

# THE MERTON GROUP

*Municipal Broadband Networks  
Market and Financial Analysis  
Merrimack, NH*

# *Market Research Analysis*

# Objectives

*“Establish viability for conversion of users to MBN in wide enough user base to ensure bond coverage”*

- Ascertain current use of Internet access & CATV by key demographics metrics (age, income, etc.)*
- Determine current ISP penetrations*
- Ascertain conversion rates to MBN for existing Internet and CATV users by key demographic metrics*
- Ascertain price points for MBN acceptance for different services (broadband Internet, CATV)*

# Video Demand

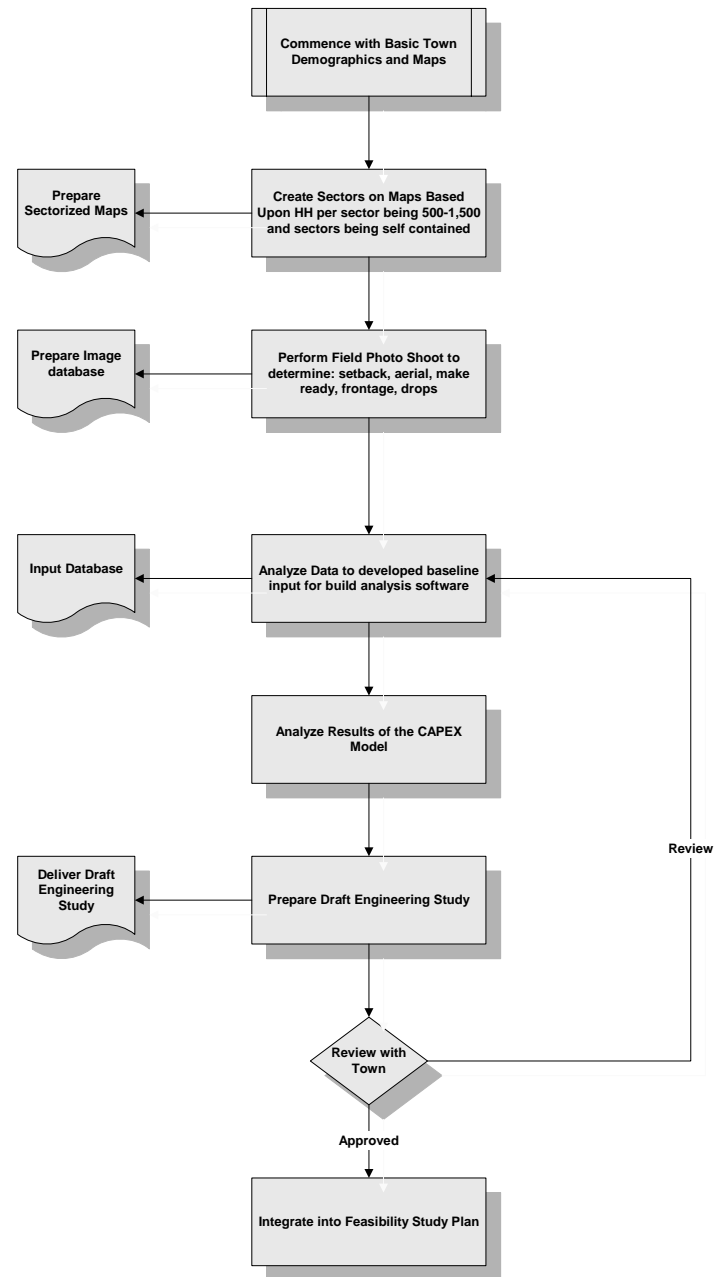
Age	HDTV 50					
	Total Num	Definitely Not	Unlikely	Possibly	Likely	Definitely Yes
<b>Below 20</b>	5	0	1	1	2	1
<b>21-30</b>	12	3	0	2	6	1
<b>31-40</b>	109	11	13	32	29	24
<b>41-55</b>	219	30	30	65	44	50
<b>Over 55</b>	152	71	22	28	15	16
<b>Total</b>	497	115	66	128	96	92

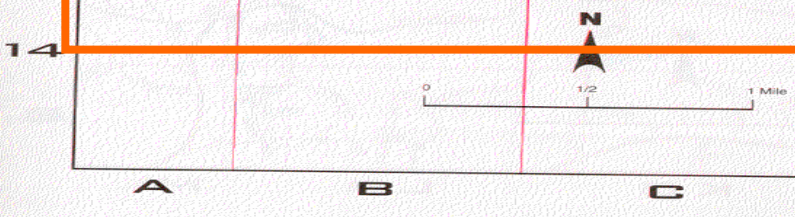
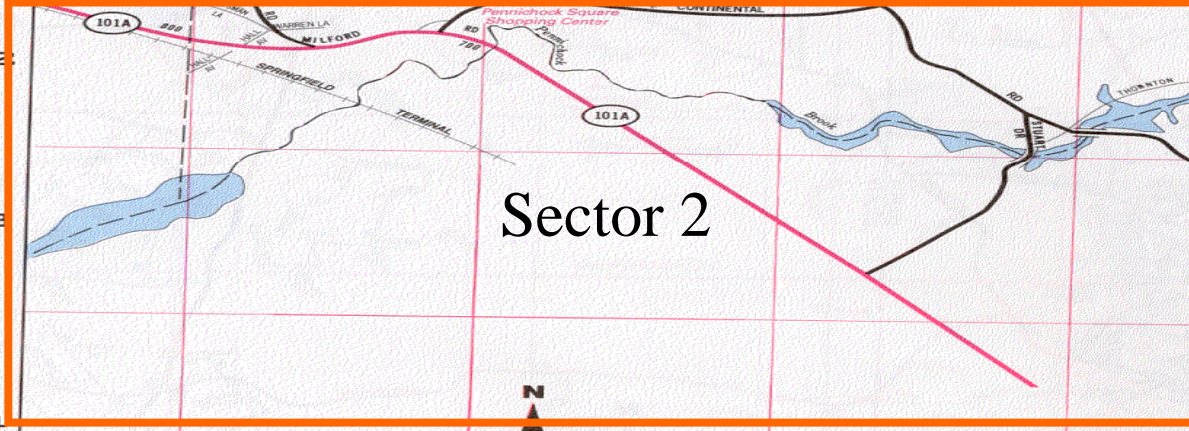
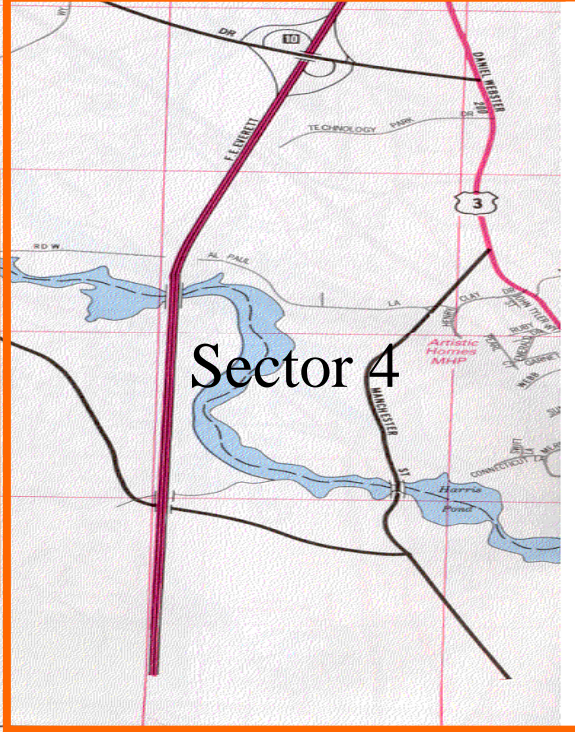
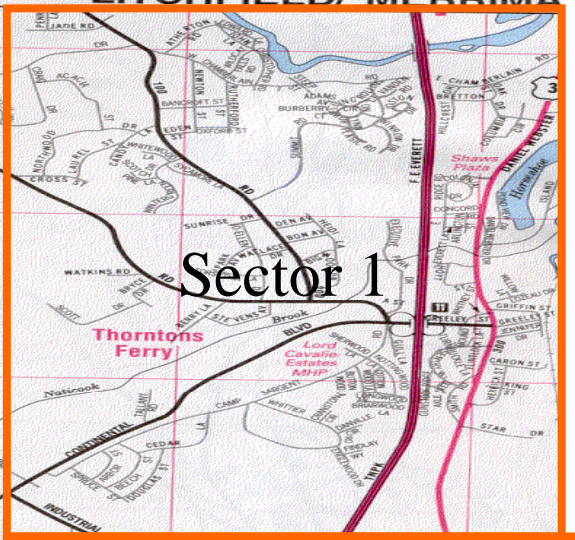
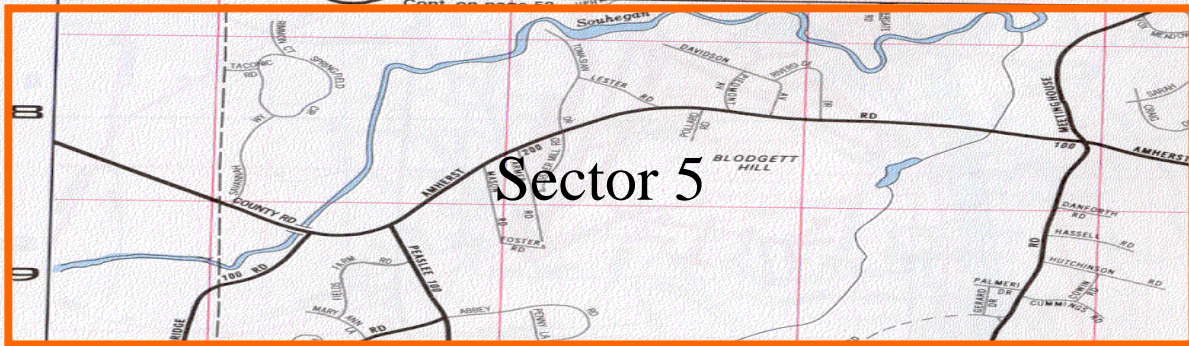
# Broadband Demand

Age	Int 50					
	Total Num	Definitely Not	Unlikely	Possibly	Likely	Definitely Yes
Below 20	5	0	1	0	2	2
21-30	12	0	1	3	4	4
31-40	109	10	19	37	19	24
41-55	216	10	35	58	55	58
Over 55	147	68	22	27	16	14
<b>Total</b>	489	88	78	125	96	102

# *Methodology*

# Engineering Methodology





B  
D  
10  
1  
12  
10  
14

A B C D E F





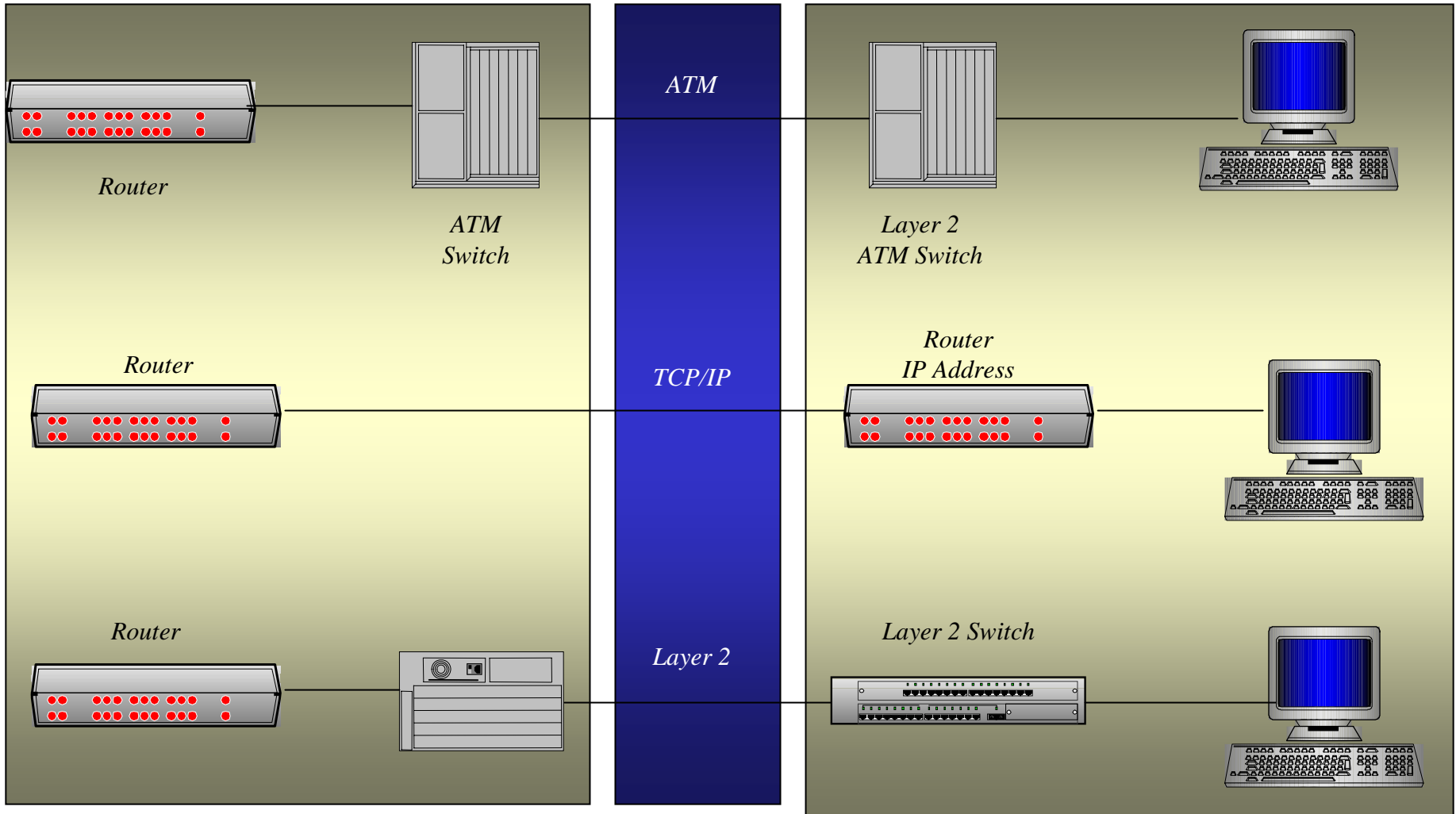
# *General Architecture*

# Ethernet Layer 2, 3 and ATM

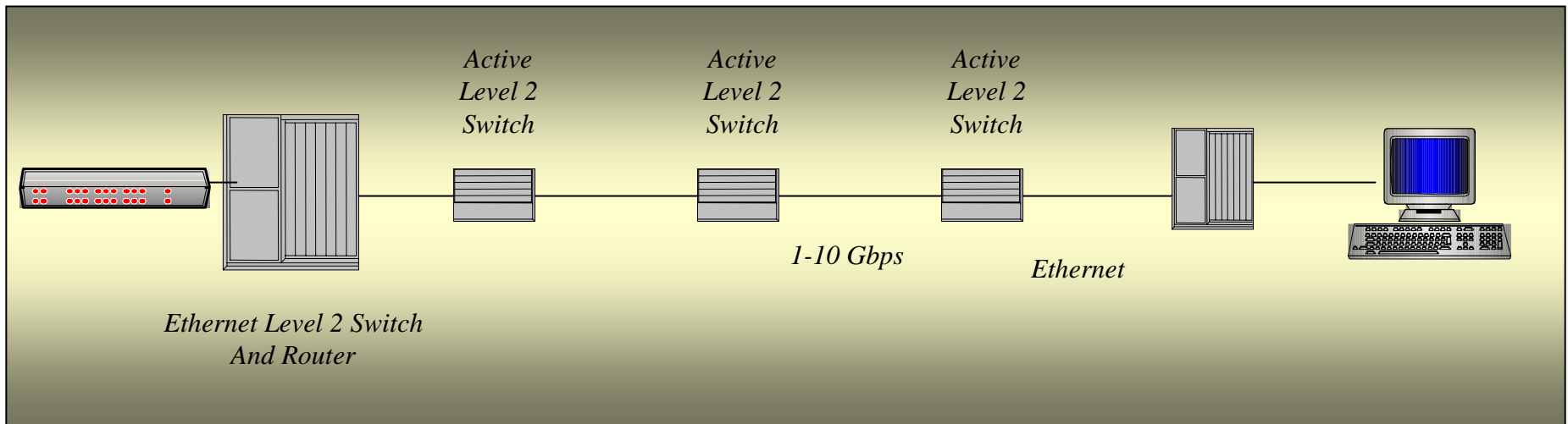
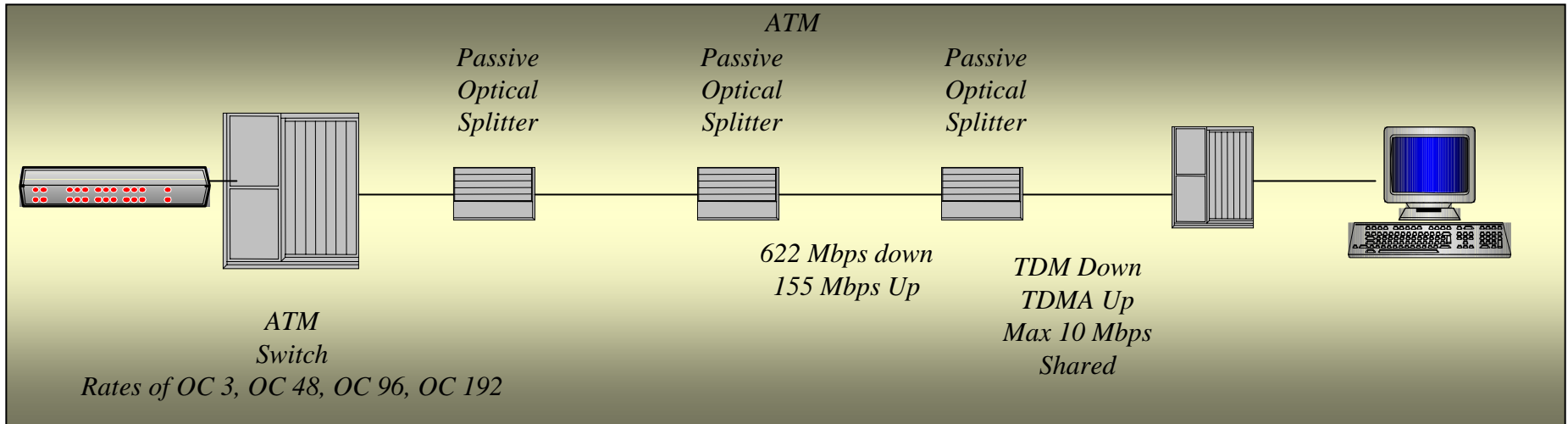
*Headend*

*Transport*

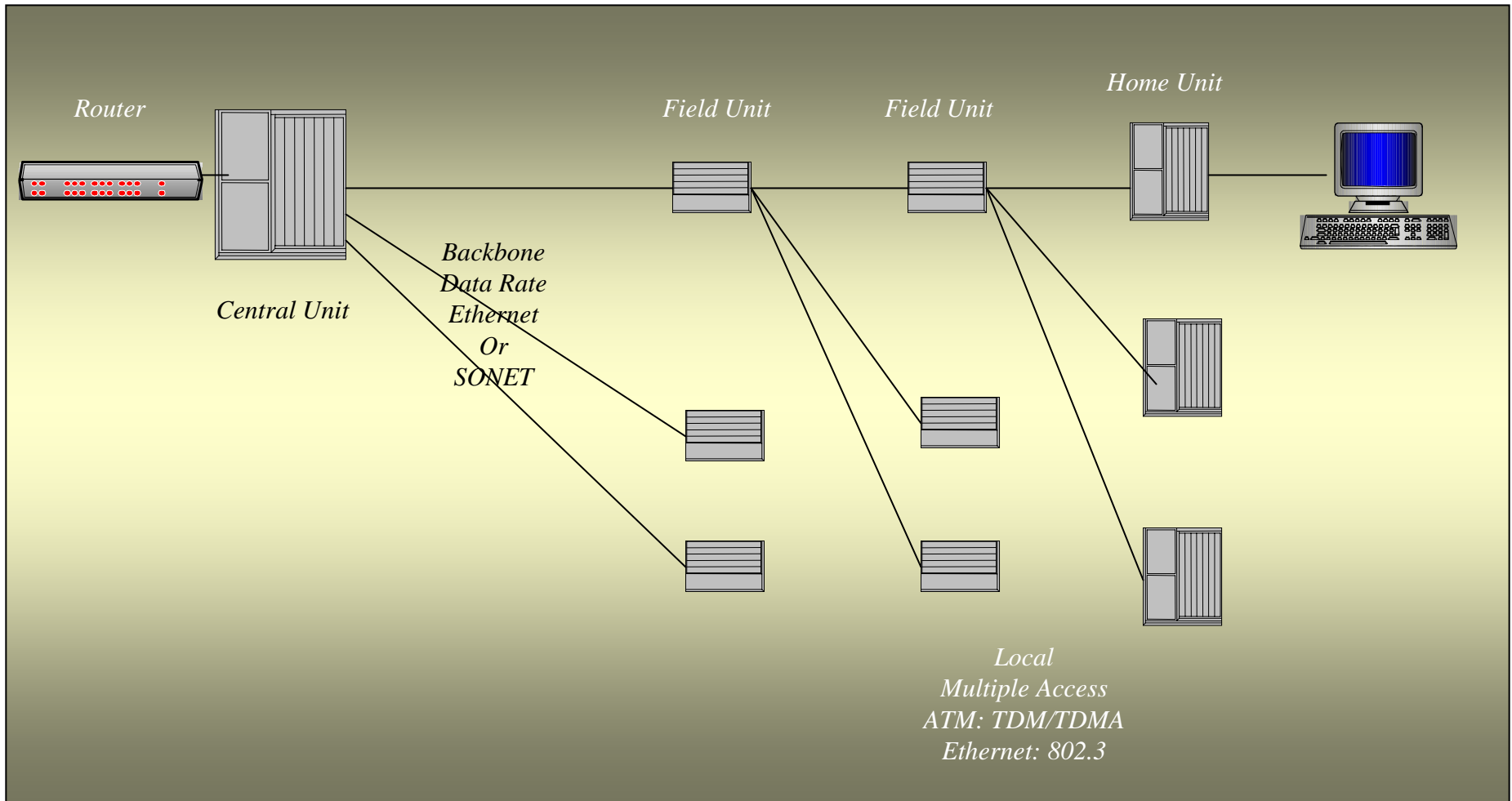
*Home*



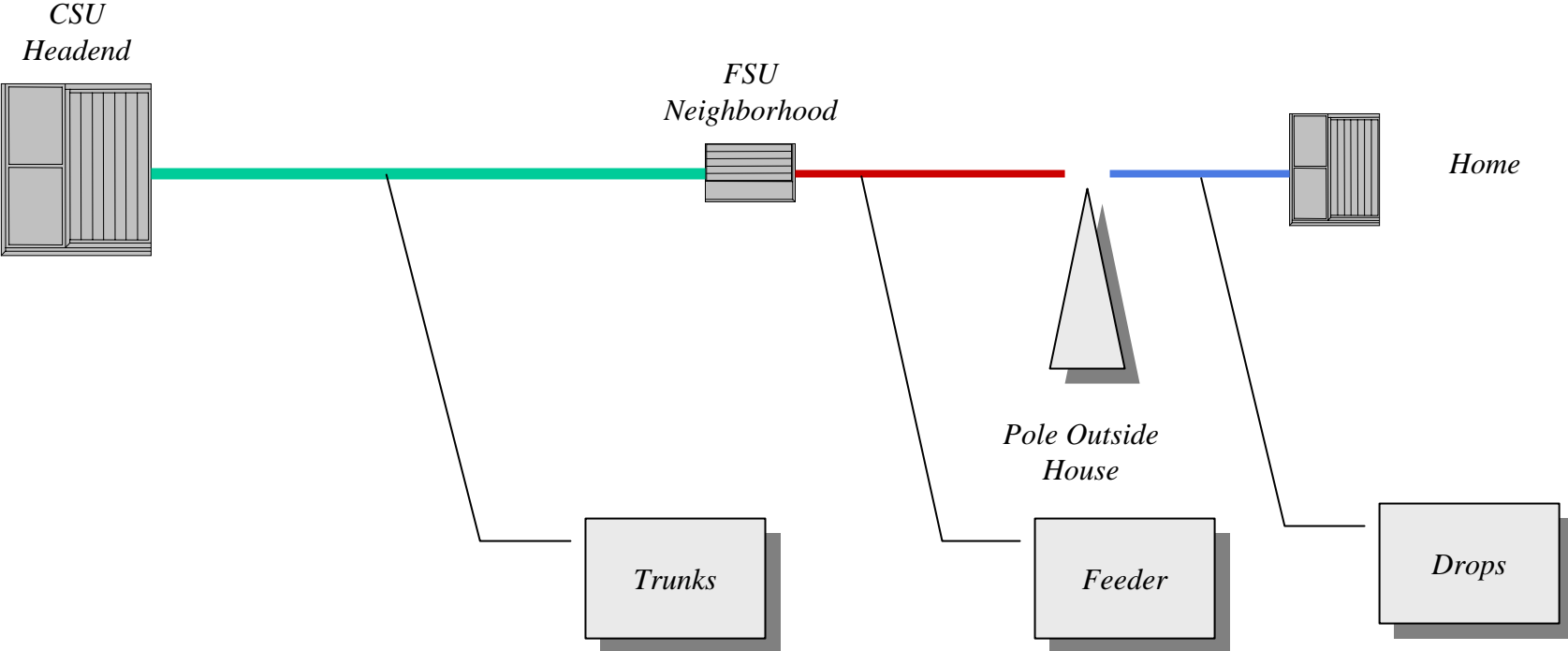
# Fiber Rates ATM v GigE



# Basic Architecture



# Generic Fiber Network Elements



# *Local Architecture*





# *Merrimack Frontage*

Sector	Street Miles	Average Frontage	Weighted Average Frontage
1	19	236	59
2	23	506	127
3	29	282	71
4	8	200	10
5	25	239	48

Total Average  
Frontage

314

# *Merrimack, NH Set Back*

Sector	Street Miles	Average Set Back	Weighted Average Setback
1	19	214	54
2	23	334	84
3	29	221	55
4	8	200	10
5	25	232	46

105

Total Average Set  
Back

249

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# *Merrimack, NH Make Ready*

Sector	Street Miles	Average Make Ready	Weighted Make Ready
1	19	14%	4%
2	23	0%	0%
3	29	39%	10%
4	8	0%	0%
5	25	60%	12%

Total Average  
Make Ready

25%

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# *Merrimack Aerial*

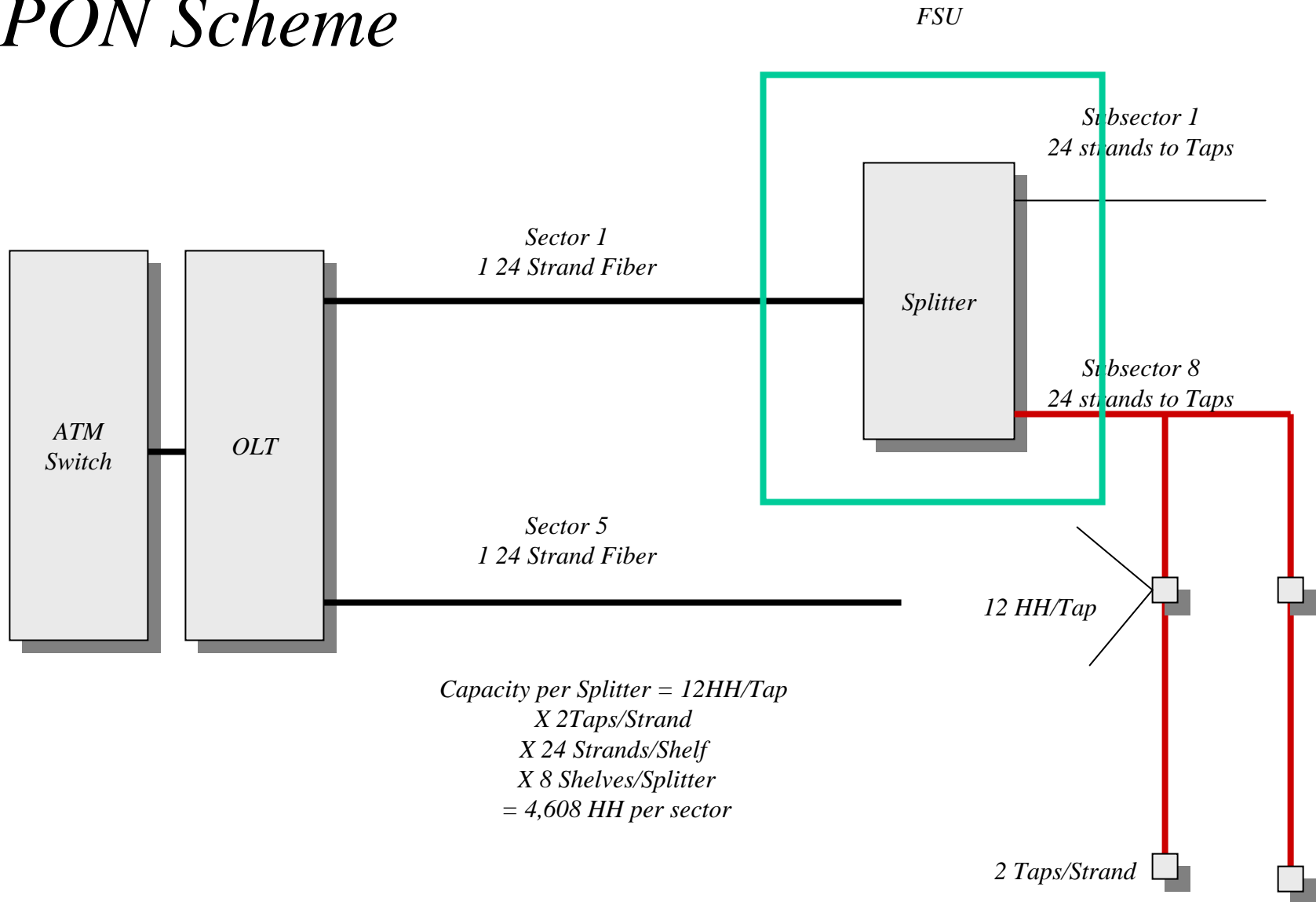
Sector	Street Miles	Average Aerial	Weighted Average Aerial
1	19	57%	14%
2	23	44%	11%
3	29	68%	17%
4	8	100%	5%
5	25	95%	19%

Total Average  
Aerial

66%

# *PON Architecture*

# PON Scheme

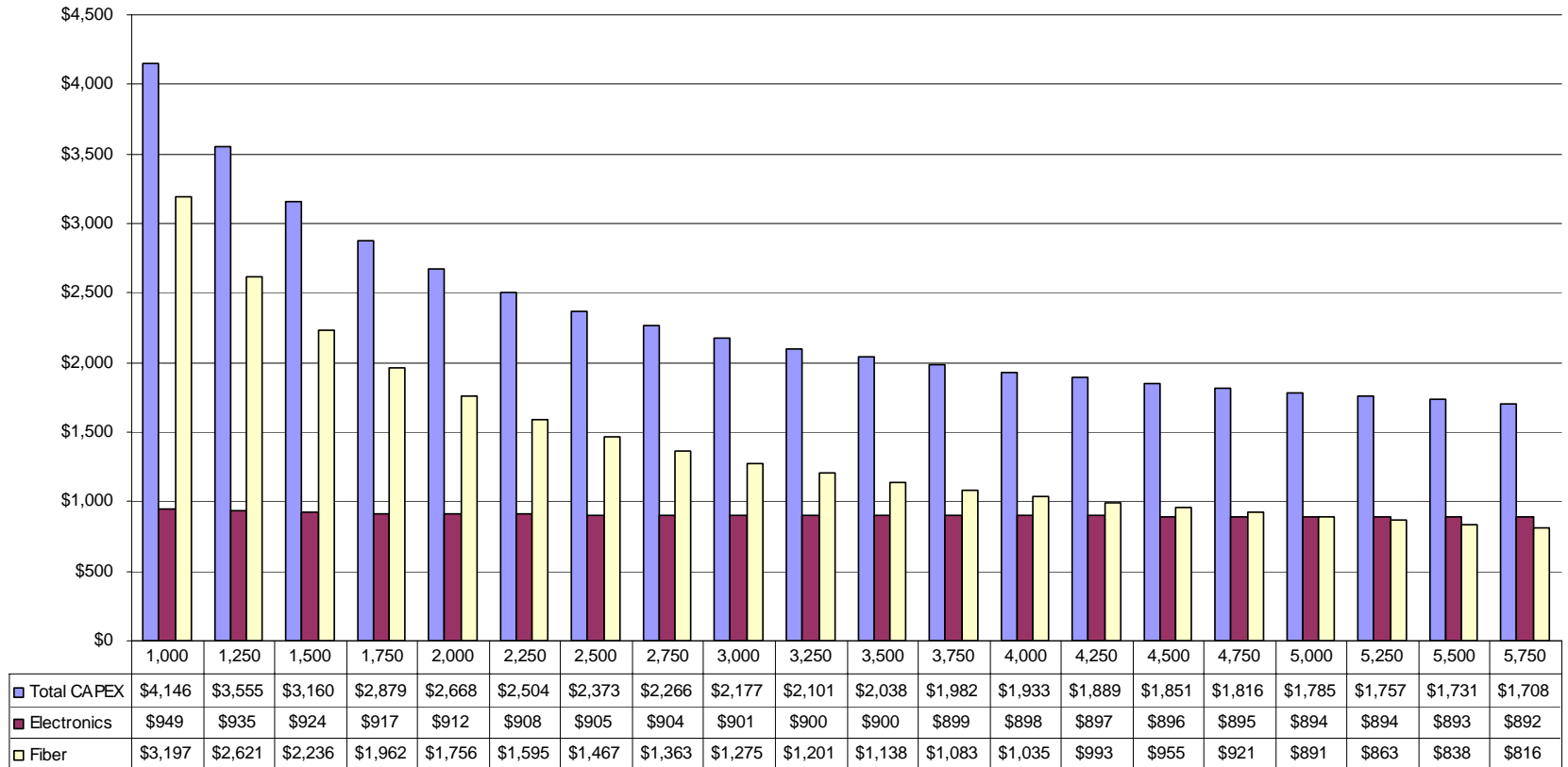


# PON Cost Analysis

<i>Unit</i>	<i>Fixed</i>	<i>Variable</i>	<i>Capacity</i>	<i>Example for 1,000 HH</i>	<i>Per HH CAPEX</i>
EUU, End User Unit		\$1,067	1 per user	\$1,067,000	\$1,067
Taps		\$558	12 users per Tap	\$46,500	\$47
Splitter	\$7,000	\$1,380	8 splitter draws pre cabinet, 576 HH per splitter draw , maxium of 4,608 HH per Splitter cabinet. Typically 5 sectors so 5 splitters	\$41,900	\$42
ATM Switch	\$40,000	\$4,000	Max capacity 15 OC-3 Cards, incremental cost per OC-3 Card, user has 2 Mbps at 5% utilization is 100 Kbps per user.	\$44,000	\$44
OLT PON Card		\$6,000	Maximum 18 Cards per shelf, capacity of 64 users per card	\$93,750	\$94
OLT Rack		\$10,000	Maximun of 3 Shelves per rack. 3,456 HH per Rack	\$10,000	\$10
Number HH				1,000	
Total				\$1,303,150	
Total per HH				\$1,303	\$1,303
Total Fiber Miles		\$25,000	In tow n of 80 miles w ith 70% coverage	\$1,400,000	\$1,400
Drop Cost		\$300		300,000	\$300
Total per HH w ith Fiber					\$3,003

# CAPEX PON

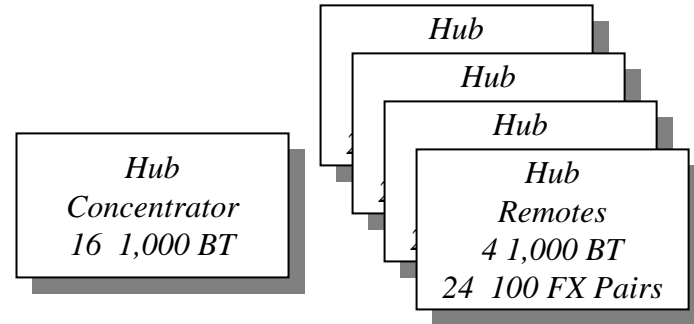
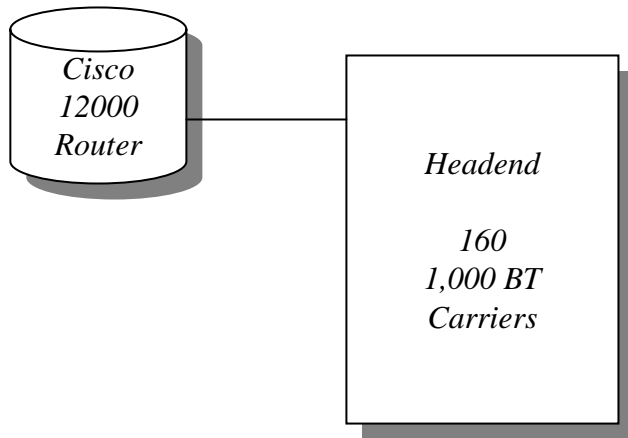
CAPEX per HH vs Number HH (PON)



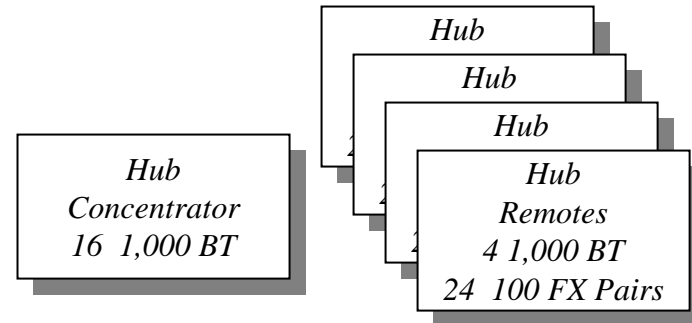


# *GigE Architecture*

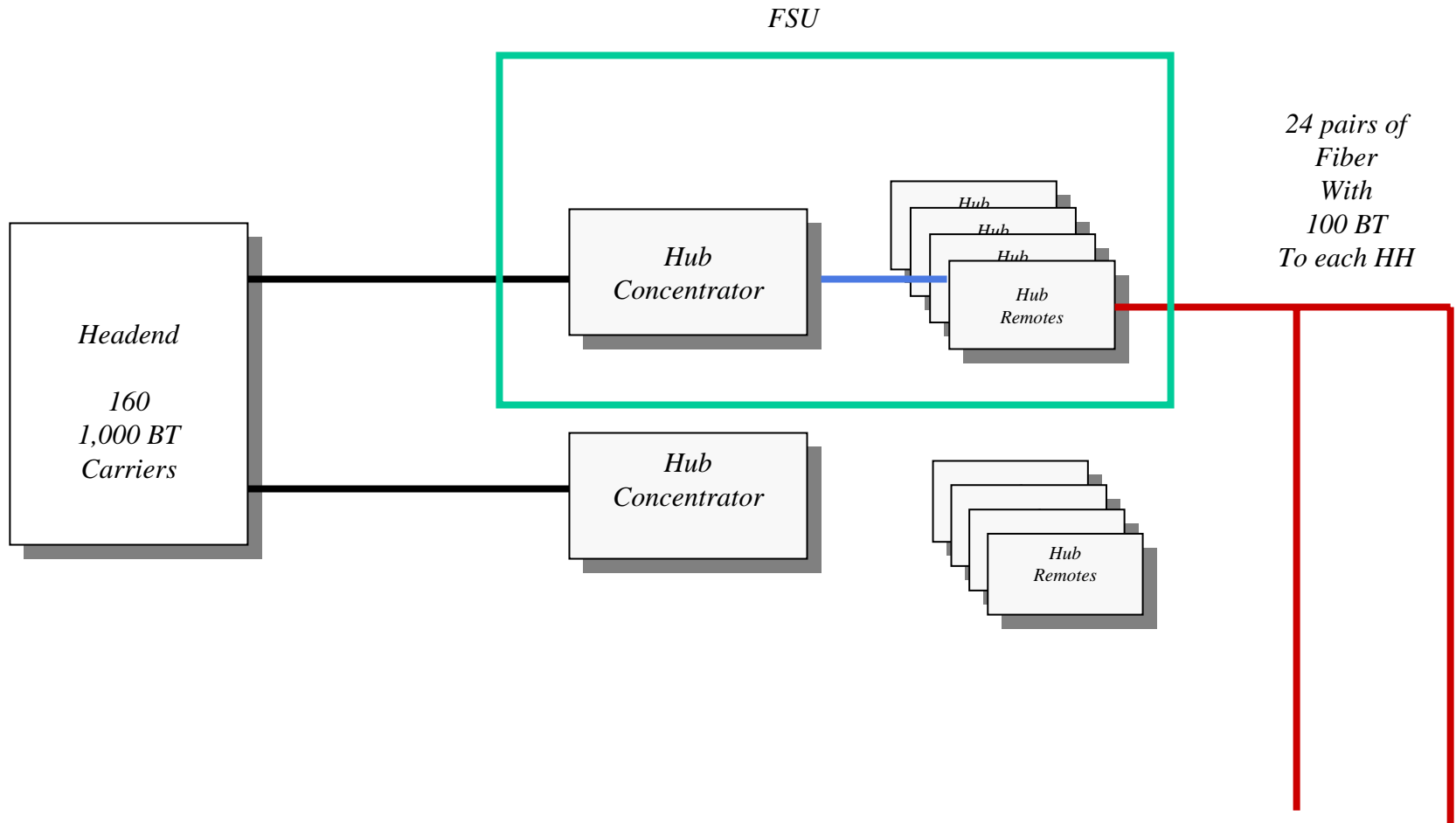
# Design Issues



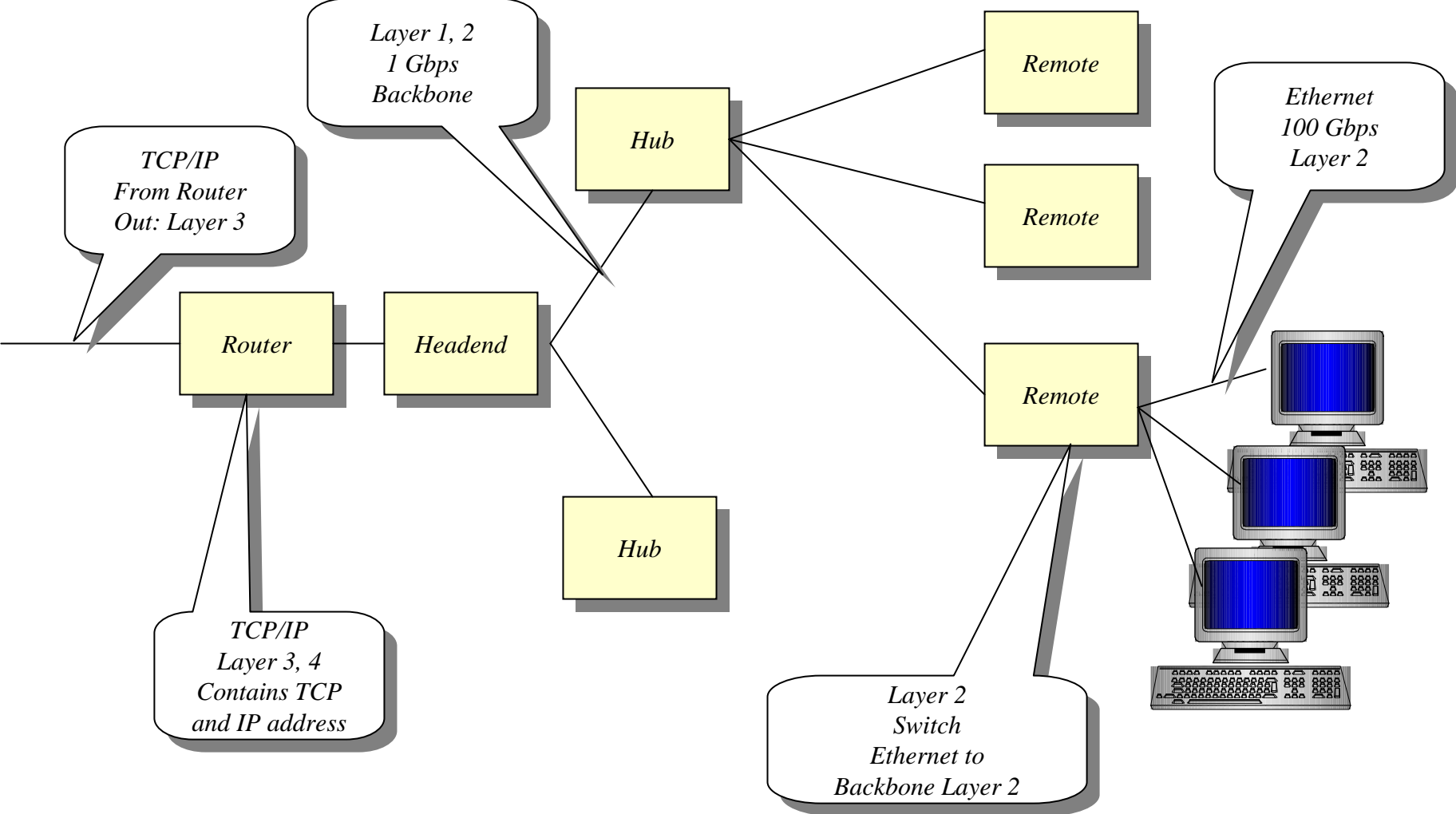
*If low load per HH, then can set 15 HH 317  
Per 410, and one 1 Gbps from 410  
Back to 3700, with 1 Gbps on in and  
1 Gbps on out.*



# System Elements GigE



# GigE Architecture

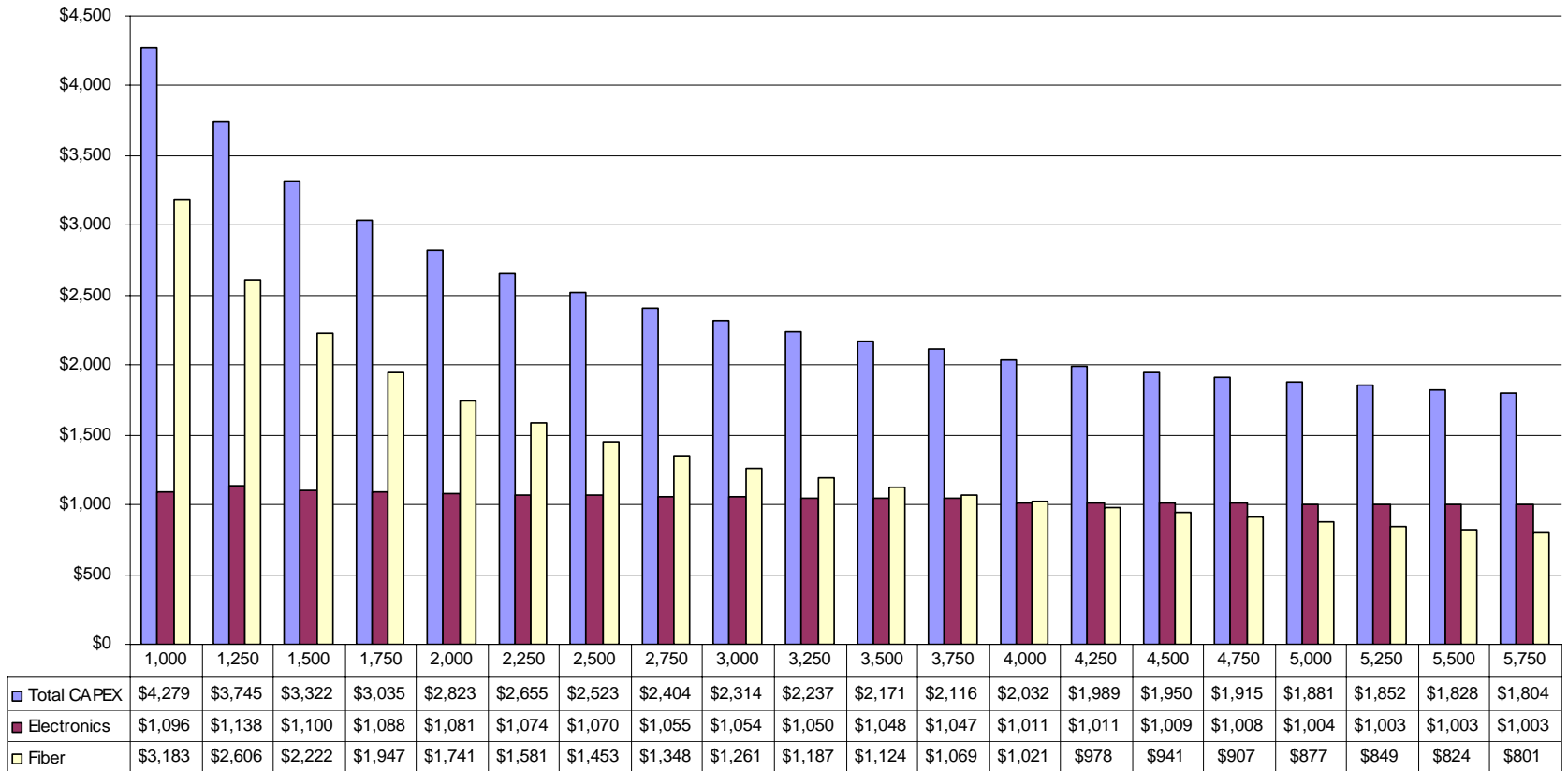


# CAPEX Gige

<i>Unit</i>	<i>Fixed</i>	<i>Variable</i>	<i>Capacity</i>	<i>Example for 1,000 HH</i>	<i>Per HH CAPEX</i>
EUU, End User Unit		\$1,165	1 per user	\$1,165,000	\$1,165
Remote		\$7,695	Supports 4 1 Gbps BT and 24 100 Mbps port pairs with 10 km range	\$320,625	\$321
Concentrator		\$6,995	Supports 16 1 Gbps BT connections at 10 km range	\$34,975	\$35
Headend	\$190,000	\$12,000	Supports 160 1 Gbps BT connections	\$202,000	\$202
Number HH				1,000	
Total				\$1,722,600	
Total per HH				\$1,723	\$1,723
Total Fiber Miles		\$25,000	In town of 80 miles with 70% coverage	\$1,400,000	\$1,400
Drop Cost		\$300		300,000	\$300
Total per HH with Fiber					\$3,423

# CAPEX per HH GigE

CAPEX per HH vs No HH (GigE)



# CAPEX GigE LITE

CAPEX per HH vs No HH (GigE)

