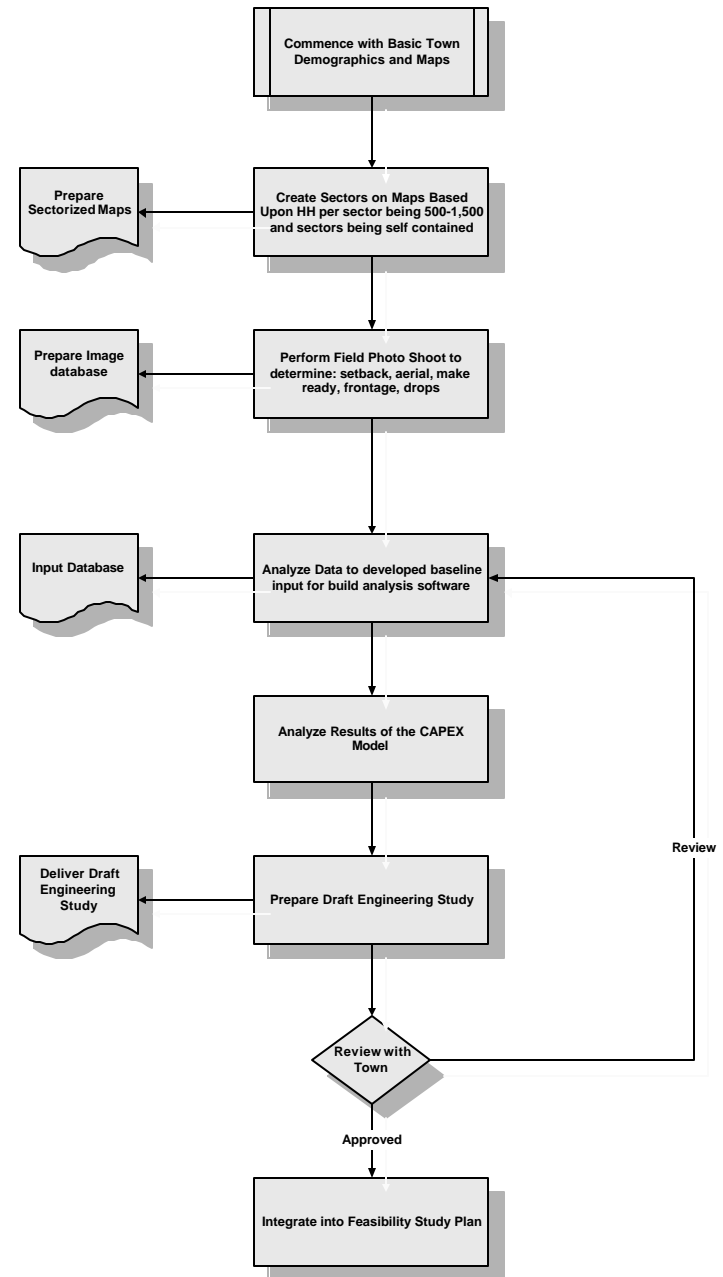


# THE MERTON GROUP

## *Municipal Broadband Networks Infrastructure Hampton, NH*

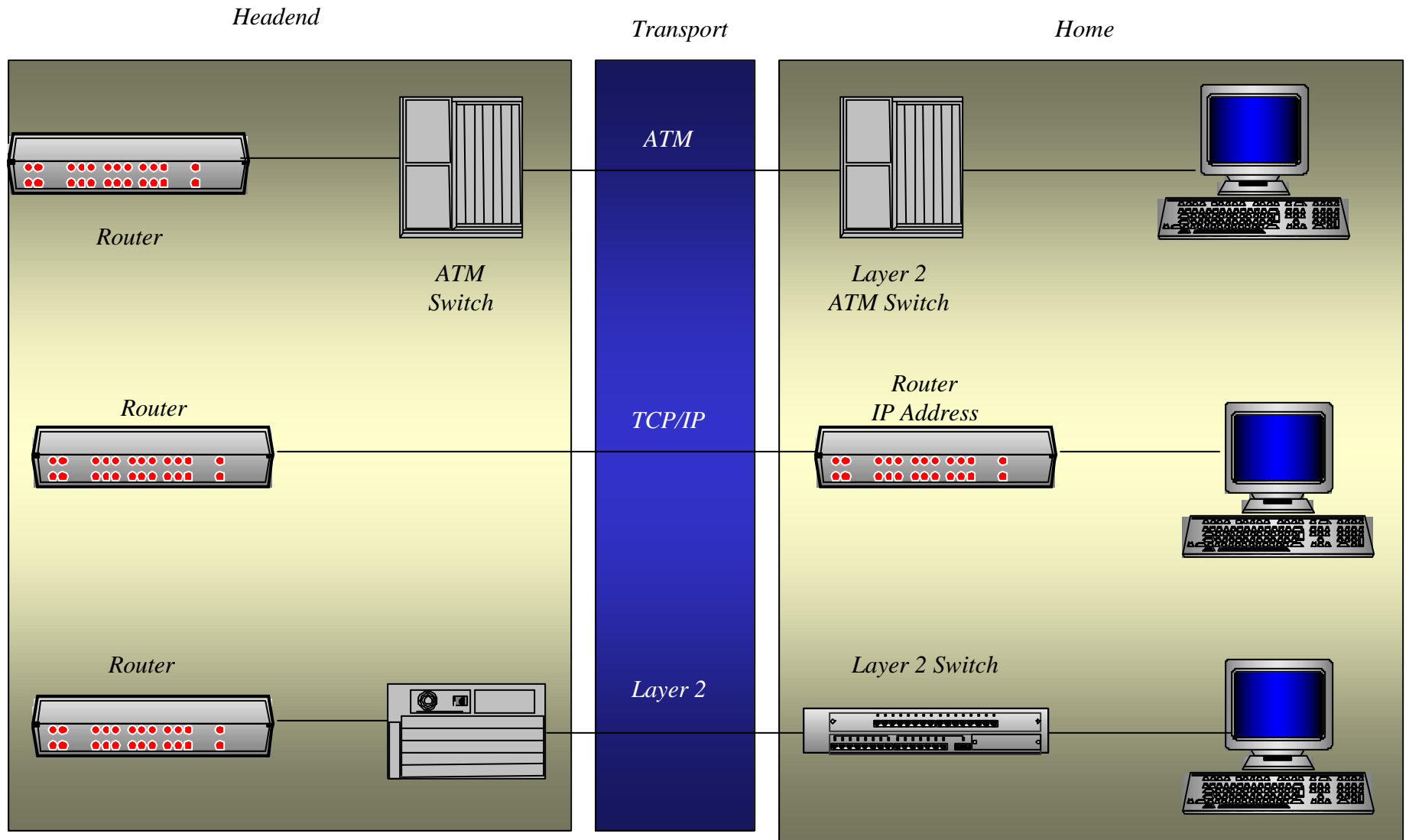
# *Methodology*

# Engineering Methodology

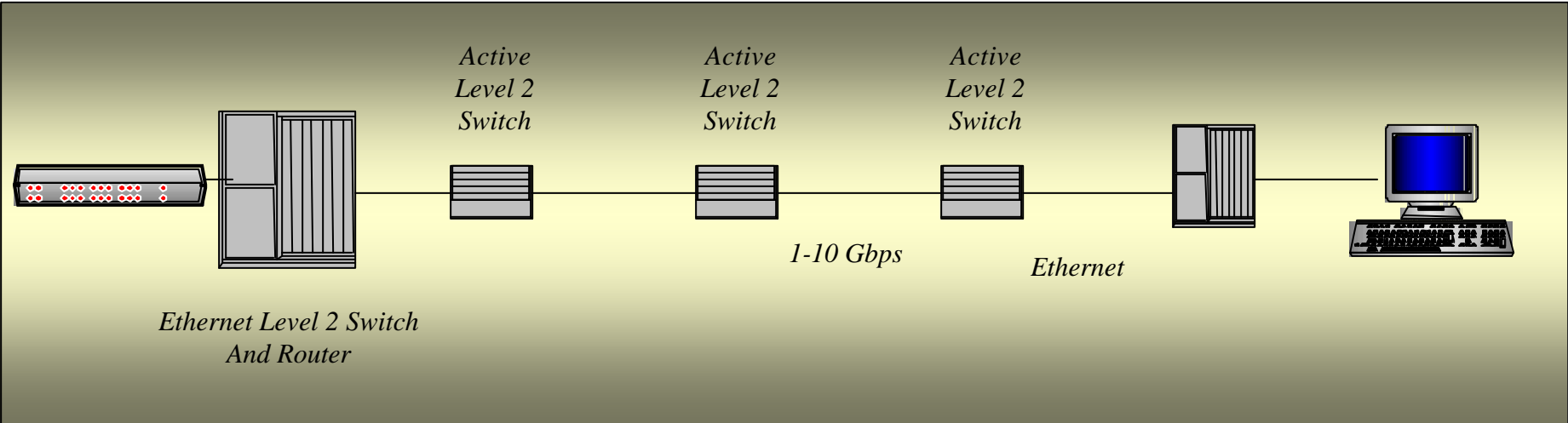
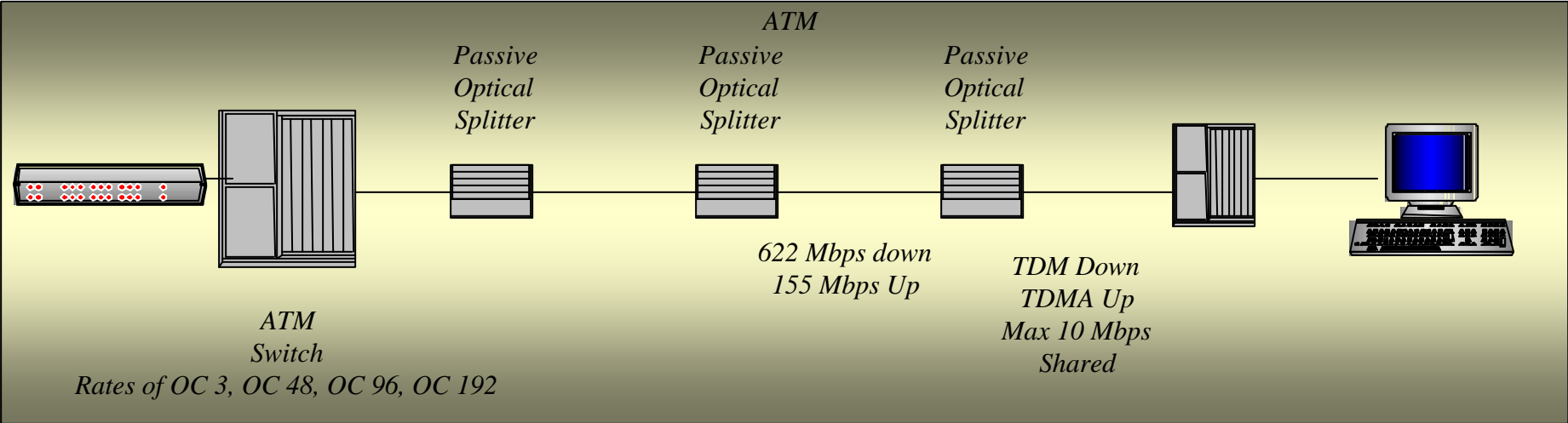


# *General Architecture*

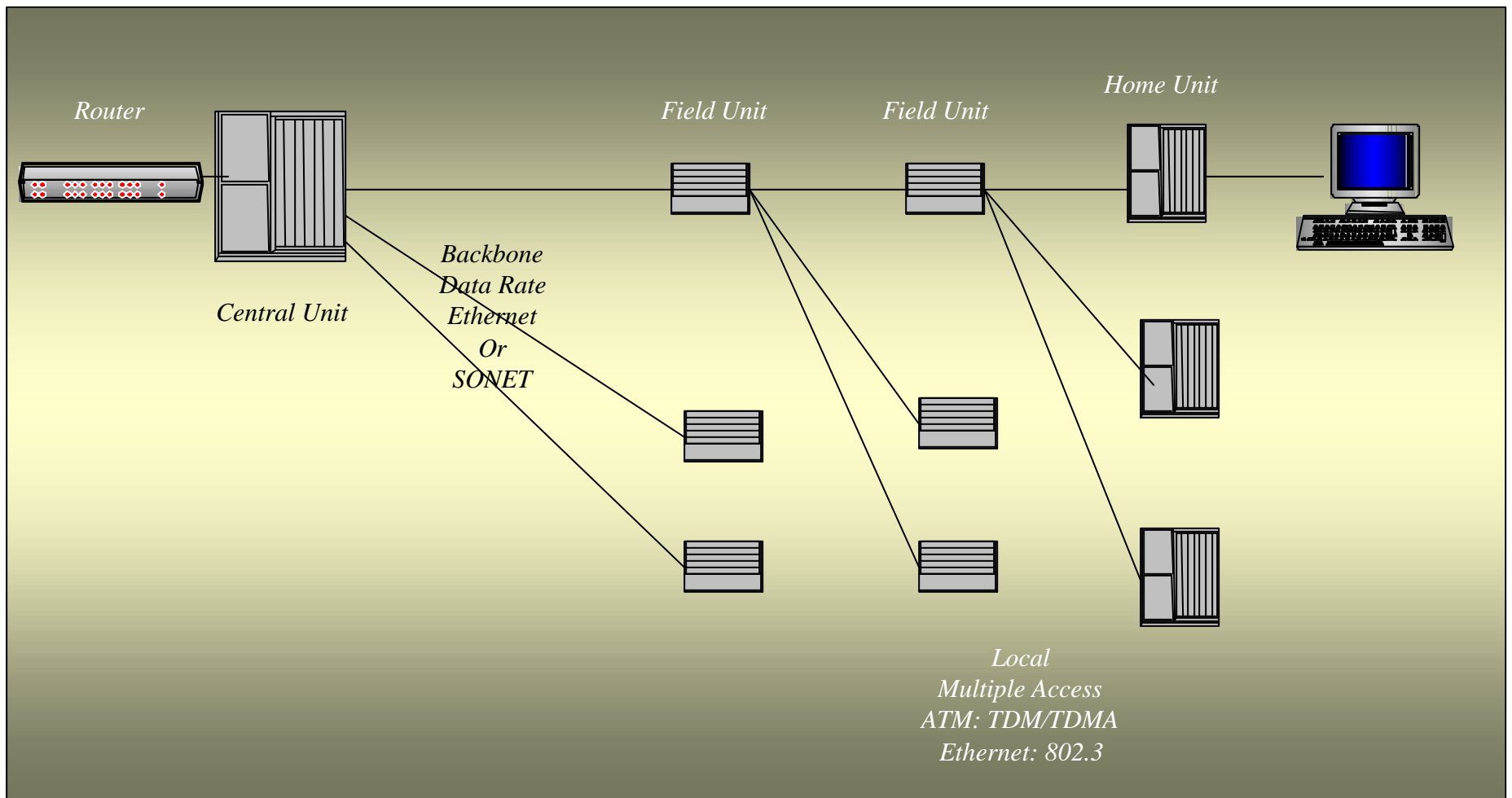
# Ethernet Layer 2, 3 and ATM



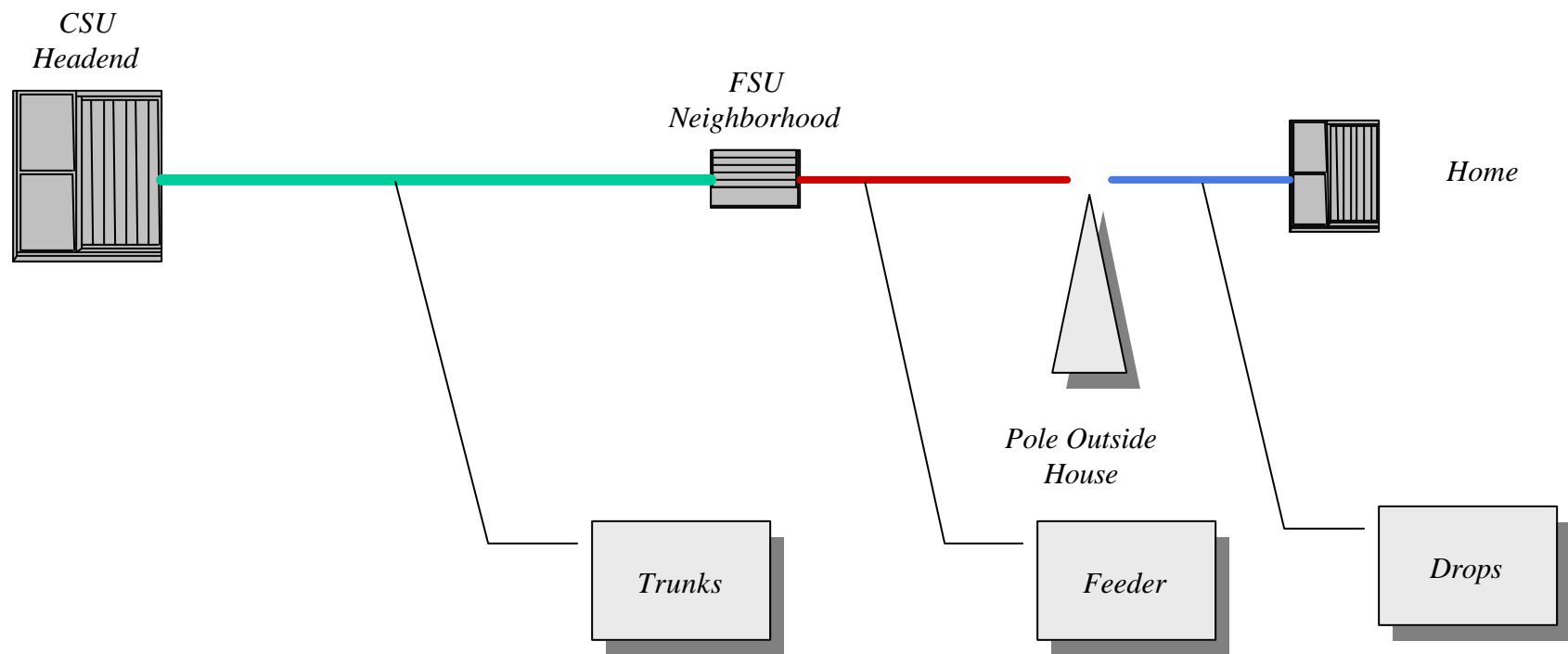
# Fiber Rates ATM v GigE



# Basic Architecture



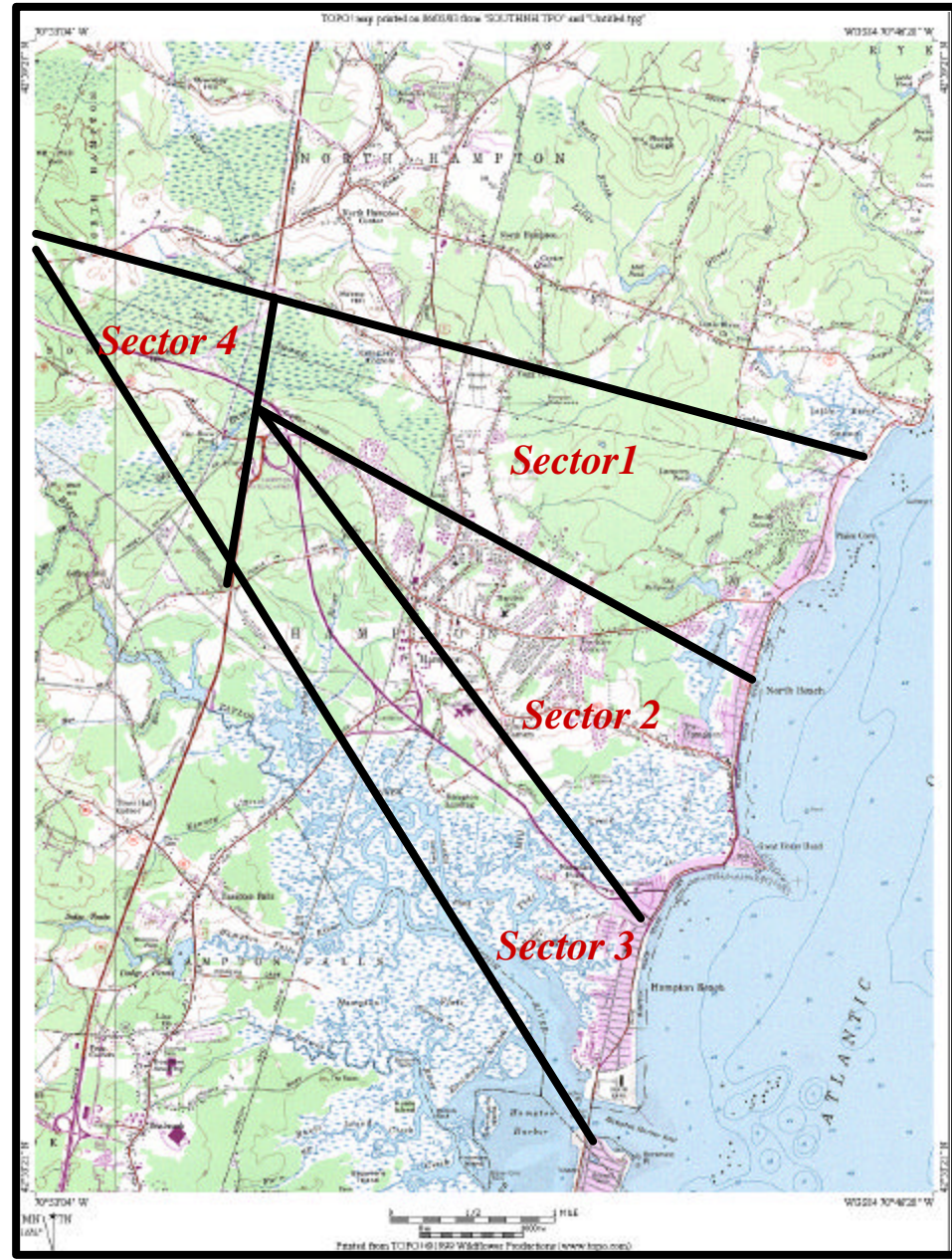
# Generic Fiber Network Elements





# *Local Architecture*

# Hampton, NH





# Hampton, NH Sectorization

## Hampton, NH

Sector	Population	Percent	Street Miles	Percent	HH/mi
1	1,616	25%	34	28%	48.10
2	2,263	35%	44	37%	50.96
3	1,487	23%	25	21%	59.01
4	1,099	17%	17	14%	65.42
5	-	0%	-	0%	

6,465

100%

120

100%

Total HH: 6,465  
Total Miles Streets: 120

# Hampton, NH Set Back

Sector	Street Miles	Average Set Back	Weighted Average Setback
1	34	224	56
2	44	243	85
3	25	174	40
4	17	250	43
5	-		-

120

Total Average Set  
Back

223

# Hampton, NH Frontage

Sector	Street Miles	Average Frontage	Weighted Average Frontage	Total Frontage	Percent Frontage
1	34	200	50	323,250	26%
2	44	158	55	356,383	28%
3	25	146	34	217,128	17%
4	17	200	34	219,810	17%
5	-		-		

Total Average  
Frontage

173

1,116,572

88%

# Hampton Aerial

Sector	Street Miles	Average Aerial	Weighted Average Aerial
1	34	99%	25%
2	44	85%	30%
3	25	82%	19%
4	17	60%	10%
5	-		0%

Total Average  
Aerial

84%



# *Hampton, NH Make Ready*

Sector	Street Miles	Average Make Ready	Weighted Make Ready
1	34	22%	6%
2	44	8%	3%
3	25	45%	10%
4	17	38%	6%
5	-		0%

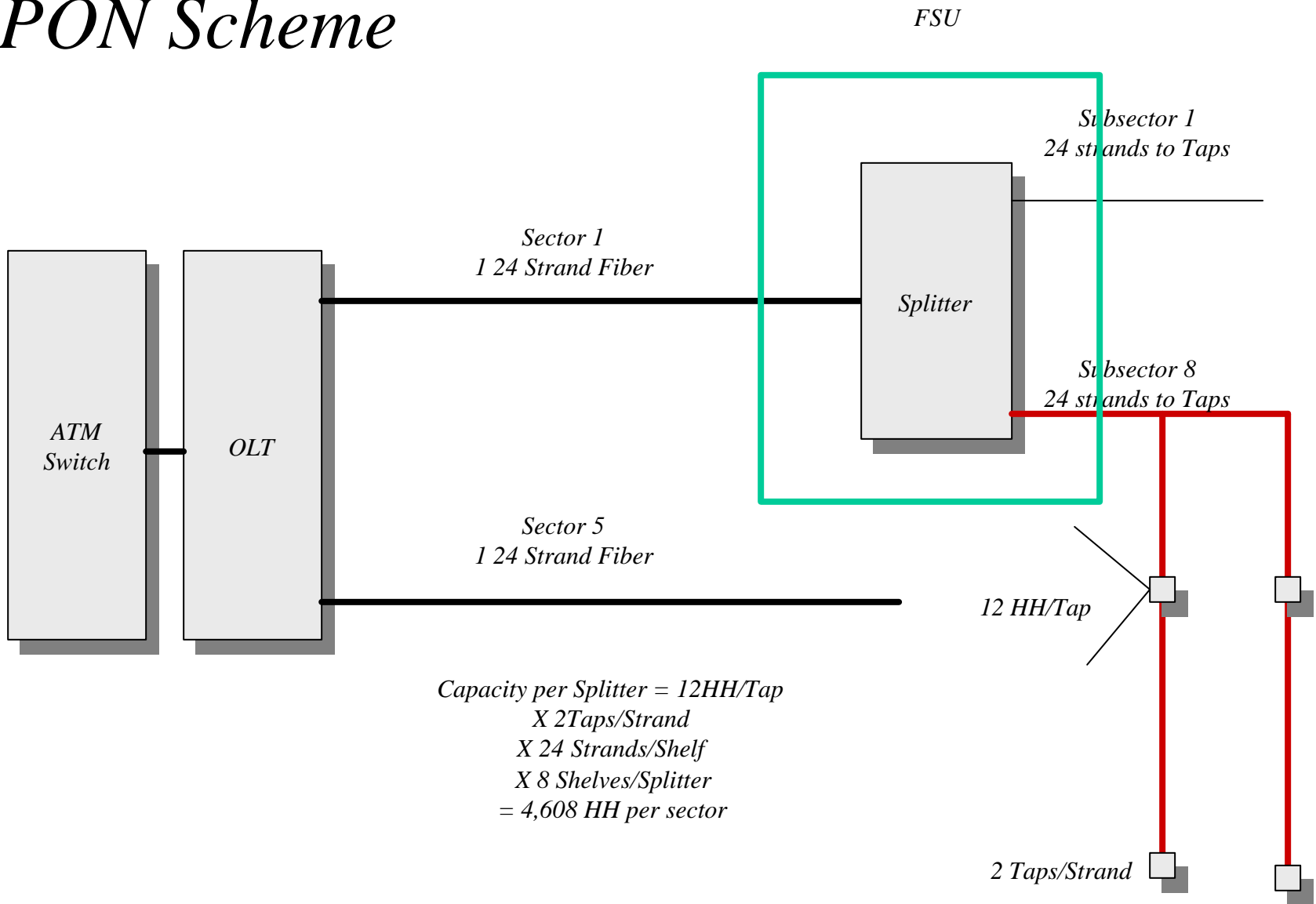
Total Average  
Make Ready

25%



# *PON Architecture*

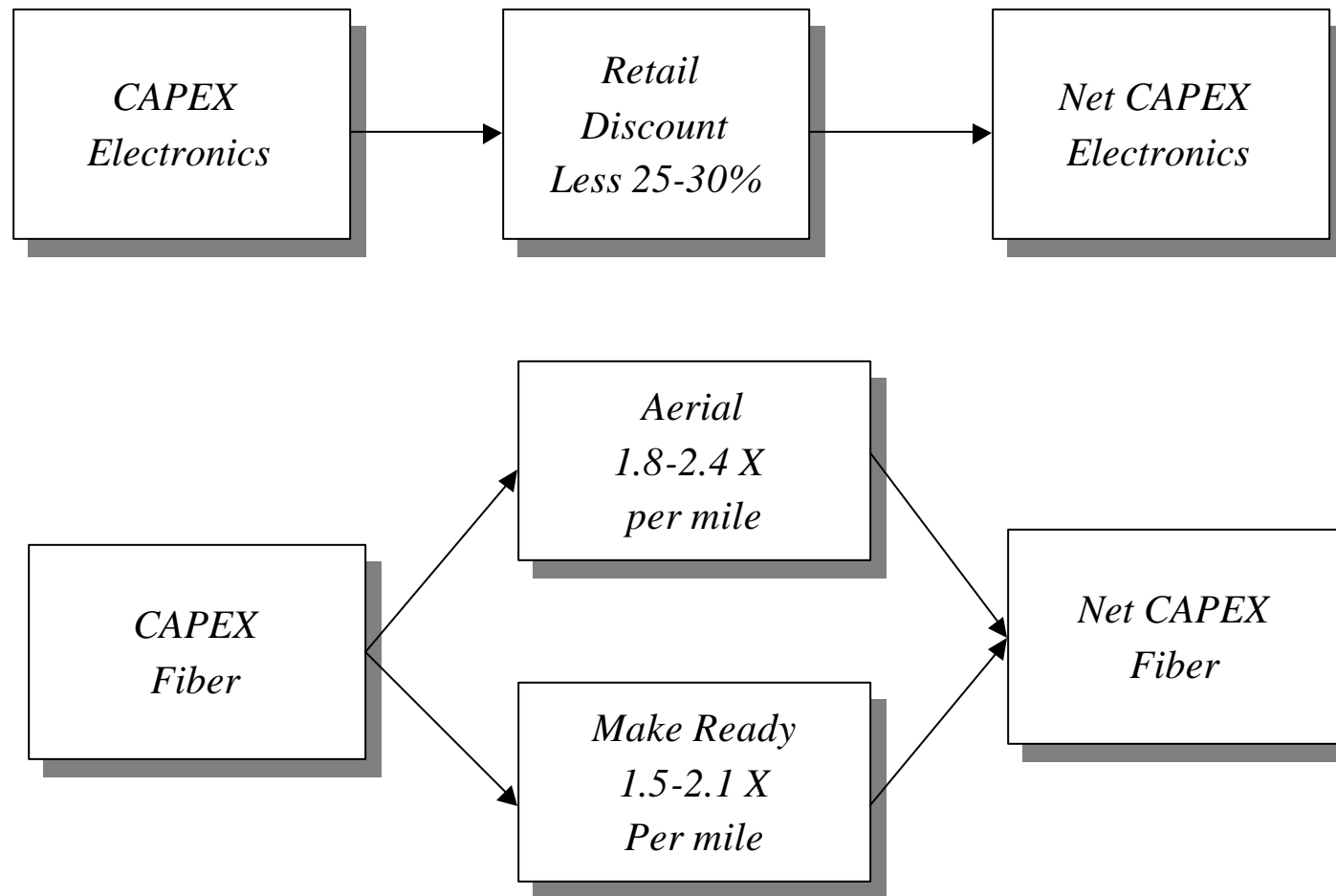
# PON Scheme



# PON Cost Analysis

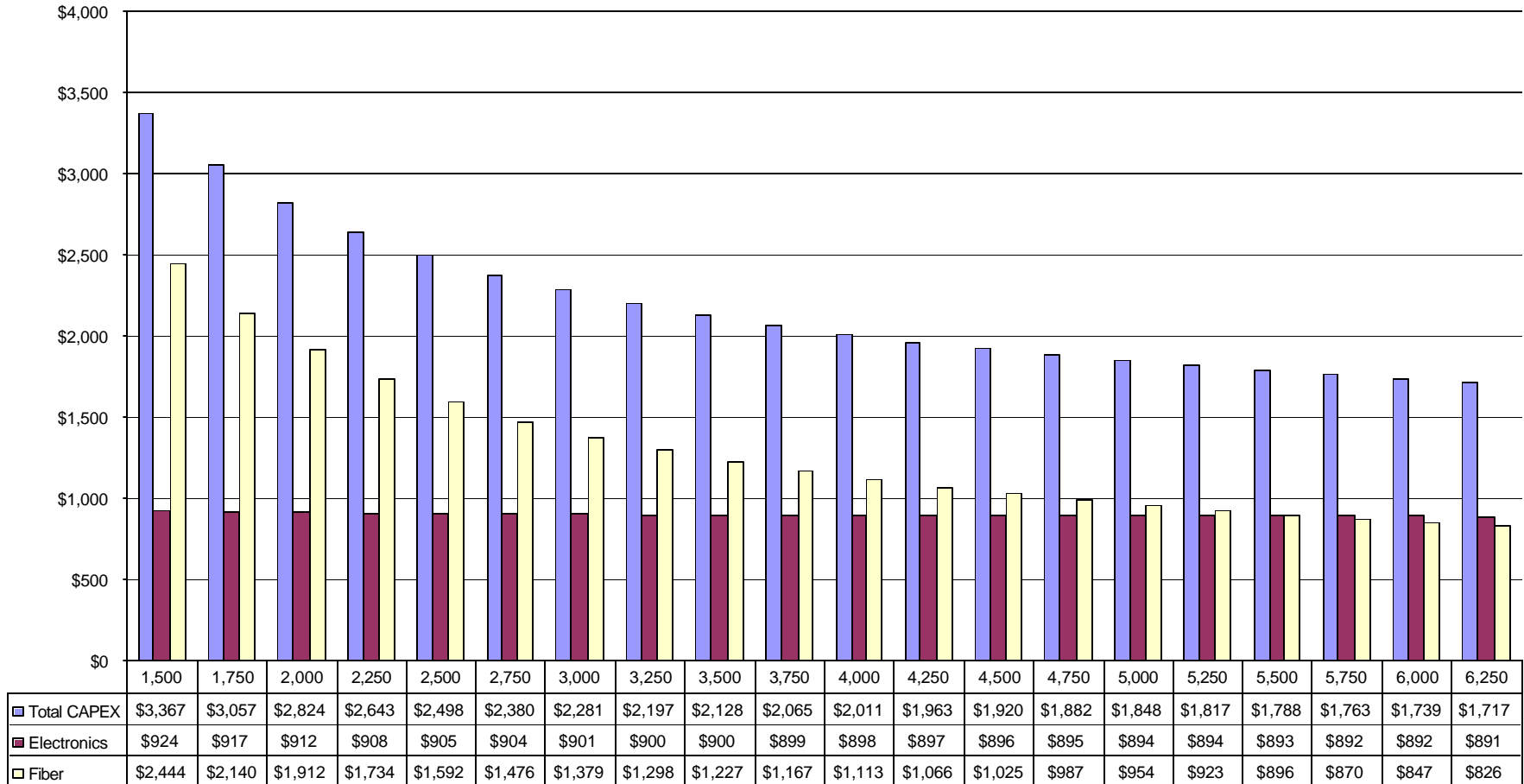
<i>Unit</i>	<i>Fixed</i>	<i>Variable</i>	<i>Capacity</i>	<i>Example for 1,000 HH</i>	<i>Per HH CAPEX</i>
EUU, End User Unit		\$1,067	1 per user	\$1,067,000	\$1,067
Taps		\$558	12 users per Tap	\$46,500	\$47
Splitter	\$7,000	\$1,380	8 splitter draws pre cabinet, 576 HH per splitter draw, maximum of 4,608 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	Maximum 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 town of 80 miles with 70% coverage	\$1,400,000	\$1,400
Drop Cost		\$300		300,000	\$300
Total per HH with Fiber					\$3,003

# *Design Detail Modifications*



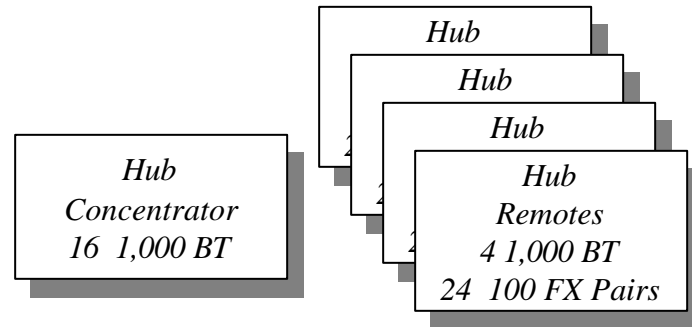
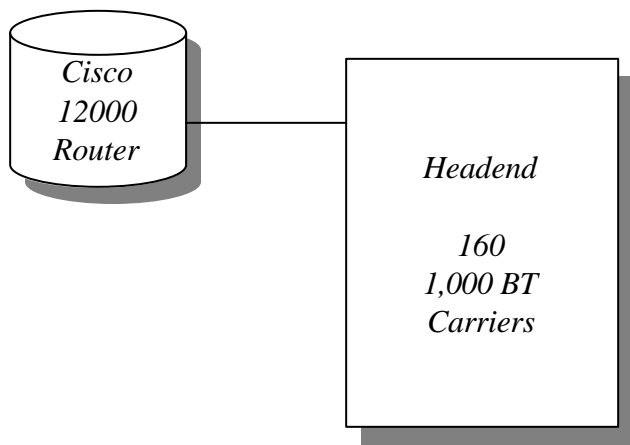
# CAPEX PON

CAPEX per HH vs Number HH (PON)

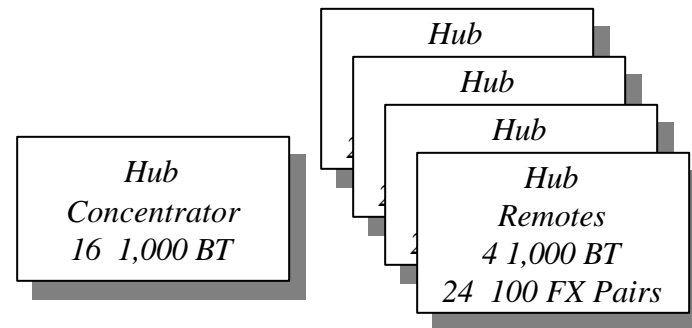


# *GigE Architecture*

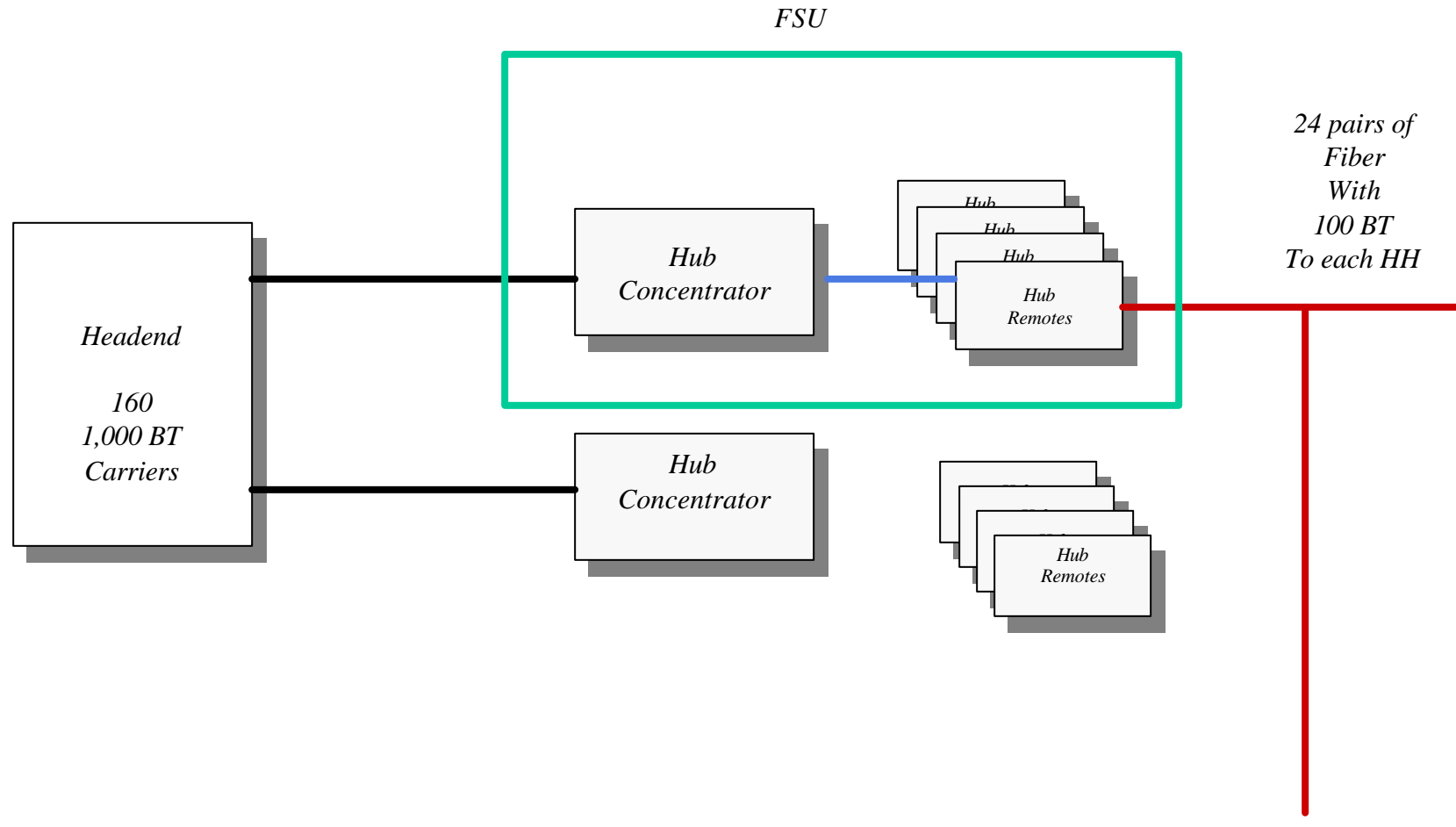
# Design Issues



*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.*

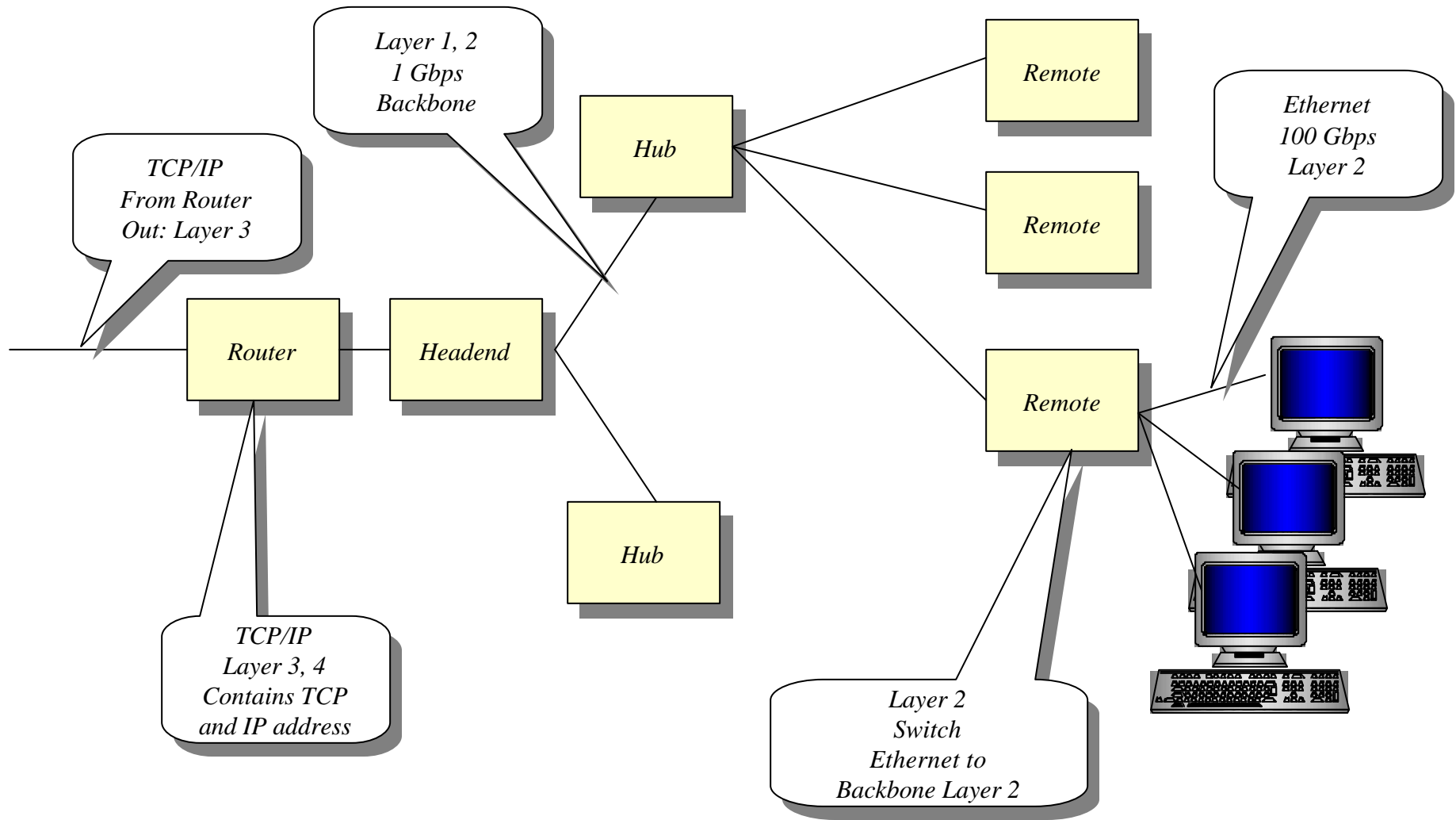


# System Elements GigE





# GigE Architecture

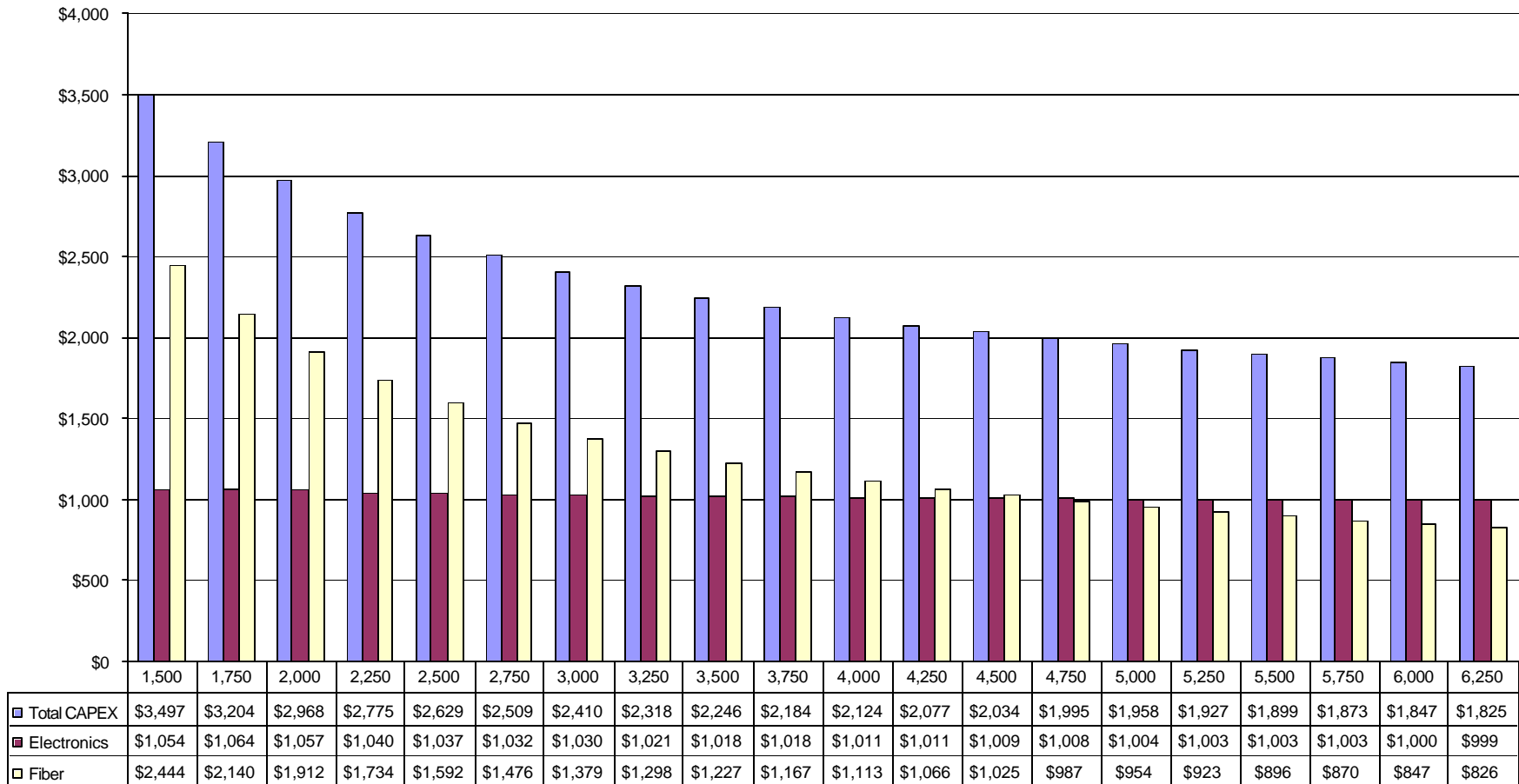


# CAPEX Gige

<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)

