- Sum underground path from 36 prints

The following tables summarizes the estimated data:

Data calculated using Consumers Energy maps	
Number of Utility Poles	1,936
Total Calculated Miles	65

The following map illustrates the proposed path for the fiber network based on Consumers Energy PDF maps:

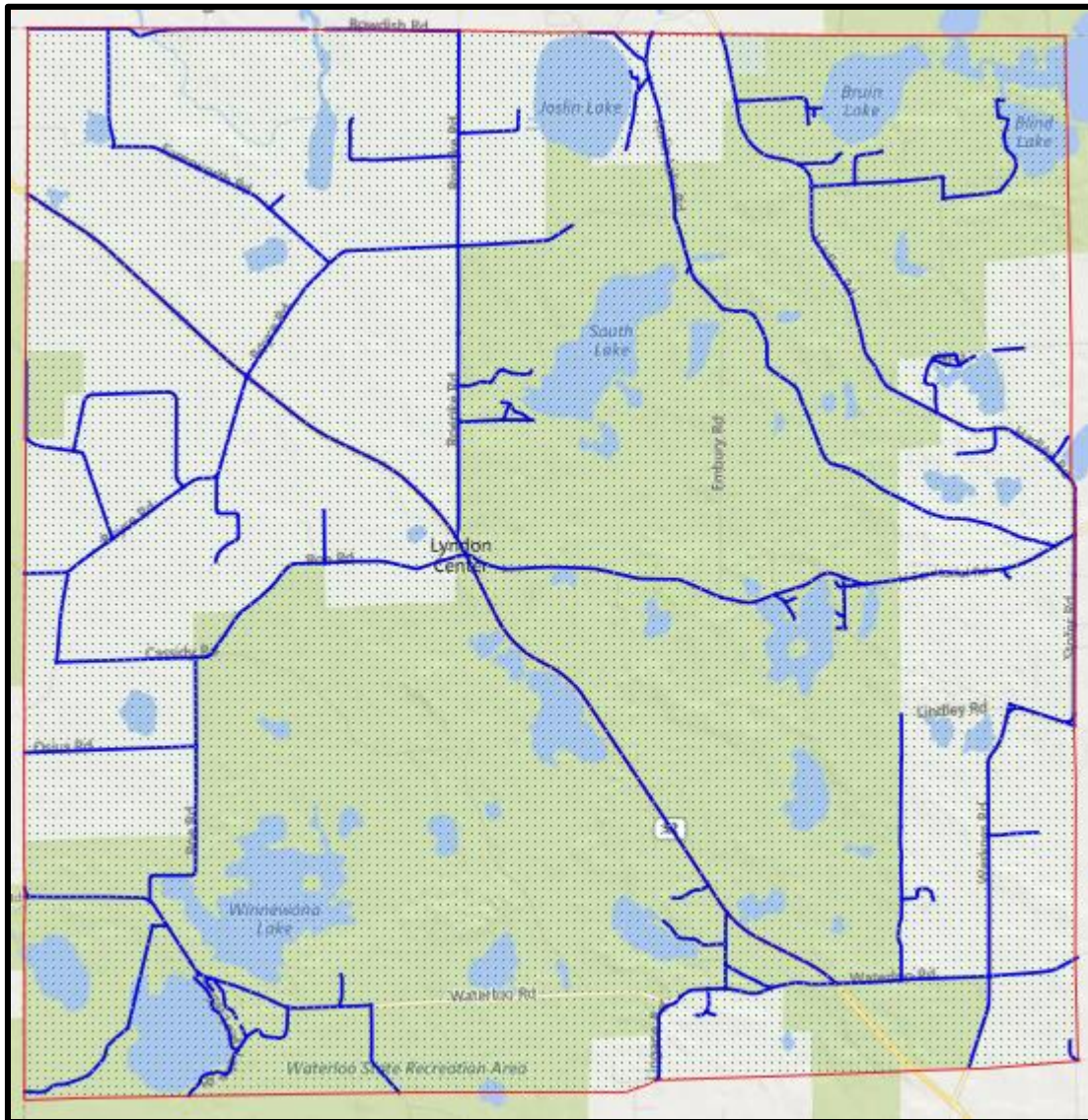


Figure 1. Map Illustrating Proposed Path for Fiber

VERIFY MILEAGE

In order to verify the mileage, Pulse referenced the data supplied by Washtenaw Road Commission. Pulse was provided the road data shapefile for Lyndon Township from the Washtenaw Road Commission. This data provided all roads within Lyndon Township's footprint, regardless if they would be within the path of the broadband network. Pulse completed the following steps to determine a more accurate count of road miles used for construction of the broadband network:

1. Tally road miles from the Washtenaw Road Commission shapefile
2. Identify roads that would not be within the path of construction
3. Subtract these roads from the shapefile
4. Tally all remaining road miles representing the proposed path of construction

The following pictures depict the roads contained within the Washtenaw Road Commission shapefile and suggested roads to remove from the fiber network:

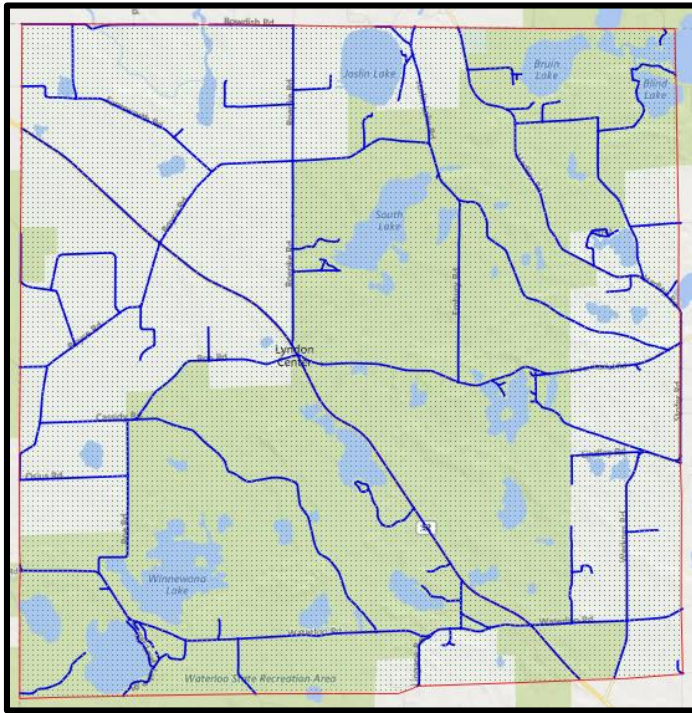


Figure 2. Map depicting Washtenaw Road Commission Shapefile

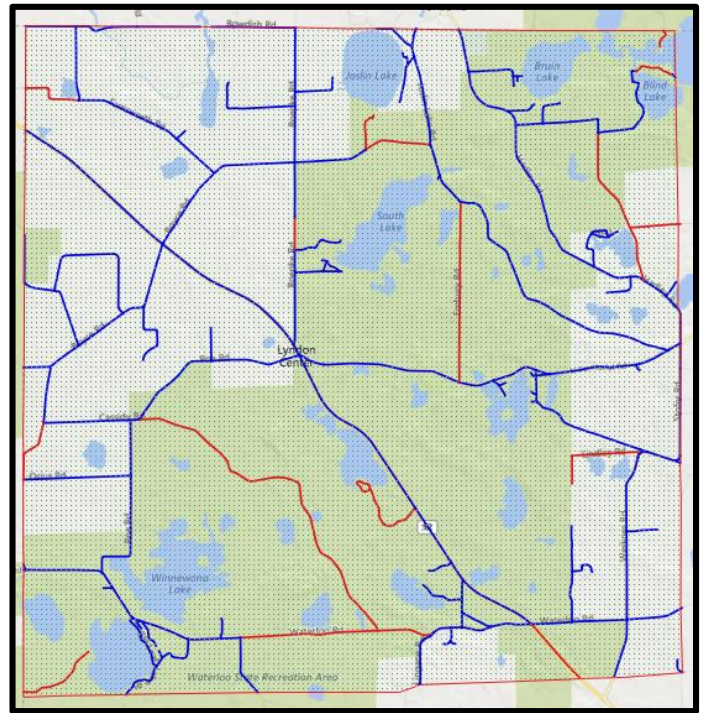


Figure 3. Map depicting roads (highlighted in RED) removed.

The following picture depicts the actual roads used in the calculation of road miles to be compared to the figure from the Consumers Energy calculation:

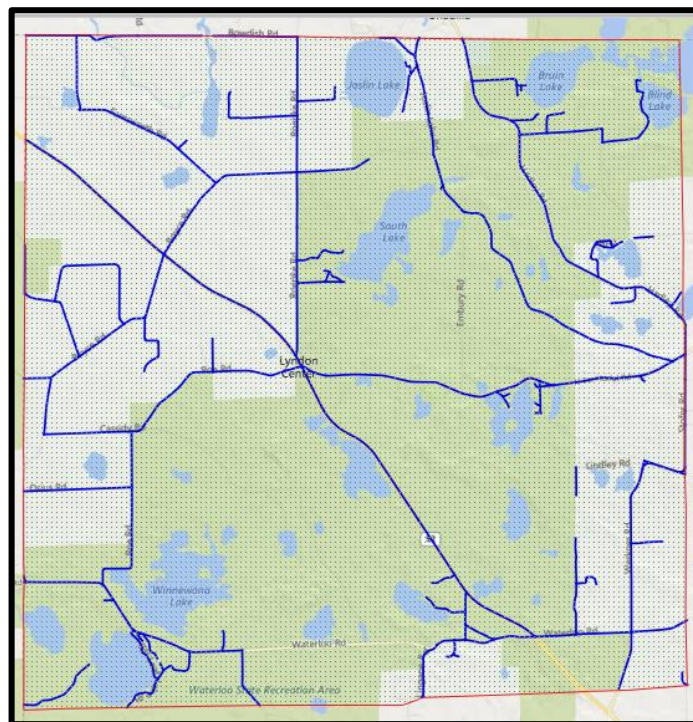


Figure 4. Map depicting net road miles used for calculation.

Comparison of two methods	
Consumers Energy	65
Washtenaw Road Commission	64.6

CORE BUSINESS MODEL ASSUMPTIONS

Our financial models make the following assumptions for both construction methods:

1. Distributed Split Architecture
2. GPON Technology
3. ISP will run operations
 - a. Headend costs will be removed from network cost estimate
 - b. GPON ONT will be removed from network cost estimate
 - c. Installation will be removed from network cost estimate
 - d. Base monthly service rate of \$46.50 will be required to cover above costs plus the operation expenses to run their business
4. Lyndon Township needs total upfront amount to build network
5. Pulse estimates 50% of homes will take service and Lyndon Township will pay the construction of the drop. The assumed drop length is 600 ft. in the model. The township could reduce costs by requiring home owners with drop lengths (which includes some footage back to the terminal along the main pole line) over 300 ft. to cover their own additional costs. Aerial model savings would be \$410,000 and underground model savings would be \$735,000.

CONSTRUCTION COMPARISON: AERIAL VS. UNDERGROUND

The majority of broadband networks will incorporate a hybrid design utilizing both aerial and underground construction. The selection of preferred construction will be based upon such factors as ease of construction, reduction in make-ready costs, environmental, and permitting. When an entity does not own the poles, this adds another layer for decision making. Pulse's financial model incorporates the costs of all factors and produces results to assist in determining the preferred construction method. Consumers Energy is the local provider of electricity and owns the poles within Lyndon's footprint. Lyndon Township, with the assistance of Michigan Broadband Cooperative and Pulse Broadband, has obtained various costs associated with aerial construction utilizing Consumers Energy's utility poles. The following table summarizes the additional costs:

Estimated Costs to Consumers Energy			
	Price	Units	Total Cost
Pole Assessment	\$57.25/pole	1,882	\$107,765
Pole Replacement	\$3,000/pole	565	\$1,694,118
Make-Ready Construction	\$750/pole	1,317	\$988,236
Total Additional Aerial Construction			\$2,790,119

In addition to the upfront costs incurred during construction, Lyndon Township will be required to pay annual pole rent and maintenance fees to Consumers Energy. The following table shows the value of the annual pole rent:

Simple Present Value Annual Ongoing Operating Costs			
	Price	Units	Total Cost
Pole Attachment Fee	\$8.50/pole	1,882	\$16,000
Annual Maintenance Fee	\$3.50/pole	1,882	\$6,588
Total Annual Ongoing Costs			\$22,588
X 20 years			\$451,765

The below table shows the model for aerial construction costs:

Total Project Costs – Aerial Model	
Pole Assessment	\$107,765
Pole Replacement	\$1,694,118
Other Make Ready	\$988,236
Aerial Construction	\$1,453,761
UG Construction	\$328,303
Permits	\$1,800
Drop Construction	\$906,068
Simple PV Pole Rent/Maintenance	\$451,765
Total	\$5,931,816

At the on-site field review, Alan Van Buskirk and Rudy Tober were made aware of Lyndon Township's desire to explore the option for 100% underground construction. A critical factor driving the need for underground construction is Lyndon Township does not own the utility poles. Lyndon Township wants to compare the upfront cost of underground construction versus the upfront and on-going costs of aerial construction. Lyndon Township also desires to have the most advanced broadband network, which they believe involves underground construction. An underground network is also more protected from weather.

The following table shows the model for 100% underground construction costs:

Total Project Costs – Underground Model	
Pole Assessment	\$0
Pole Replacement	\$0
Other Make Ready	\$0
Aerial Construction	\$0
UG Construction	\$4,708,554
Permits	\$36,000
Drop Construction	\$1,550,532
Simple PV Pole Rent/Maintenance	\$0
Total	\$6,295,086

CONSTRUCTION MODEL COMPARISON

The following table compares the costs for the two models:

Total Project Costs – Model Comparison		
	Aerial/UG	Underground
Pole Assessment	\$107,765	\$0
Pole Replacement	\$1,694,118	\$0
Other Make Ready	\$988,236	\$0
Aerial Construction	\$1,453,761	\$0
UG Construction	\$328,303	\$4,708,554
Permits	\$1,800	\$36,000
Drop Construction	\$906,068	\$1,550,532
Simple PV Pole Rent/Maintenance	\$451,765	\$0
Total	\$5,931,816	\$6,295,086

DETAIL PROJECT COSTS — AERIAL MODEL

CAPITAL BUDGET ASSUMPTIONS

Capital costs to construct the network will be approximately \$6,000,000. The timeline anticipated for the build is 12 months based on achievable milestones plus the construction preparation time. The following assumptions were made in the capital projections for the financial model:

- Outside Plant Construction:
 - 62.8 miles of distribution plant will be constructed over the course of 12 months. Construction is assumed to begin in Month 4 and to be completed by Month 16.
 - The cost of aerial construction is estimated at \$69,319 per mile. Make ready costs for Consumers Energy is \$42,707 per mile. Total aerial labor excluding make ready is \$11,302 (plant labor less make ready plus technical labor). Materials cost per mile is \$8,239. We have assumed a majority (60%) of fiber will be 96 count fiber. The \$69,319 referenced above includes professional services discussed below.
 - The cost of underground construction is estimated at \$104,542 per mile. The model assumes a fixed number of pedestals based on homes passed. This causes higher than anticipated cost per mile when a low number of underground miles are assumed in the model. The \$104,542 referenced above includes professional services discussed below.
- Drop Construction:
 - 579 homes are expected to sign up for services over the course of two years.
 - The cost of drop construction is \$1,565 per home. Labor is \$1,380 and materials are \$147. Aerial pole line is utilized and 30% underground for drops is assumed. Conduit is not utilized unless boring (driveways and sidewalks) is required.
 - Drop length of 600 feet is assumed per home.
 - Inside the home installation including ONT electronics will be the responsibility of the ISP partner.
- Professional Services:
 - The mapping of the outside plant is required to create the fiber design. This will require an estimated 754 hours over the course of six months to complete. The design of the outside plant is estimated at 356 hours over the course of six months to complete.
 - Project management for project planning, inspection of contractors and invoice approval/reconciliation is estimated to require a crew of two over the course of 12 months for a total of 3,780 hours.
 - Drop surveys to provide the fiber route from the distributed split to the side of the house for contractors is estimated at 261 hours to map and draft. These will be completed over the course of a year.

CAPITAL BUDGET

		Township		
PROJECT:	SERVICE AREA:	Unit Cost	No. of Units	Total Costs
FTTH Network	Lyndon Township, MI			
OUTSIDE PLANT LABOR				
Pre-Construction	Complete Make Ready Construction	\$ 42,707.20	59.7	\$ 2,548,236
	Pole Assessment	\$ 150	-	\$ -
Aerial	PM99 (Move Pole Facilities)	\$ 72.00	188	\$ 13,553
	CO12(6M) [Hang stranded fiber]	\$ 0.95	31,504	\$ 29,929
	CO24(6M) [Hang stranded fiber]	\$ 0.95	31,504	\$ 29,929
	CO48(6M) [Hang stranded fiber]	\$ 0.95	31,504	\$ 29,929
	CO96(6M) [Hang stranded fiber]	\$ 0.95	189,027	\$ 179,576
	CO144(6M) [Hang stranded fiber]	\$ 1.05	31,504	\$ 33,080
	PM2A [Aerial Bond]	\$ 4.50	376	\$ 1,694
	PF3-3 [Place Screw Anchor]	\$ 40.00	179	\$ 7,160
	PE1-3 [Place down guy]	\$ 24.00	179	\$ 4,296
	PF3-AUX [Install auxiliary eye]	\$ 8.00	119	\$ 955
	PM69 [Place fiber storage loop]	\$ 50.00	119	\$ 5,967
Underground	BMUDT [Trench Conduit]	\$ 5.50	13,265	\$ 72,958
	BMUDD [Bore Conduit]	\$ 12.00	3,316	\$ 39,795
	BFO12 [Pull Fiber]	\$ 0.90	1,658	\$ 1,492
	BFO24 [Pull Fiber]	\$ 0.90	1,658	\$ 1,492
	BFO48 [Pull Fiber]	\$ 0.90	1,658	\$ 1,492
	BFO96 [Pull Fiber]	\$ 0.90	9,949	\$ 8,954
	BFO144 [Pull Fiber]	\$ 0.90	1,658	\$ 1,492
	BM71 [Rock Adder]	\$ 10.00	829	\$ 8,291
	BD5 [Pedestals]	\$ 60.00	579	\$ 34,740
	BM2-A [Grounding]	\$ 40.00	579	\$ 23,160
	BM80 [Risers]	\$ 50.00	66	\$ 3,316
	BM53 [Markers]	\$ 20.00	99	\$ 1,990
	BHF [Handholes]	\$ 300.00	33	\$ 9,949
Technical	SPL [Install Splitter]	\$ 50.00	21	\$ 1,034
	SPL-CBN [Install Splitter Cabinet]	\$ 1,000.00	5	\$ 5,147
	HACO12 [Splice Enclosures for 12 ct]	\$ 125.00	66	\$ 8,291
	HACO24 [Splice Enclosures for 24 ct]	\$ 125.00	66	\$ 8,291
	HACO48 [Splice Enclosures for 48 ct]	\$ 135.00	66	\$ 8,954
	HACO96 [Splice Enclosures for 96 ct]	\$ 150.00	50	\$ 7,500
	HACO144 [Splice Enclosures for 144 ct]	\$ 150.00	66	\$ 9,949
	TERM	\$ 150.00	290	\$ 43,425
	HO1 [Splicing with bi-directional testing]	\$ 25.00	10,540	\$ 263,502
			Total	\$ 3,449,517

		Township		
PROJECT:	SERVICE AREA:	Unit Cost	No. of	Total
FTTH Network	Lyndon Township, MI		Units	Costs
OUTSIDE PLANT MATERIALS				
Fiber	12 ct. Loose Tube Fiber	\$ 0.30	37,207	\$ 11,162
	24 ct. Loose Tube Fiber	\$ 0.35	37,207	\$ 13,023
	48 ct. Loose Tube Fiber	\$ 0.45	37,207	\$ 16,743
	96 ct. Loose Tube Fiber	\$ 0.70	223,245	\$ 156,271
	144 ct. Loose Tube Fiber	\$ 1.00	37,207	\$ 37,207
Aerial	1/4" EHS Strand	\$ 0.14	319,520	\$ 44,733
	Lashing wire 0.038" Type 302 1,600' Roll	\$ 24.00	282	\$ 6,758
	Weaver(Bonding Clamp)	\$ 1.75	555	\$ 972
	#6 Bare Copper Ground Wire	\$ 0.34	989	\$ 336
	Anchor 8" Helix	\$ 26.89	179	\$ 4,813
	Sno-Shoe (pair)	\$ 39.95	119	\$ 4,767
	Stainless Steel Strap	\$ 0.20	4,003	\$ 801
	1/2" Spacer	\$ 0.12	4,003	\$ 480
	Guy Guards	\$ 3.08	179	\$ 551
	Auxilliary Eye	\$ 14.39	119	\$ 1,717
Stranded Hardware	#4 Split Bolt	\$ 0.81	376	\$ 305
	Preformed Deadend 1/4" Strand	\$ 3.21	1,111	\$ 3,566
	12" x 5/8" Machine Bolt w/ Nut	\$ 1.07	941	\$ 1,007
	2"x1/8" Flat Square Washer	\$ 0.30	2,240	\$ 672
	5/8"-11 Square Nut	\$ 0.22	1,497	\$ 329
	3 Bolt Clamp	\$ 4.38	1,129	\$ 4,947
	3 Bolt Clamp Curved	\$ 5.48	376	\$ 2,063
	5/8"Thimble Eye Bolt	\$ 3.90	179	\$ 698
	Bug nut(D Lash Clamp)	\$ 0.30	4,003	\$ 1,201
	Guy Hook - Ram's Head	\$ 3.01	179	\$ 539
Underground	Arnco 1.25" HDPE Conduit	\$ 0.52	16,581	\$ 8,622
	Channell 24x36x24 Handhole	\$ 193.40	33	\$ 6,414
	Channell Pedestal	\$ 55.00	579	\$ 31,845
	Pedestal Stickers	\$ 0.70	579	\$ 405
	0.75" Flex Conduit - 20'	\$ 9.70	133	\$ 1,287
	Screw Lags	\$ 0.25	1,327	\$ 332
	5/8" x 8' Copper Ground Rod	\$ 10.31	612	\$ 6,311
	Ground Rod Clamp	\$ 0.90	612	\$ 551
	Warning Marker	\$ 14.60	99	\$ 1,453
Technical	"A" Splice Enclosure	\$ 220.00	133	\$ 29,183
	"C" Splice Enclosure	\$ 250.00	116	\$ 29,081
	"D" Splice Enclosure	\$ 285.00	66	\$ 18,903
	Splice Trays for A Enclosure	\$ 20.00	265	\$ 5,306
	Splice Trays for C Enclosure	\$ 22.00	399	\$ 8,777
	Splice Trays for D Enclosure	\$ 25.00	398	\$ 9,949
	Aerial Clamps for FOSC 450	\$ 25.82	315	\$ 8,141
	Splitter Cabinets	\$ 5,000.00	5	\$ 25,733
	Splitters	\$ 800.00	21	\$ 16,543
	AirFOSC	\$ 150.00	290	\$ 43,425
	Splice Protector (sleeves)	\$ 0.27	10,540	\$ 2,846
			Total	\$ 570,770

		Township		
PROJECT:	SERVICE AREA:	Unit Cost	No. of Units	Total Costs
FTTH Network	Lyndon Township, MI			
DROP TO THE HOME				
Labor	CO2(6M) [Hang stranded fiber]	\$ 0.90	208,440	\$ 187,596
	BMUDT [Trench No Conduit]	\$ 2.00	125,064	\$ 250,128
	BMUDD [Bore Conduit]	\$ 12.00	13,896	\$ 166,752
	BFO2 [Pull Fiber]	\$ 1.00	138,960	\$ 138,960
	BM83 [Drop Riser Guard]	\$ 25.00	232	\$ 5,790
	BM(0.75) [House Cane]	\$ 13.00	232	\$ 3,011
	PM2A [Aerial Bond]	\$ 4.50	347	\$ 1,563
	BM2-A [Grounding]	\$ 40.00	347	\$ 13,896
	NID [Place NID Housing]	\$ 25.00	579	\$ 14,475
	HO1 [Splicing]	\$ 25.00	579	\$ 14,475
	HO1T [Testing]	\$ 4.00	579	\$ 2,316
Materials	2 Ct. Loose Tube Fiber	\$ 0.20	347,400	\$ 69,480
	Lashing wire 0.038" Type 302 1,600' Roll	\$ 24.00	156	\$ 3,752
	0.75" Flex Conduit - 20'	\$ 9.70	232	\$ 2,247
	Arnco 0.75" HDPE Conduit	\$ 0.30	13,896	\$ 4,169
	Weaver(Bonding Clamp)	\$ 1.84	347	\$ 640
	#6 Bare Copper Ground Wire	\$ 0.38	347	\$ 130
	#4 Split Bolt	\$ 1.33	347	\$ 462
	5/8" x 8' Copper Ground Rod	\$ 10.31	347	\$ 3,582
	Ground Rod Clamp	\$ 0.90	347	\$ 313
	Splice Protector (sleeves)	\$ 0.27	695	\$ 185
	Calix 700 Series ONT Enclosure	\$ -	579	\$ -
			Total	\$ 1,051,831
PROFESSIONAL SERVICES				
Plant Design/Mgmt	OSP Field Verification/GPS Mapping	\$ 86.11	754	\$ 64,902
	OSP Drafting/Design	\$ 83.53	356	\$ 29,729
	OSP Project Management/Inspection	\$ 92.46	3,780	\$ 349,500
Drop Design/Mgmt	Service Entrance Mapping/Drafting	\$ 85.00	261	\$ 22,147
	Service Entrance Mgmt/Inspection	\$ -	-	\$ -
				\$ -
			Total	\$ 466,277

GRAND TOTAL \$ 5,628,396

MODEL ASSUMPTIONS AND OUTPUT

The below inputs drive the 20-year Pulse financial model created for Lyndon Township.

Plant Statistics:

Homes Passed	1,158
Small Bus Passed	0
Large Commercial	0
Total Miles	62.8
UG %	5.0%
Do you own the poles?	No
Pole Condition	Good
Underground Construction Conditions	Good
Number of Substations	0

Construction Statistics:

Make Ready Per Aerial Mile	\$42,707
Aerial Production	75 miles per month
UG Production	5 miles per month
Avg. Length of Drop fiber along main	400.0
Avg. Length of Drop fiber from main to	200.0
UG Drop %	40.0%
Avg. Feet between splices	500.0

Capital Expenditures			
Summary of Total Capital Required			
Construction Costs		\$5,370,486	
Ongoing Capital Costs at Launch		\$561,330	
Total Project Capital Costs		\$5,931,816	
Construction Costs			
	Unit Cost	x Quantity	= Total
Headend/Office Space	\$204,722	0	\$0
Cabinet Equipment	\$89,722	0	\$0
Aerial Construction (A)	\$69,319	59.7	\$4,136,116
Underground Construction (B)	\$104,542	3.1	\$328,303
Drop Construction (C)	\$1,565	579	\$906,068
Total Construction			\$5,370,486
<i>Details for construction costs above:</i>			
(A) Aerial Cost Per Mile		(B) Underground Cost Per Mile	
Plant Labor (inc. Make Ready)	\$48,340	Plant Labor	\$66,591
Technical Labor	\$5,670	Technical Labor	\$5,670
Fiber	\$3,732	Fiber	\$3,732
Aerial Materials	\$1,356	UG Materials	\$18,327
Technical Mat.	\$3,151	Technical Mat.	\$3,151
Design	\$1,507	Design	\$1,507
Constr. Mgmt	\$5,565	Constr. Mgmt	\$5,565
Total Aerial	\$69,319	Total UG	\$104,542
		(C) Drop Cost Per Home	
		Plant Labor	\$1,326
		Tech. Labor	\$54
		Fiber	\$120
		Materials	\$27
		NID Enclosure	\$0
		Design	\$38
		Constr. Mgmt	\$0
		Total Drop	\$1,565
Ongoing Capital Costs at Launch			
	Cost	x Quantity	= Total
Pole Assessment	\$57	1,882	\$107,765
Permits	\$1,200	1.5	\$1,800
Simple PV of Pole Rent (20 yrs)	\$22,588	20	\$451,765
Plant Maintenance Materials	\$0	0	\$0
			\$561,330

DETAIL PROJECT COSTS – UNDERGROUND MODEL

CAPITAL BUDGET ASSUMPTIONS

Capital costs to construct the network will be approximately \$6,300,000. The timeline anticipated for the build is 15 months based on achievable milestones plus the construction preparation time. The following assumptions were made in the capital projections for the financial model:

- Outside Plant Construction:
 - 62.8 miles of distribution plant will be constructed over the course of 15 months. Construction is assumed to begin in Month 4 and to be completed by Month 19.
 - The cost of aerial construction is \$0.
 - The cost of underground construction is estimated at \$74,967 per mile. Labor is \$53,689 per mile including both plant and technical (splicing). Materials are \$12,636 per mile which includes fiber, conduit, splitters, splice enclosures and other underground materials. The \$74,967 referenced above includes professional services discussed below.
- Drop Construction:
 - 579 homes are expected to sign up for services over the course of two years.
 - The cost of drop construction is \$2,678 per home at 100% underground. Labor is \$2,492 (all underground) and materials are \$148. Drops do not include conduit unless boring (driveways and sidewalks) is required.
 - Drop length of 600 feet is assumed per home.
 - Inside the home installation including ONT electronics will be the responsibility of the ISP partner.
- Professional Services:
 - The mapping of the outside plant is required to create the fiber design. This will require an estimated 754 hours over the course of six months to complete. The design of the outside plant is estimated at 356 hours over the course of six months to complete.
 - Project management for project planning, inspection of contractors and invoice approval/reconciliation is estimated to require a crew of two over the course of 15 months for a total of 4,860 hours.
 - Drop surveys to provide the fiber route from the distributed split to the side of the house for contractors is estimated at 261 hours to map and draft. These will be completed over the course of a year.

CAPITAL BUDGET

		Township		
PROJECT:	SERVICE AREA:	Unit Cost	No. of Units	Total Costs
FTTH Network	Lyndon Township, MI			
OUTSIDE PLANT LABOR				
Pre-Construction	Complete Make Ready Construction	\$ 0.00	0.0	\$ 0
	Pole Assessment	\$ 150	-	\$ -
Aerial	PM99 (Move Pole Facilities)	\$ 72.00	0	\$ 0
	CO12(6M) [Hang stranded fiber]	\$ 0.95	0	\$ 0
	CO24(6M) [Hang stranded fiber]	\$ 0.95	0	\$ 0
	CO48(6M) [Hang stranded fiber]	\$ 0.95	0	\$ 0
	CO96(6M) [Hang stranded fiber]	\$ 0.95	0	\$ 0
	CO144(6M) [Hang stranded fiber]	\$ 1.05	0	\$ 0
	PM2A [Aerial Bond]	\$ 4.50	0	\$ 0
	PF3-3 [Place Screw Anchor]	\$ 40.00	0	\$ 0
	PE1-3 [Place down guy]	\$ 24.00	0	\$ 0
	PF3-AUX [Install auxiliary eye]	\$ 8.00	0	\$ 0
	PM69 [Place fiber storage loop]	\$ 50.00	0	\$ 0
Underground	BMUDT [Trench Conduit]	\$ 5.50	265,301	\$ 1,459,155
	BMUDD [Bore Conduit]	\$ 12.00	66,325	\$ 795,903
	BFO12 [Pull Fiber]	\$ 0.90	33,163	\$ 29,846
	BFO24 [Pull Fiber]	\$ 0.90	33,163	\$ 29,846
	BFO48 [Pull Fiber]	\$ 0.90	33,163	\$ 29,846
	BFO96 [Pull Fiber]	\$ 0.90	198,976	\$ 179,078
	BFO144 [Pull Fiber]	\$ 0.90	33,163	\$ 29,846
	BM71 [Rock Adder]	\$ 10.00	16,581	\$ 165,813
	BD5 [Pedestals]	\$ 60.00	579	\$ 34,740
	BM2-A [Grounding]	\$ 40.00	579	\$ 23,160
	BM80 [Risers]	\$ 50.00	-	\$ -
	BM53 [Markers]	\$ 20.00	1,990	\$ 39,795
	BHF [Handholes]	\$ 300.00	663	\$ 198,976
Technical	SPL [Install Splitter]	\$ 50.00	21	\$ 1,034
	SPL-CBN [Install Splitter Cabinet]	\$ 1,000.00	5	\$ 5,147
	HACO12 [Splice Enclosures for 12 ct]	\$ 125.00	66	\$ 8,291
	HACO24 [Splice Enclosures for 24 ct]	\$ 125.00	66	\$ 8,291
	HACO48 [Splice Enclosures for 48 ct]	\$ 135.00	66	\$ 8,954
	HACO96 [Splice Enclosures for 96 ct]	\$ 150.00	50	\$ 7,500
	HACO144 [Splice Enclosures for 144 ct]	\$ 150.00	66	\$ 9,949
	TERM	\$ 150.00	290	\$ 43,425
	HO1 [Splicing with bi-directional testing]	\$ 25.00	10,540	\$ 263,502
			Total	\$ 3,372,098

		Township		
PROJECT:	SERVICE AREA:	Unit Cost	No. of	Total
FTTH Network	Lyndon Township, MI		Units	Costs
OUTSIDE PLANT MATERIALS				
Fiber	12 ct. Loose Tube Fiber	\$ 0.30	34,821	\$ 10,446
	24 ct. Loose Tube Fiber	\$ 0.35	34,821	\$ 12,187
	48 ct. Loose Tube Fiber	\$ 0.45	34,821	\$ 15,669
	96 ct. Loose Tube Fiber	\$ 0.70	208,925	\$ 146,247
	144 ct. Loose Tube Fiber	\$ 1.00	34,821	\$ 34,821
Aerial	1/4" EHS Strand	\$ 0.14	0	\$ 0
	Lashing wire 0.038" Type 302 1,600' Roll	\$ 24.00	0	\$ 0
	Weaver(Bonding Clamp)	\$ 1.75	0	\$ 0
	#6 Bare Copper Ground Wire	\$ 0.34	1,242	\$ 422
	Anchor 8" Helix	\$ 26.89	0	\$ 0
	Sno-Shoe (pair)	\$ 39.95	0	\$ 0
	Stainless Steel Strap	\$ 0.20	0	\$ 0
	1/2" Spacer	\$ 0.12	0	\$ 0
	Guy Guards	\$ 3.08	0	\$ 0
	Auxilliary Eye	\$ 14.39	0	\$ 0
Stranded Hardware	#4 Split Bolt	\$ 0.81	0	\$ 0
	Preformed Deadend 1/4" Strand	\$ 3.21	0	\$ 0
	12" x 5/8" Machine Bolt w/ Nut	\$ 1.07	0	\$ 0
	2"x1/8" Flat Square Washer	\$ 0.30	0	\$ 0
	5/8"-11 Square Nut	\$ 0.22	0	\$ 0
	3 Bolt Clamp	\$ 4.38	0	\$ 0
	3 Bolt Clamp Curved	\$ 5.48	0	\$ 0
	5/8"Thimble Eye Bolt	\$ 3.90	0	\$ 0
	Bug nut(D Lash Clamp)	\$ 0.30	0	\$ 0
	Guy Hook - Ram's Head	\$ 3.01	0	\$ 0
Underground	Arnco 1.25" HDPE Conduit	\$ 0.52	331,626	\$ 172,446
	Channell 24x36x24 Handhole	\$ 193.40	663	\$ 128,273
	Channell Pedestal	\$ 55.00	579	\$ 31,845
	Pedestal Stickers	\$ 0.70	579	\$ 405
	0.75" Flex Conduit - 20'	\$ 9.70	-	\$ -
	Screw Lags	\$ 0.25	-	\$ -
	5/8" x 8' Copper Ground Rod	\$ 10.31	1,242	\$ 12,808
	Ground Rod Clamp	\$ 0.90	1,242	\$ 1,118
	Warning Marker	\$ 14.60	1,990	\$ 29,050
Technical	"A" Splice Enclosure	\$ 220.00	133	\$ 29,183
	"C" Splice Enclosure	\$ 250.00	116	\$ 29,081
	"D" Splice Enclosure	\$ 285.00	66	\$ 18,903
	Splice Trays for A Enclosure	\$ 20.00	265	\$ 5,306
	Splice Trays for C Enclosure	\$ 22.00	399	\$ 8,777
	Splice Trays for D Enclosure	\$ 25.00	398	\$ 9,949
	Aerial Clamps for FOSC 450	\$ 25.82	315	\$ 8,141
	Splitter Cabinets	\$ 5,000.00	5	\$ 25,733
	Splitters	\$ 800.00	21	\$ 16,543
	AirFOSC	\$ 150.00	290	\$ 43,425
	Splice Protector (sleeves)	\$ 0.27	10,540	\$ 2,846
			Total	\$ 793,626

		Township		
PROJECT:	SERVICE AREA:	Unit Cost	No. of Units	Total Costs
FTTH Network	Lyndon Township, MI			
DROP TO THE HOME				
Labor	CO2(6M) [Hang stranded fiber]	\$ 0.90	0	\$ 0
	BMUDT [Trench No Conduit]	\$ 2.00	312,660	\$ 625,319
	BMUDD [Bore Conduit]	\$ 12.00	34,740	\$ 416,880
	BFO2 [Pull Fiber]	\$ 1.00	347,400	\$ 347,400
	BM83 [Drop Riser Guard]	\$ 25.00	579	\$ 14,475
	BM(0.75) [House Cane]	\$ 13.00	579	\$ 7,527
	PM2A [Aerial Bond]	\$ 4.50	0	\$ 0
	BM2-A [Grounding]	\$ 40.00	0	\$ 0
	NID [Place NID Housing]	\$ 25.00	579	\$ 14,475
	HO1 [Splicing]	\$ 25.00	579	\$ 14,475
	HO1T [Testing]	\$ 4.00	579	\$ 2,316
Materials	2 Ct. Loose Tube Fiber	\$ 0.20	347,400	\$ 69,480
	Lashing wire 0.038" Type 302 1,600' Roll	\$ 24.00	0	\$ 0
	0.75" Flex Conduit - 20'	\$ 9.70	579	\$ 5,616
	Arnco 0.75" HDPE Conduit	\$ 0.30	34,740	\$ 10,422
	Weaver(Bonding Clamp)	\$ 1.84	0	\$ 0
	#6 Bare Copper Ground Wire	\$ 0.38	0	\$ 0
	#4 Split Bolt	\$ 1.33	0	\$ 0
	5/8" x 8' Copper Ground Rod	\$ 10.31	0	\$ 0
	Ground Rod Clamp	\$ 0.90	0	\$ 0
	Splice Protector (sleeves)	\$ 0.27	0	\$ 0
	Calix 700 Series ONT Enclosure	\$ -	579	\$ -
			Total	\$ 1,696,295
PROFESSIONAL SERVICES				
Plant Design/Mgmt	OSP Field Verification/GPS Mapping	\$ 86.11	754	\$ 64,902
	OSP Drafting/Design	\$ 83.53	356	\$ 29,729
	OSP Project Management/Inspection	\$ 92.22	4,860	\$ 448,200
Drop Design/Mgmt	Service Entrance Mapping/Drafting	\$ 85.00	261	\$ 22,147
	Service Entrance Mgmt/Inspection	\$ -	-	\$ -
				\$ -
			Total	\$ 564,977

GRAND TOTAL \$ 6,516,996

MODEL ASSUMPTIONS AND OUTPUT

The below inputs drive the 20-year Pulse financial model created for Lyndon Township.

Plant Statistics:

Homes Passed	1,158
Small Bus Passed	0
Large Commercial	0
Total Miles	62.8
UG %	100.0%
Do you own the poles?	No
Pole Condition	Good
Underground Construction Conditions	Good
Number of Substations	0

Construction Statistics:

Make Ready Per Aerial Mile	\$0
Aerial Production	75 miles per month
UG Production	5 miles per month
Avg. Length of Drop fiber along main	400.0
Avg. Length of Drop fiber from main to	200.0
UG Drop %	100.0%
Avg. Feet between splices	500.0

Capital Expenditures					
Summary of Total Capital Required					
Construction Costs				\$6,259,086	
Ongoing Capital Costs at Launch				\$36,000	
Total Project Capital Costs				\$6,295,086	
Construction Costs					
	Unit Cost	x Quantity	=	Total	
Headend/Office Space	\$204,722	0		\$0	
Cabinet Equipment	\$89,722	0		\$0	
Aerial Construction (A)	\$27,944	0.0		\$0	
Underground Construction (B)	\$74,967	62.8		\$4,708,554	
Drop Construction (C)	\$2,678	579		\$1,550,532	
Total Construction				\$6,259,086	
Details for construction costs above:					
(A) Aerial Cost Per Mile		(B) Underground Cost Per Mile		(C) Drop Cost Per Home	
Plant Labor (inc. Make Ready)	\$5,632	Plant Labor	\$48,019	Plant Labor	\$2,438
Technical Labor	\$5,670	Technical Labor	\$5,670	Tech. Labor	\$54
Fiber	\$3,493	Fiber	\$3,493	Fiber	\$120
Aerial Materials	\$1,356	UG Materials	\$5,992	Materials	\$28
Technical Mat.	\$3,151	Technical Mat.	\$3,151	NID Enclosure	\$0
Design	\$1,507	Design	\$1,507	Design	\$38
Constr. Mgmt	\$7,136	Constr. Mgmt	\$7,136	Constr. Mgmt	\$0
Total Aerial	\$27,944	Total UG	\$74,967	Total Drop	\$2,678
Ongoing Capital Costs at Launch					
	Cost	x Quantity	=	Total	
Pole Assessment	\$57	0		\$0	
Permits	\$1,200	30.0		\$36,000	
Simple PV of Pole Rent (20 yrs)	\$0	20		\$0	
Plant Maintenance Materials	\$0	0		\$0	
				\$36,000	

DETAIL PROJECT COSTS – ISP

CAPITAL BUDGET ASSUMPTIONS

Capital costs to operate the network will be approximately \$472,000. The following assumptions were made in the capital projections for the financial model:

- Network Equipment:
 - An ISP will build a headend to house the GPON network gear and router. Pulse recommends using reliable, proven network equipment. The Calix E7 Series 10GE has been modeled and include 10GE transceivers and Ethernet cards. The router housed in the headend is assumed to be a Cisco ASR-1000 router or something equivalent. The total cost of the headend is \$204,722. This cost is required at the beginning of the project.
- In-Home Installation:
 - Inside the home installation/service calls will be handled by an internal technician, but won't be able to install all customers initially. The ISP will need to hire 3rd party technicians to fulfill the excess demand at the time of launch. The 3rd party help is assumed at \$125 per home.
 - The assumed Calix 700 Series ONT is installed inside the home and transmits a wireless signal to devices in the home. Each ONT costs \$275 for the equipment. Only homes that sign up for service will have an ONT installed.
 - The \$30 ONT enclosure is split in our model (total price of \$275 + \$30 = \$305) installed at time of drop.
- Equipment
 - Trucks have been included in the budget for the inside the home technician. We have assumed a cost of \$35,000 per truck.
 - Fiber testing equipment will be required for troubleshooting after construction. We have assumed of each of the three basic equipment for a total of \$18,000.
 - Computers and iPads for the new staff are in the budget for \$1,500.

CAPITAL BUDGET

		ISP		
PROJECT:	SERVICE AREA:	Unit Cost	No. of Units	Total Costs
FTTH Network	Lyndon Township, MI			
NETWORK AND ACCESS EQUIPMENT				
Main Office	Headend Room Build to Suit	\$ 65,000.00	1	\$ 65,000
	Cisco ASR-1000 Routers	\$ 50,000.00	1	\$ 50,000
	E7-2 Package Chassis	\$ 696.50	2	\$ 1,393
	Battery String Kit, Heater and Connectors	\$ 2,239.00	1	\$ 2,239
	10GE SFP+ Transceiver 20Km, 1310nm	\$ 2,096.50	3	\$ 6,290
	GPON SFP OIM, Class B+ 1490/1310nm	\$ 1,200.00	21	\$ 24,814
	E7-2 10GE-4 Ethernet Card	\$ 5,596.50	1	\$ 5,597
	Fiber Management	\$ 5,000.00	4	\$ 20,000
	E7-2 8 Card PON unit	\$ 9,796.50	3	\$ 29,390
			Total	\$ 204,722
DROP TO THE HOME				
Installation	Contracted Installation Labor	\$ 125.00	220	\$ 27,506
	Calix 700 Series ONT Electronics	\$ 275.00	579	\$ 159,225
	Miscellaneous Materials	\$ 30.00	579	\$ 17,370
	Miscellaneous Materials	\$15	579	\$ 8,685
			Total	\$ 212,786
EQUIPMENT				
Devices	Trimble Units	\$ 3,500	-	\$ -
	Computers, iPads	\$ 500	3	\$ 1,500
	OTDR	\$ 15,000	1	\$ 15,000
	Power Meter	\$ 1,000	1	\$ 1,000
	Light Source	\$ 2,000	1	\$ 2,000
Vehicles	Pickup Trucks	\$ 35,000	1	\$ 35,000
	Bucket Trucks	\$ 40,000	-	\$ -
	Trailer	\$ 10,000	-	\$ -
	Trench Machine	\$ 75,000	-	\$ -
	Bore Machine	\$ 125,000	-	\$ -
	Wrenches, tool boxes, etc.	\$ 10,000	-	\$ -
	ATV's	\$ 5,000	-	\$ -
Plant Maintenance	Materials	\$ -	-	\$ -
			Total	\$ 54,500

Does not include operating resources or cash cushion

GRAND TOTAL **\$ 472,008**

MODEL ASSUMPTIONS

The below inputs drive the 20-year Pulse financial model created for Lyndon Township's ISP partner.

Plant Statistics:

Homes Passed	1,158
Small Bus Passed	0
Large Commercial	0
Total Miles	65

Ongoing Capital Costs:

External Installation	\$125 per install
ONT (plus \$30 enclosure)	\$275 each
Installation Materials	\$15 per internal install
Plant Maintenance Materials	\$20 per mile

Customer Metrics:

Res Customer Take Rate	50%
Small Bus Customer Take Rate	30%
Commercial Take Rate	50%
Timeline to Launch Services	8 Months
Customer Ramp	12 Months
Data Only - Low Tier	\$46.46
Data Only - High Tier	\$56.46
Data Only Upsell to High Tier	25%
VoIP Only	\$39.95
VoIP Federal Line Charge	\$3.95
Bundle Discount - Double Play	\$5.00
% order for Double Play - Data/VoIP	30%
Installation revenue	\$0.00
Small Bus Pricing	\$69.95
Commercial Pricing	\$1,200.00
Cell Tower Opportunities	0
Cell Tower Pricing	\$2,250.00
FCC CAF or Other Revenue from Grant:	\$0 Annual revenue
Average Retail Price Increase	0.5%
Future Community Dev. from Fiber	1.0% After Year 5

Operating Costs:

Bandwidth	\$3,300 Monthly
VoIP	\$13.00 Per Line
Customer Care	\$10.00 Per Sub
Network Management	\$4.00 Per Sub
Admin/Marketing Resource	1
Admin/Marketing Resource	\$50,000 Base salary
Maintenance Technicians	0
Maintenance Technicians	\$50,000 Base salary
Installation Technicians	1
Installation Technicians	\$40,000 Base salary
Internal installs	4.0 Per day per tech
Benefits	50.0%
Bad Debt Expense	1.0%
Vehicle Repairs and Fuel	\$600 monthly
Facilities Rent	\$0
Facilities Utilities	\$500
Property Tax Expense	1.0% as a percent of assets
Marketing cost per connect	\$50
Other expenses	2.0% percent of revenue
Average Expense Cost Increase	2.0%

Balance Sheet Items:

Loan Term	8.3 years
Interest Rate	3.8%
Plant Depreciable Life	8.3 years

FINANCIAL HIGHLIGHTS

The highlights below come from the Management Dashboard tab from the Pulse financial model. These were chosen as important indicators for Lyndon Township to share with interested parties. A few very important notes to show financial feasibility of the project include:

- \$604,000 loan assumed for first year which includes \$82,000 operating runway
- Positive monthly cash flow after debt service
- Simple payback period for the project of 4.5 years is better than 8-year loan term

Balance Sheet Overview								
	Year 1	Year 2	Year 3	Year 4	Year 5	Total (\$ 000's)	Per Passing	Per Customer
Total Miles constructed	0	0	0	0	0			
Homes passed	1,158	1,158	1,158	1,158	1,158			
Take Rate	50.0%	50.0%	50.0%	50.0%	50.0%			
Residential Customers	579	579	579	579	579			
Network Equipment (\$ 000's)	\$205	\$0	\$0	\$0	\$0	\$205	\$177	\$354
In-Home Capital Expenditures (\$ 000's)	\$250	\$0	\$0	\$0	\$0	\$250	\$216	\$432
Op. Exp. and Cash Cushion (\$000's)	\$149	\$55	\$0	\$0	\$0	\$205	\$177	\$353
Total Capital Expenditures (\$ 000's)	\$604	\$55	\$0	\$0	\$0	\$659	\$569	\$1,139
Grants Received (\$ 000's)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Debt Incurred (\$ 000's)	\$604	\$55	\$0	\$0	\$0	\$1,081	\$934	\$1,868

Income Statement Overview					
<i>All financial drivers stated per customer at end of year</i>					
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	\$60.63	\$60.76	\$61.06	\$61.37	\$61.67
Variable Costs	\$23.60	\$23.80	\$24.27	\$24.74	\$25.21
Customer Margin	\$37.03	\$36.96	\$36.79	\$36.63	\$36.46
Operating Costs	\$13.20	\$23.49	\$23.90	\$24.33	\$24.77
Total EBITDA	\$23.84	\$13.48	\$12.89	\$12.29	\$11.69
Debt Service	\$12.21	\$13.33	\$13.33	\$13.33	\$13.33
Monthly Cash Flow	\$11.63	\$0.15	(\$0.44)	(\$1.03)	(\$1.64)

Key Project Viability Indicators					
	Year 1	Year 2	Year 3	Year 4	Year 5
EBITDA per Customer	\$23.84	\$13.48	\$12.89	\$12.29	\$11.69
Equity to Assets %	-15.1%	-11.4%	-9.2%	-6.8%	-3.9%
TIER	5.37	1.91	1.98	2.09	2.28
Simple Payback	7.0 years		Project IRR		0.0%
Loan Term	8.3 years		Loan Interest Rate		3.8%

10-YEAR FINANCIAL SCHEDULES

Lyndon Township, MI Projected Income Statement

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Mileage and Homes Passed:										
Aerial Miles	0	0	0	0	0	0	0	0	0	0
UG Miles	0	0	0	0	0	0	0	0	0	0
Miles	0	0	0	0	0	0	0	0	0	0
Homes passed	1,158	1,158	1,158	1,158	1,158	1,158	1,158	1,170	1,181	1,193
Businesses passed	0	0	0	0	0	0	0	0	0	0
Large businesses passed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Customer Statistics:										
Res customer take rate	50.0%	50.0%	50.0%	50.0%	50.0%	54.6%	54.6%	54.6%	54.6%	54.6%
Bus customer take rate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Large Bus customer take rate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Res customers	579	579	579	579	579	632	632	638	645	651
Bus customers	0	0	0	0	0	0	0	0	0	0
Large bus customers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Installs	579	0	0	0	0	53	0	6	6	6
Projected Income Statement:										
Revenue:										
Data only	\$63,288	\$238,261	\$239,278	\$240,469	\$241,659	\$257,528	\$266,395	\$269,150	\$273,174	\$277,251
Double Play - Data/VoIP	\$48,672	\$183,237	\$184,019	\$184,935	\$185,851	\$198,055	\$204,874	\$206,993	\$210,087	\$213,223
Double Play - Data/Video	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Triple Play	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Small Business	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Large Commercial	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Installation Fees Collected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cell Towers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
FCC or Other Grants	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total revenue	\$111,960	\$421,498	\$423,297	\$425,404	\$427,510	\$455,582	\$471,269	\$476,143	\$483,261	\$490,475

Lyndon Township, MI
Projected Income Statement

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Bad debt	\$769	\$4,214	\$4,231	\$4,252	\$4,273	\$4,521	\$4,711	\$4,756	\$4,827	\$4,899
Admin/marketing wages	\$25,000	\$50,000	\$51,000	\$52,020	\$53,060	\$54,122	\$55,204	\$56,308	\$57,434	\$58,583
Maintenance tech wages	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Installation tech wages	\$20,000	\$40,000	\$40,800	\$41,616	\$42,448	\$43,297	\$44,163	\$45,046	\$45,947	\$46,866
Capitalized portion of install wages	(\$28,488)	\$0	\$0	\$0	\$0	(\$4,556)	\$0	(\$567)	(\$585)	(\$602)
Payroll taxes and benefits	\$8,256	\$45,000	\$45,900	\$46,818	\$47,754	\$46,431	\$49,684	\$50,394	\$51,399	\$52,423
Vehicle repairs and fuel	\$3,600	\$7,344	\$7,491	\$7,641	\$7,794	\$7,949	\$8,108	\$8,271	\$8,436	\$8,605
Facilities rent	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Utilities	\$6,000	\$6,120	\$6,120	\$6,120	\$6,120	\$6,120	\$6,120	\$6,120	\$6,120	\$6,120
Plant Maintenance Materials	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property tax expense	\$0	\$2,047	\$2,047	\$2,047	\$2,047	\$2,047	\$2,047	\$2,047	\$2,559	\$4,094
Pole rental	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Marketing sales	\$28,950	\$0	\$0	\$0	\$0	\$2,652	\$0	\$317	\$321	\$324
Other operating expense	\$2,239	\$8,430	\$8,466	\$8,508	\$8,550	\$9,112	\$9,425	\$9,523	\$9,665	\$9,809
Total operating expenses	\$66,326	\$163,155	\$166,055	\$169,022	\$172,047	\$171,695	\$179,463	\$182,214	\$186,123	\$191,122
EBITDA	(\$17,118)	\$94,032	\$90,130	\$85,990	\$81,792	\$98,810	\$99,055	\$96,842	\$94,968	\$92,027
EBITDA Margin	-15.3%	22.3%	21.3%	20.2%	19.1%	21.7%	21.0%	20.3%	19.7%	18.8%
Interest Expense	\$21,567	\$21,128	\$18,401	\$15,570	\$12,631	\$9,580	\$6,412	\$10,822	\$14,391	\$12,082
Depreciation	\$35,085	\$55,610	\$55,610	\$55,610	\$55,610	\$57,010	\$57,733	\$57,870	\$58,126	\$58,384
Net income	(\$73,770)	\$17,295	\$16,120	\$14,811	\$13,551	\$32,221	\$34,909	\$28,149	\$22,451	\$21,561
Average Customer Statistics:										
Revenue Per Customer	\$38.67	\$60.66	\$60.92	\$61.23	\$61.53	\$60.07	\$62.14	\$62.15	\$62.46	\$62.76
Direct Variable Cost	\$21.68	\$23.65	\$24.05	\$24.52	\$25.00	\$24.40	\$25.41	\$25.73	\$26.13	\$26.53
Direct Margin Per Customer	\$17.00	\$37.02	\$36.87	\$36.70	\$36.53	\$35.67	\$36.72	\$36.43	\$36.33	\$36.23
Indirect Operating Cost	\$22.91	\$23.48	\$23.90	\$24.33	\$24.76	\$22.64	\$23.66	\$23.79	\$24.05	\$24.45
Total Margin per Customer	(\$5.91)	\$13.53	\$12.97	\$12.38	\$11.77	\$13.03	\$13.06	\$12.64	\$12.27	\$11.78

Lyndon Township, MI
Projected Statement of Cash Flows and Balance Sheet

Projected Statement of Cash Flows:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net income	(\$73,770)	\$17,295	\$16,120	\$14,811	\$13,551	\$32,221	\$34,909	\$28,149	\$22,451	\$21,561
Add: depreciation	\$35,085	\$55,610	\$55,610	\$55,610	\$55,610	\$57,010	\$57,733	\$57,870	\$58,126	\$58,384
Change in receivables	(\$35,107)	(\$73)	(\$176)	(\$176)	(\$176)	(\$3,462)	(\$192)	(\$589)	(\$597)	(\$605)
Change in payables	\$21,306	\$6,070	\$516	\$521	\$525	\$1,662	\$555	\$655	\$880	\$721
Cash flow to/from operations	(\$52,486)	\$78,901	\$72,069	\$70,765	\$69,511	\$87,430	\$93,005	\$86,086	\$80,860	\$80,062
Capital expenditures	(\$454,638)	\$0	\$0	\$0	\$0	(\$15,381)	\$0	(\$215,566)	(\$206,582)	(\$1,879)
Cash flows to investing	(\$454,638)	\$0	\$0	\$0	\$0	(\$15,381)	\$0	(\$215,566)	(\$206,582)	(\$1,879)
Proceeds from senior debt financing	\$603,918	\$55,296	\$0	\$0	\$0	\$0	\$0	\$215,566	\$206,582	\$0
Principal payments on senior debt	(\$63,269)	(\$71,476)	(\$74,203)	(\$77,034)	(\$79,973)	(\$83,024)	(\$86,191)	(\$112,063)	(\$88,027)	(\$50,456)
Non-FCC Grant contributions	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equity contributions	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equity distributions	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cash flows to/from financing	\$540,649	(\$16,180)	(\$74,203)	(\$77,034)	(\$79,973)	(\$83,024)	(\$86,191)	\$103,503	\$118,555	(\$50,456)
Ending cash balance	\$33,525	\$96,245	\$94,112	\$87,843	\$77,381	\$66,407	\$73,221	\$47,244	\$40,077	\$67,804

Projected Balance Sheet:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cash	\$33,525	\$96,245	\$94,112	\$87,843	\$77,381	\$66,407	\$73,221	\$47,244	\$40,077	\$67,804
Receivables	\$35,107	\$35,180	\$35,355	\$35,531	\$35,706	\$39,169	\$39,360	\$39,949	\$40,546	\$41,151
Total current assets	\$68,631	\$131,425	\$129,467	\$123,374	\$113,088	\$105,576	\$112,581	\$87,193	\$80,623	\$108,955
Property	\$454,638	\$454,638	\$454,638	\$454,638	\$454,638	\$470,019	\$470,019	\$685,585	\$892,167	\$894,045
Depreciation	(\$35,085)	(\$90,694)	(\$146,304)	(\$201,913)	(\$257,523)	(\$314,533)	(\$372,266)	(\$430,136)	(\$488,262)	(\$546,646)
Total assets	\$488,185	\$495,369	\$437,801	\$376,099	\$310,203	\$261,062	\$210,334	\$342,642	\$484,528	\$456,354
Payables and deferred revenue	\$21,306	\$27,376	\$27,892	\$28,412	\$28,938	\$30,600	\$31,154	\$31,810	\$32,690	\$33,411
Bank debt	\$540,649	\$524,469	\$450,266	\$373,232	\$293,259	\$210,235	\$124,044	\$227,547	\$346,102	\$295,645
Total liabilities	\$561,955	\$551,844	\$478,157	\$401,644	\$322,197	\$240,835	\$155,198	\$259,356	\$378,791	\$329,056
Contributed equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Accumulated income/loss	(\$73,770)	(\$56,475)	(\$40,356)	(\$25,545)	(\$11,994)	\$20,227	\$55,136	\$83,286	\$105,737	\$127,298
Total Equity	(\$73,770)	(\$56,475)	(\$40,356)	(\$25,545)	(\$11,994)	\$20,227	\$55,136	\$83,286	\$105,737	\$127,298
Total Liabilities and Equity	\$488,185	\$495,369	\$437,801	\$376,099	\$310,203	\$261,062	\$210,334	\$342,642	\$484,528	\$456,354

NEXT STEPS AND CONSIDERATIONS

Based on the results of our on-site visit, cost and business structure breakdown, and financial analysis we have identified additional considerations for the township. The following list for the township should be discussed:

1. **Network Maintenance.** We have identified the potential hard construction costs of the network, but there will also be on-going maintenance costs. We have outlined these projected costs and expressed them in the ISP model. There will be a need to either hire technical staff or contract these services through a third party. It will be important to think through how this aspect of the network will function and how the relationship between the ISP function and Township owned network will operate.
2. **Fiber Drop Costs and Assumptions.** In the model we have assumed that 50% of Lyndon Township residents and businesses will take fiber service. This is consistent with national averages, but is an unknown at this point. The model accounts for 50% of homes and businesses requiring drop construction at an average cost of \$1,565 - \$2,678 per drop depending on the construction method chosen. If the drop count increases beyond 50% in the future, those drops and their associated costs would be incremental to the model. In other words, they would need to be paid for either by the entity requesting drop installation (residents), additional millage or paid for through the on-going revenues generated by the ISP. In any case, this should be considered as the current model is reviewed. The model can be changed to reflect any number of drops desired (including 100%), but cost estimates for the network would need to be increased accordingly.
3. **ISP Services Provider.** A challenge in presenting this model is that an ISP provider has not yet been identified and there is no way to know what level of interest might exist from 3rd parties, or if Lyndon Township will have the ability to partner with other communities to provide these kinds of services. The ISP model presented in the Feasibility Study assumes a “stand alone” scenario. This is the least efficient version, due to the small size of the network (600 projected subscribers) and the associated inability to gain any economy of scale. Given that there are on-going costs to maintain the network, provide service and generate reserves for future capital improvements, the efficiency of the ISP and its ability to generate positive cash flow will be critical not only in providing needed monies for on-going costs, but also to help keep monthly subscription fees reasonable for subscribers to the network. Once the details of the ISP relationship can be determined a more accurate long term financial model can be developed.
4. **Key Unknowns in the Model.** Given the short time frame of the study and the difficulty in obtaining quality data from Consumers Power Company the aerial model contains significant unknowns that can only be resolved with Consumers Power Company information. The maps provided by Consumers lacked critical information (span lengths etc.) and our discussion with Consumers Power regarding “Make Ready” costs provided extremely general information (which we have used in our preliminary Make Ready cost calculation). This information is not precise and could vary considerably. The only way to obtain accurate information is to pay consumers power their required \$57.25 per pole analysis fee. Given that we estimate that there are approximately 1,900 poles in Lyndon Township this fee could easily exceed \$100K or more. If Lyndon Twp. were to consider a primarily aerial construction approach utilizing pole attachments to Consumers Power infrastructure, we would strongly advise that the first step in such a process would be to identify the precise Consumers Power Make Ready cost.

DISCLAIMER

These forward-looking statements reflect Pulse's best professional judgment based on currently known factors but involve significant risks and uncertainties. We are confident in our abilities to project the fiber and telecommunications industries, but actual results could vary materially dependent on changes in the market conditions.