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I. Overview

As part of its Feasibility Study for a Fiber Optic Telecommunications System, Uptown Services incorporates a comprehensive market analysis and competitive assessment to satisfy the study objectives.

This report presents detailed analysis of the Los Alamos market based upon information obtained through the following means:

- Quantitative market research and a Conjoint Market Simulation model
- Secondary analysis of the industry, its incumbent operators, and other municipal examples nationwide
- Information provided by the Wideband Community Network (WVN) committee

This report presents Uptown's analysis of the existing incumbent service providers, including ISPs and others. The following incumbent providers are analyzed:

- Video Entertainment: Comcast and DBS (Dish Network)
- Broadband Internet Access: Qwest and Comcast
- Local Telephone: Qwest

II. Competitive Assessment

As the late market entrant across all three LOBs, the pricing and revenue potential of a new FTTP retailer will be significantly influenced by the incumbent product design. For this reason, it is necessary to understand the choices Los Alamos consumers have available to them today, and how potential FTTP retail offerings can compete against these. Incumbent offerings will be addressed below from the perspective of the video channel lineup, video packages and prices, Internet packages and prices, phone packages and prices, and bundles involving these three lines of business.

A. Comcast

Comcast is the predominant cable operator within greater Los Alamos.

1. Channel Lineup

Comcast offers a channel lineup with 172 channels made available across limited basic, expanded basic, and digital packages. It has taken advantage of the added capacity from its two-way upgrade to 750MHz and is offering digital music and PPV. It carries 9 local broadcast channels as well. Comcast has introduced Video-On-Demand (VOD), but has not yet launched high definition. It is expected to be launched at any time, and will be priced at an additional \$5.00 per month to any digital package.

2. Video Packages and Pricing

The pricing of incumbent video services is the primary attribute with which alternative providers can achieve market share if the County decides to move forward in constructing a FTTP network. Nationwide, cable rates have grown substantially over the last five years through an annual series of rate increases. In Los Alamos, basic cable is \$40.51 from Comcast, which benchmarks slightly higher than the national average compared to most cable incumbents. The Comcast video product structure is presented in Exhibit 1.

Exhibit 1 – Comcast Video Packaging Structure

	Monthly Price	Analog Channels	Digital Channels	Premium(s)	Digital Music	High Definition
Basic Service	\$30.89	41 Channels	-	HBO, Showtime, Cinemax, and Starz!/Encore are \$12.95 each	-	-
Expanded Basic	\$40.51	62 Channels				
Digital Classic	\$50.46	62 Channels	13 Channels		45 Channels Included	Available Soon (\$5.00 extra)
Digital Plus	\$55.46	62 Channels	34 Channels			
Digital Silver	\$66.95	62 Channels	34 Channels			
Digital Gold	\$74.95	62 Channels	34 Channels			
Digital Platinum	\$83.95	62 Channels	34 Channels			

Source: Uptown Services Analysis, 2003

3. Internet

Comcast offers a single cable modem Internet service to households and small businesses in Los Alamos. Exhibit 2 shows its Internet product line.

The MSO will increase download capability from 1.5Mbps to around 3Mbps when it upgrades from docsis 1.1 to docsis 2.0.

Exhibit 2 – Comcast Broadband Internet Offerings

Tier	Monthly Price	Downstream Speed	Upstream Speed	IP Addresses
Cable Modem	\$45.95	1.5Mbps → 3Mbps	256Kbps	1 Dynamic

Source: Uptown Services Analysis, 2003

B. Dish Network

Dish Network (owned by EchoStar) and DirecTV (owned by Hughes Electronics, in a pending acquisition by News Corp), are the two national-level satellite video service providers, known as DBS, or direct broadcast satellite. For this analysis, Dish Network is used to represent the DBS providers, since it is the more aggressive of the two players with lower prices.

DBS has made significant market share gains against cable in the last several years, and this is reflected in its 33% penetration in Los Alamos, well above the national average of 18%. Across the US, approximately 40 markets now have local channels being carried by the DBS providers, and this has occurred in Los Alamos as well with access to the Albuquerque and Santa Fe broadcasters. EchoStar has 11 local broadcast channels available for \$5.99 extra per month.

The main strength of DBS is aggressive pricing combined with channel breadth. Dish Network also offers channels in high definition format. These are Discovery HD, HBO HDTV, Showtime HDTV, and CBS. Both DBS providers focus their marketing efforts around a few video packages that are aggressively priced. These packages do not include local channels, even where they are available, and must be purchased for an additional fee. Dish Network's video packages are presented in Exhibit 3. The satellite providers are known for aggressive pricing, especially at the low end of the product range, and this is what Dish is doing with an entry price of \$25.

Exhibit 3 – Dish Network Video Packaging Structure

	Monthly Price	Local Channels	Digital Channels	Premium(s)	Digital Music	High Definition
America's Top 50	\$24.99	\$5.99	46	-	Included	Available
America's Top 100	\$33.99	\$5.99	71	-	Included	Available
America's Top 150	\$42.99	\$5.99	102	2	Included	Included
Everything Pak	\$74.99	\$5.99	102	All	Included	Included

Source: Uptown Services Analysis, 2003

C. Qwest

Qwest offers DSL Internet access in Los Alamos in addition to local phone service. It has 33% market share of the total Internet market in Los Alamos.

1. Internet Tiers and Pricing

Qwest tiers its residential DSL Internet service into two levels; Up to 256Kbps or up to 640Kbps on the downstream path. This means that it offers Internet service levels differentiated by the speed at which users can download Internet content. Business tiers are also available with symmetrical throughput rates, but with static IP addresses and other business-related features.

Exhibit 4 – Qwest Broadband Internet Offerings

Tier	Monthly Price	Downstream Speed	Upstream Speed
Qwest Choice DSL	\$34.99	Up to 256Kbps	Up to 256Kbps
Qwest Choice DSL Deluxe	\$47.99	Up to 640Kbps	Up to 256Kbps
Qwest DSL Pro – 640K	\$80.95	Up to 640Kbps	Up to 640Kbps
Qwest DSL Pro – 1M	\$102.95	Up to 1Mbps	Up to 1Mbps
Qwest DSL Pro – 4M	\$179.95	Up to 4Mbps	Up to 1Mbps
Qwest DSL Pro – 7M	\$289.95	Up to 7Mbps	Up to 1Mbps

Source: Uptown Services Analysis, 2003

2. Local Phone

Qwest is the sole provider of local phone service in the Los Alamos area so it will be used as the competitor benchmark. Its major phone products are summarized in Exhibit 5. Comcast does not offer cable telephony in Los Alamos.

Qwest simplifies its phone service options into 5 packages as summarized in Exhibit 5.

Exhibit 5 – Qwest Phone Packaging Structure

	Monthly Price	Number of Lines	Calling Features	Wire Maintenance	Long Distance
Qwest Choice	\$24.99	1	Up to 3	Included	Additional
Qwest Choice – 2 lines	\$34.99	1	Up to 3	Included	Additional
Long Distance	-	-	\$0.05/minute with \$20/month cap		

Source: Uptown Services Analysis, 2003

Qwest charges the following monthly recurring fees for each calling feature when purchased outside of its Qwest Choice Home package:

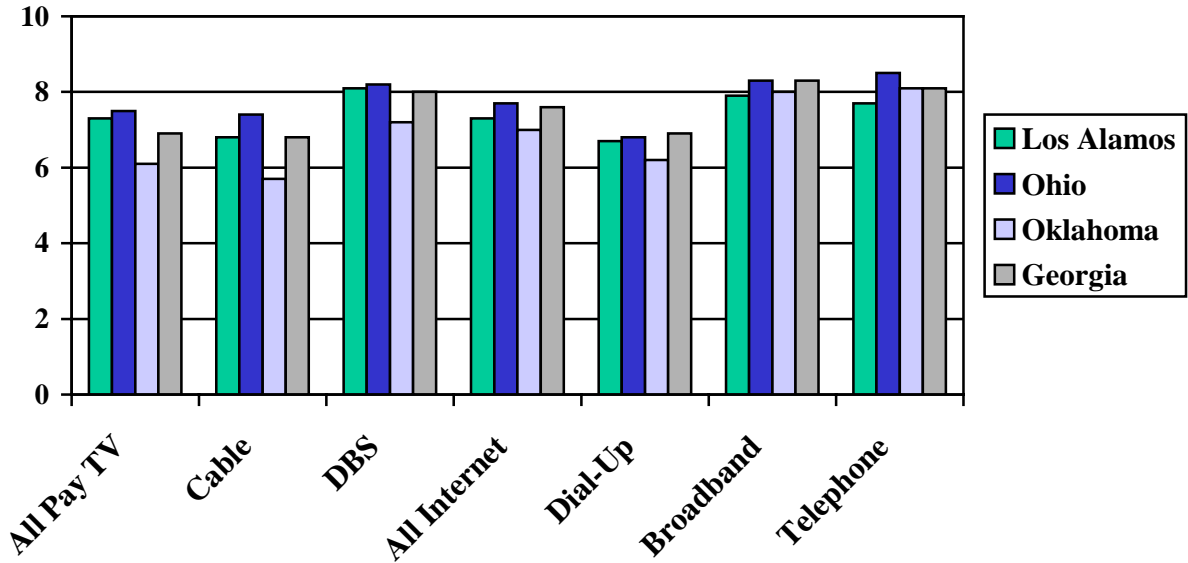
- Main Line \$12.25
- Additional Line \$12.25
- Line-Backer \$4.75
- Phone-Backer \$4.50
- Call Waiting \$4.78
- Voice Messaging \$6.95
- Caller ID \$6.25
- Custom Ringing \$5.00
- Three-Way Calling \$3.50
- Call Forwarding \$3.00
- Call Following \$3.95
- Last Call Return \$2.95
- Speed Calling 8 \$2.00
- Call Rejection \$4.50

D. Service Provider Comparisons

1. Customer Satisfaction

Satisfaction ratings among Los Alamos households are near market averages for pay TV and Internet service, but are relatively low for local phone service. Within service categories, satellite television scores significantly higher than cable, and high-speed Internet access scores significantly higher than dial-up. Exhibit 6 compares the satisfaction ratings in Los Alamos to other recent Uptown client markets for comparative purposes.

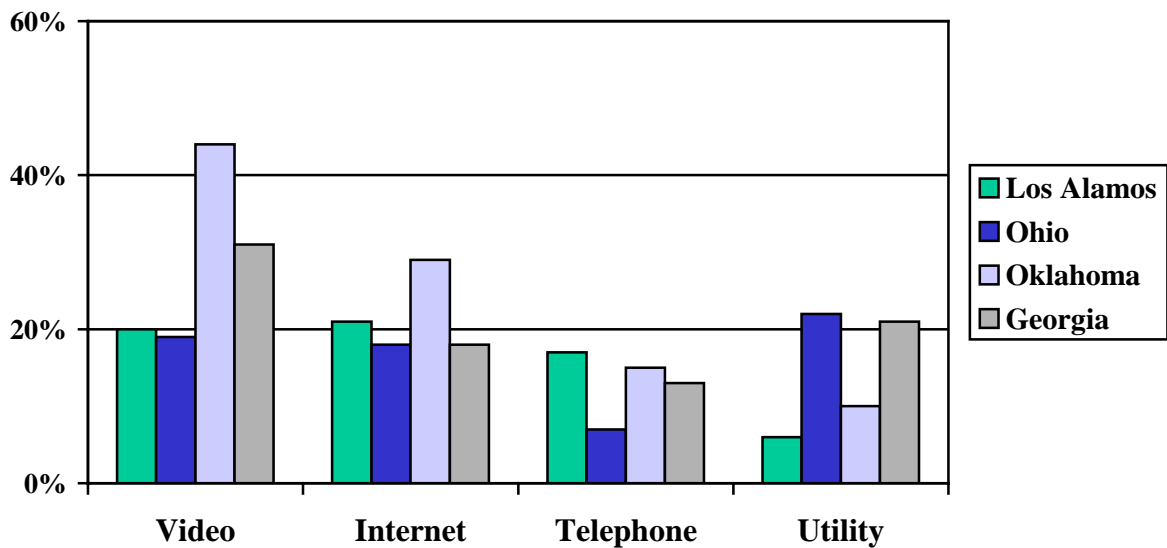
Exhibit 6 – Satisfaction Rating Benchmark (mean rating on a 1 – 10 scale)



Source: Quantitative Research Report, Uptown Services. November 2003

In addition to calculating the mean scores for satisfaction, the survey provides insight into the percentage of households who are unsatisfied with their current service provider. The size of this segment of the market is important in understanding the residential population that is more motivated to try an alternative provider. The satisfaction with local utility services in Los Alamos is comparatively high, with fewer than 10% of households dissatisfied with their electric service. The percentage of households that are dissatisfied, which is defines as a satisfaction level between ‘1’ and ‘5’, are presented in Exhibit 7.

Exhibit 7 – Incidence of Dissatisfied Video/Internet/Phone Users (% Rating from 1 to 5)



Source: Quantitative Research Report, Uptown Services. November 2003

2. Product Value

This section and the following section present side-by-side comparisons between the incumbents for video and Internet services, respectively (there is no section for phone since Qwest effectively has a monopoly at this time). For both lines of business, a simple price comparison as well as a graphical depiction of the value being delivered to consumers is presented.

a) Product Value Comparison – Video Services

Exhibit 8 presents the current “rate card” (non-promotional) pricing of Comcast and Dish Network for video.

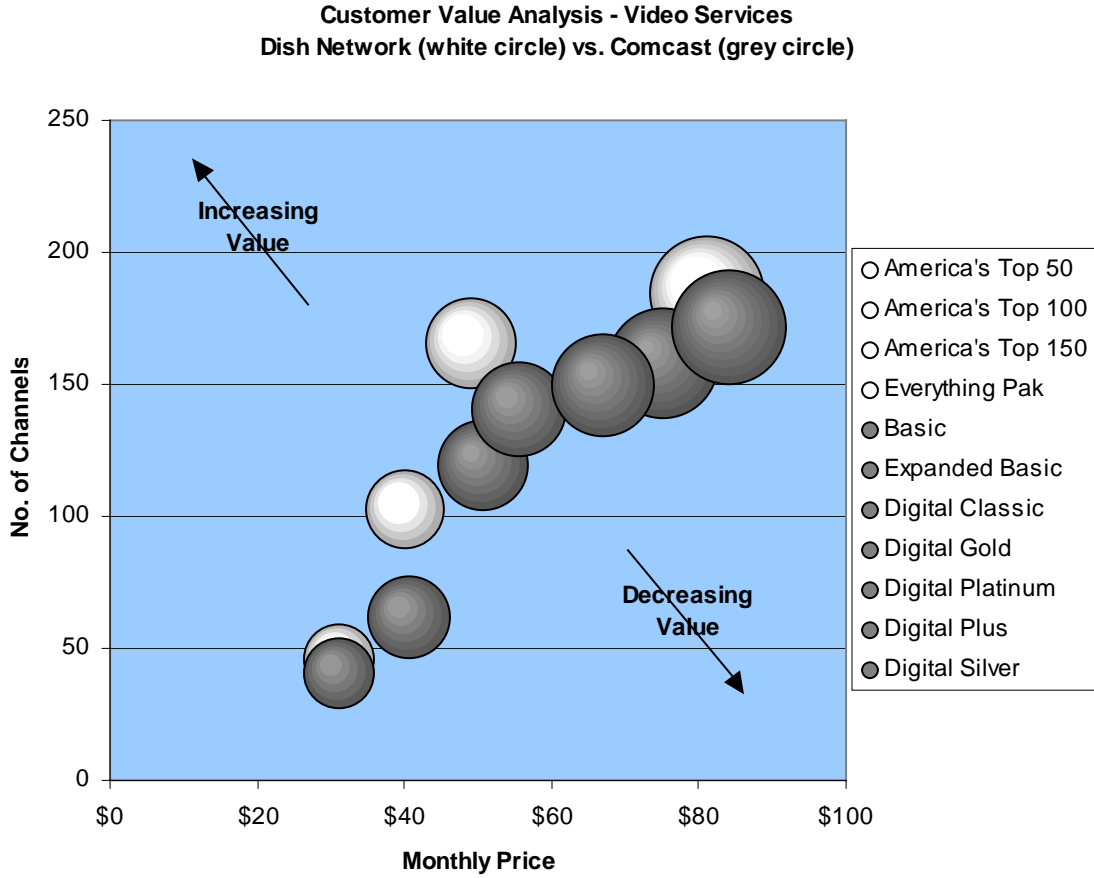
Exhibit 8 – Video Pricing Comparison

		Comcast	Dish Network
Analog Basic	Basic Service	\$30.89	NA
	Expanded Basic /America's Top 50 ^{1,2}	\$40.51	\$24.99
Digital Packages	Digital Classic /America's Top 100 ^{1,2}	\$50.46	\$33.99
	Digital Plus (1 premium)	\$55.46	
	Digital Silver /America's Top 150 ² (2 premiums)	\$66.95	\$42.99
	Digital Gold (3 premiums)	\$74.95	
	Digital Platinum /Everything Pak ² (4 premiums)	\$83.95	\$74.99
Premium Channels	HBO	\$12.95	
	Cinemax	\$12.95	
	Showtime/The Movie Channel	\$12.95	
	Starz!/Encore	\$12.95	
Ala Carte Services	PPV Movie (non-adult)	\$3.95	\$3.99
	High Definition	No	Yes
Local	Local Broadcast	Included	\$5.99
Notes: ¹ Assumes no premium channels ² Without local channels			

Source: Uptown Services Analysis, 2003

As a methodology to compare the different incumbent product strategies, Uptown has plotted the monthly price of the incumbent video packages against the number of channels received. In this way, one can get a sense of the degree to which each provider is delivering customer value. This is presented in Exhibit 9. Although this can only approximate value as consumers place different levels of value on each channel, it provides a visual confirmation of how the packages are competitively positioned.

Exhibit 9 – Video Value Comparison



Source: Uptown Services Analysis, 2003

b) Product Value Comparison – Internet Services

Exhibit 10 presents the current “rate card” (non-promotional) pricing of Qwest and Comcast for Internet service.

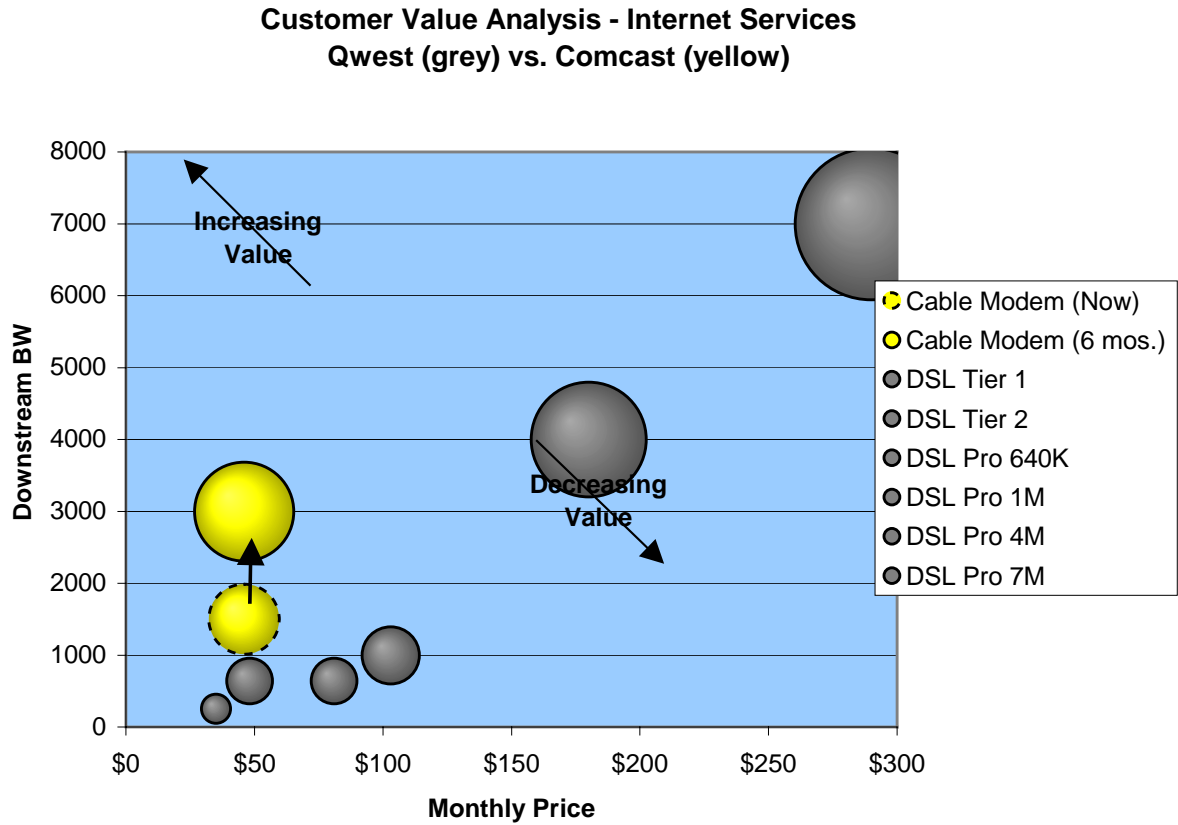
Exhibit 10 – Internet Pricing Comparison

Internet Service	Qwest	Comcast
256Kbps Symmetrical	\$34.99	-
640Kbps Down/256 Up	\$47.99	-
DSL Pro - 640Kbps	\$80.95	-
DSL Pro -1Mbps	\$102.95	-
Cable Modem (3Mbps)	-	\$45.95
DSL Pro -4M	\$179.95	-
DSL Pro -7M	\$289.95	-

Source: Uptown Services Analysis, 2003

As seen in Exhibit 11 below, Comcast cable modem service will represent the best broadband Internet value to the general residential market after implementation of docsis 2.0. This router upgrade is resulting in download speed increases to 3 Mbps in various markets across the country at this time.

Exhibit 11 – Internet Value Comparison



III. System Technical Evaluation

A. Comcast

Comcast is has deployed a standard coaxial cable television system with limited utilization of fiber optics in core trunk routes. They are currently offering a full complement of analog and digital television services as well as high-speed Internet access, but have not deployed telephone service.

A Hybrid Fiber Coax (HFC) network like the one that Comcast is operating has served the needs of cable operators for nearly 20 years. However, the system is not likely to support the evolving video and data needs over the next ten to fifteen years. Services like HDTV, Video on Demand and ultra-high-speed Internet access are all going to drive the need for more bandwidth than a typical HFC system can deliver. It can be assumed that the capacity of the Comcast network will

exhaust in five to seven years, at which time they will either need to upgrade to FTTP or forgo offering the latest video and data services.

B. Qwest

Qwest is delivering services over a network comprised primarily of copper wire. There is a very limited amount of fiber deployed in the area to a few major customers, but all residential and small business customers are served using traditional copper pairs. Qwest is extremely limited in what they are able to offer in the way of video and Internet services. Video over copper lines possible using Very High Bit Rate DSL (VDSL), but the cost is high and only a limited number of trials have been implemented. DSL is a suitable means of providing broadband Internet services to consumers and small businesses, but the performance and availability are constrained by the given subscriber's distance from the service Qwest central office. DSL is currently available in Los Alamos, however it is highly unlikely that Qwest will invest in VDSL capabilities in order to offer video services. VDSL deployments will occur in metropolitan areas first and may never come to a market the size of Los Alamos.

C. Implications for Los Alamos's System Selection

Should the County choose to move forward with implementing a FTTP network, a key factor in the business's success will be creating and maintaining competitive advantage in served markets. Deploying a system capable of delivering more and better services than Comcast and Qwest would be a critical step in creating and maintaining such an advantage. It can be assumed that the County would not want to consider deploying a copper wire system like Qwest. So, the choice for Los Alamos can be boiled down to implementing a superior HFC system or a system better than HFC altogether, like FTTP.

IV. Forecast of Market Demand

Uptown has collected market penetration data from a number of similar municipalities who are competing against incumbent providers of video, Internet and telephone services. The intent of this analysis is to simply compare the demonstrated ability of these peers to capture market share as compared to the Los Alamos business case. Again, the objective is to understand to what extent there is potential risk to the future revenue stream anticipated within the financial forecast. The viability of the County's initiative to construct a fiber optic network is dependent upon its ability to generate subscriber growth.

This analysis takes into consideration three sources of information and analysis as the foundation for Uptown's estimates of subscriber and revenue potential for a FTTP network in Los Alamos:

- Current market share of incumbents
- Predictive modeling using a Conjoint Simulation Model
- Benchmark comparisons to other utility broadband operating results

A. Current Market Share

With the data collected from the quantitative research study (phone survey), Uptown is able to calculate the following penetration levels for each of the major incumbents as shown in Exhibit 12. This data represents a sample of 736 residential households in Los Alamos during October 2003.

Exhibit 12 – Video and Internet Subscribers

Type of Service	Provider	Market Penetration (% of Respondents)
Video Provider	Comcast	42%
	Satellite	33%
	Neither	25%
Internet Provider	AOL	18%
	Earthlink	16%
	Qwest	10%
	MSN	9%
	Comcast	8%
	Other ISPs	37%
	Don't Know	2%
Internet Technology	Dial-Up	51%
	Broadband	45%
	Don't Know	4%

Source: Quantitative Research Report, Uptown Services, November 2003

For video services, about 75% of Los Alamos households are subscribing to pay television services, with the majority of the market share going to the Comcast and the rest to the two national satellite providers. The 25% who are not subscribing to television service are likely taking the “rabbit ears” approach, but this group will also include cable signal theft as well. This usually happens after a premises is vacated and the cable company fails to perform a disconnect, thereby leaving the next resident with free analog cable service.

For Internet service, the Los Alamos market is also concentrated. Of houses surveyed, 92% were able to state positively that they have a PC and, of these, 89% are using the Internet. From this information, we can see that dial-up has about 51% market share, with the rest being broadband (either cable modem or DSL service). Uptown calculates broadband Internet penetration in Los Alamos to be 45%. This compares high to national averages, and is reflected in the level of demand for an alternative provider.

B. Conjoint Simulation Model

As part of the quantitative market research conducted as part of this feasibility study, Uptown commissioned a research technique known as Conjoint Analysis to enable the development of a market share simulation tool. While telephone surveys in and of themselves can provide reliable estimates of market demand when executed without bias and interpreted properly, a conjoint study has the additional ability to model potential scenarios and dynamically forecast the impact of changes in services attributes on eventual market share. This capability provides this feasibility study with an ability to understand potential market share for the FTTP project not only in terms of today's market situation (competitor brands, prices, etc.) but also in terms of potential changes in the future.

A total of 300 online surveys were completed in which the following research process was used to create the underlying data for the conjoint model:

- Participants are presented with about 15 different scenarios for which telecommunications services they most prefer to receive, from which provider, and at what price. The scenarios represent bundle possibilities.
- Each scenario is equivalent to asking the respondents which combination they like best of the two to five combinations presented. The option to keep what you currently have is always available.
- The five price levels tested have been transformed in the model to a continuous array ranging from \$30 to \$150. This allows us to simulate any price level within the range.
- The results are used to build a simulation model. This enables the client to examine alternative market scenarios.

1. Attributes Tested

The key determinant of market demand for any good or service is the combination of the attributes it possesses along with the value placed on these attributes by the market. A Conjoint Model is a research technique that allows various combinations of attributes to be presented to respondents, and then asks the respondent to indicate preference. Through thousands of these responses, data can be analyzed (using a Hierarchical Bayes technique) and the value (or utility) of each attribute can be ascertained. For this study, the following attributes were tested within the three categories of (1) who the provider is, (2) what services the provider is offering, and (3) what price the services cost. The numerical score associated with each attribute is the baseline utility value calculated for it.

Providers (“Brands”)

1. Los Alamos Utilities (+9)
2. Comcast Cable TV (+3)
3. Satellite TV (-1)
4. Qwest (-3)
5. A new provider in Los Alamos (-8)

Price

1. \$30 (+62)
2. \$60 (+38)
3. \$90 (0)
4. \$120 (-28)
5. \$150 (-72)

Services & Service Bundles

1. Local phone only ((-37)
2. Local phone and high-speed Internet (+28)
3. Local phone and Dial-up Internet (-35)
4. Local phone and cable TV (-10)
5. Local phone and Satellite TV (-3)
6. Cable TV and high-speed Internet (+17)
7. Cable TV and dial-up Internet (-44)

8. Satellite TV and high-speed Internet (+22)
9. Satellite TV and dial-up Internet (-29)
10. Local phone, high-speed Internet, and cable TV (+49)
11. Local phone, dial-up Internet, and cable TV (-8)
12. Local phone, high-speed Internet, and satellite TV (+58)
13. Local phone, dial-up Internet, and satellite TV (-10)

2. Model Validation

The conjoint model was validated by Uptown by running the above attributes through the model at their status quo levels. This scenario is summarized in Exhibit 13. This scenario reflects all current services options and Internet, video, and local telephone for services in Los Alamos. While other providers and resellers offer these services, the incumbents represent the vast majority of market share in the Los Alamos market.

Exhibit 13 – Status Quo Market Scenario

Brand	Services	Price
Qwest	2 = Local phone and high-speed Internet	\$66
Comcast	6 = Cable TV and high-speed Internet	\$87
Satellite	8 = Satellite TV and high-speed Internet	\$90

Source: Quantitative Research Report, Uptown Services. November 2003

Exhibit 14 summarizes the market share prediction (Percent in 2-Product bundle) of the conjoint model as compared to the telephone survey responses. The error, as measured in points in penetration, is no higher than 4% in any single LOB. This error rate is similar to the standard error of the phone survey at a 95% confidence interval. With these results, and other statistical tests conducted on the data to confirm randomness, Uptown is confident in the capability of the conjoint model to predict market share outcomes with a high degree of accuracy.

Exhibit 14 – Conjoint Model Verification Results^{1,2}

		Qwest	Comcast	Satellite	Multiple Providers
Residential Penetration (Phone Survey)	Video	-	42%	33%	NA
	Broadband Internet	33%	12%	11%	
	Telephone	100%	-	-	
Percent in 2-Product Bundle	Phone Survey	33%	12%	11%	44%
	Conjoint Model	29%	10%	15%	46%
Error		- 4%	- 2%	+ 4%	+ 2%

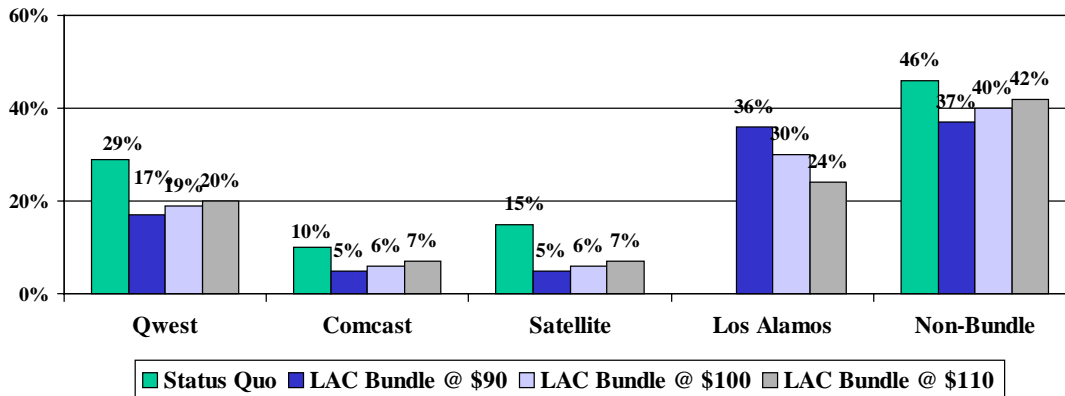
Source: Quantitative Research Report, Uptown Services. November 2003

Notes: ¹ Although telephone penetration was not measured by the survey, Uptown assumes it is 100%. ² Satellite Internet penetration of 11% represents 33% DSL penetration of their 33% video penetration to normalize for reselling DSL.

3. Forecast Penetration and Price Elasticity

Exhibit 15 present s the market share prediction of the Conjoint Model for the impact of Los Alamos County offering a 3-product bundle at three different price points (\$90, \$100, and \$110) compared to the current status quo. In these scenarios, it is assumed that the incumbent providers are offering the same services and pricing as they currently do in Los Alamos. These scenarios form the basis for Uptown’s estimate of the market penetration the County would achieve if it offered retail broadband services as an alternative to the incumbents.

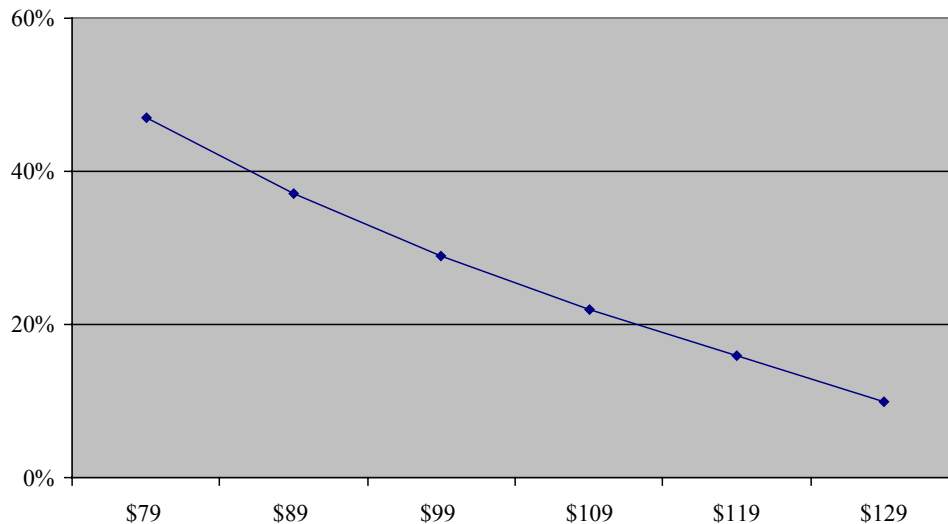
Exhibit 15 – Expected Market Share of Bundle Subscribers at \$90, \$100, and \$110



Source: Quantitative Research Report, Uptown Services. November 2003

As one would expect, the penetration varies significantly depending upon the price the county would charge. At a \$90 bundle price, penetration would be 36%, but this drops to 30% and 24% for prices of \$100 and \$110 respectively. Prices have a high elasticity of demand, with a 22% increase in price (from \$90 to \$110) reducing expected demand (penetration) by 33% (from 36% to 24%). The elasticity curve, as calculated in these scenarios, is presented in Exhibit 16.

Exhibit 16 – Expected Market Share of Los Alamos Bundle (at various prices)



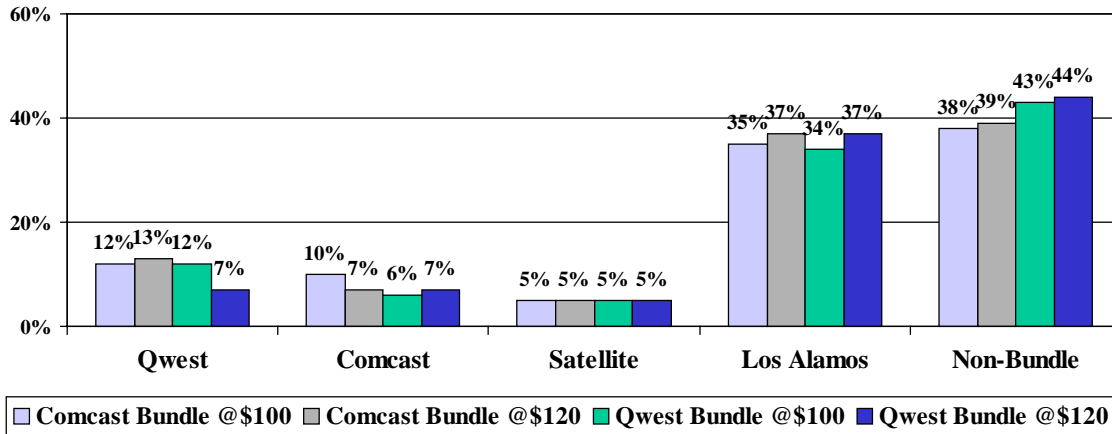
Source: Quantitative Research Report, Uptown Services. November 2003

Uptown ran further scenarios through the Conjoint Model to assess the degree to which the forecasted County penetration metric is defensible against competitive tactics by the incumbents, the most likely of which would be the introduction of 3-product bundles via partnerships with other operators (e.g. Qwest partnering with DirecTV, etc.). Exhibit 17 shows the market share outcome across the following four scenarios and the resultant impact to the County's market penetration estimate (note, in these scenarios, the County is offering a \$90 3-product bundle):

- Comcast introduces a 3-product bundle priced at \$100 per month.
- Comcast introduces a 3-product bundle priced at \$120 per month.
- Qwest introduces a 3-product bundle priced at \$100 per month.
- Qwest introduces a 3-product bundle priced at \$120 per month.

As can be seen from the model output, there is an immaterial impact to the expected penetration for the County in this scenario. Uptown attributes this to the price advantage (10% discount) being recommended and the higher satisfaction with the County as a utility brand compared to the incumbent service providers.

Exhibit 17 – Expected Market Share if Comcast or Qwest offers bundles at \$100 or \$120



Source: Quantitative Research Report, Uptown Services. November 2003

C. Benchmark Comparisons

1. Penetration Results

Exhibit 18 presents a summary of the penetration levels achieved by six municipal peers. It should be noted that these penetration metrics are expressed as homes passed versus serviceable homes. Uptown uses homes passed as the denominator for two reasons. First, the peer market statistics that are presented generally use the homes passed definition. Second, from the standpoint of linking market penetration to likely financial performance, Uptown believes that this statistic is more meaningful when defined closer to when the majority of capital is expended. Whether an upgrade or new build, this is when a home is passed, versus when serviceable, as the latter usually involves smaller investment associated with node certification.

Exhibit 18 – Summary of Utility Broadband Subscriber Results

Market	Households	Year	Video	Internet	Phone
Market A	30,000	Year 3	9% ¹	40%	2%
Market B	5,000	Year 1	18%	17%	13%
Market C	90,000	Year 4	34%	11% ²	NA
Market D	15,000	Year 7	58%	43%	NA
Market E	30,000	Year 2	34%	14%	NA
Market F	12,000	Year 5	52%	40%	NA
Average	-	-	34%	28%	8%
LAC	N/A	Year 5	36%	36%	36%

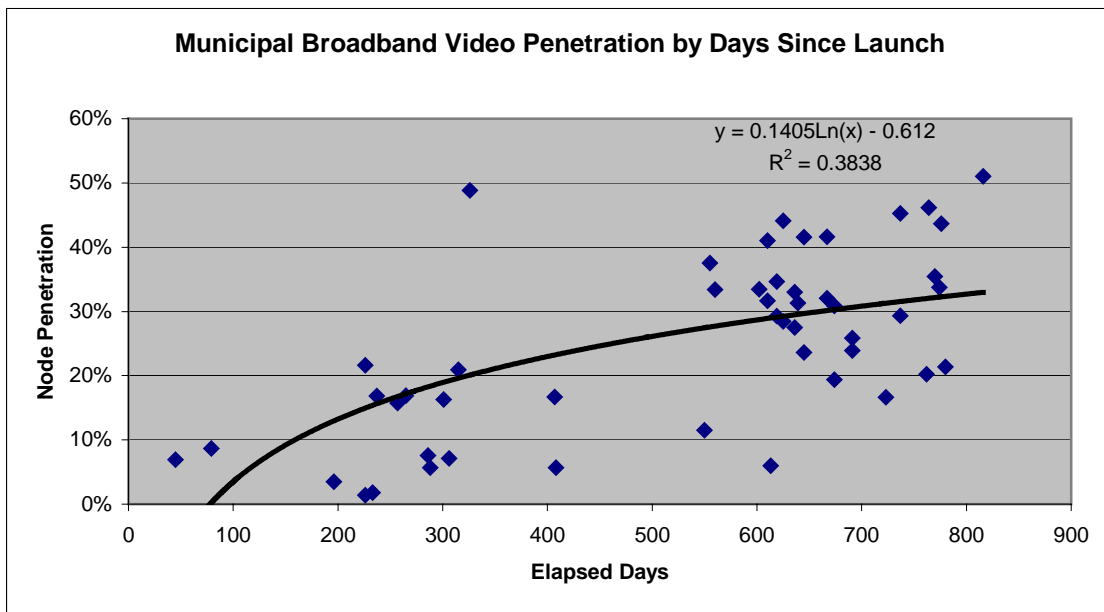
¹ This comparatively low penetration result is significantly influenced by poor reliability because this market launched its video service through IP video.

² This market’s comparatively low Internet penetration is due, at least in part, to a pure wholesale strategy in which all three ISPs are charging a \$100 activation fee. We believe this is a significant barrier to market share growth and is an unusual tactic compared to DSL and cable modem providers who minimize upfront payments to accelerate their market share growth.

2. Diffusion Results

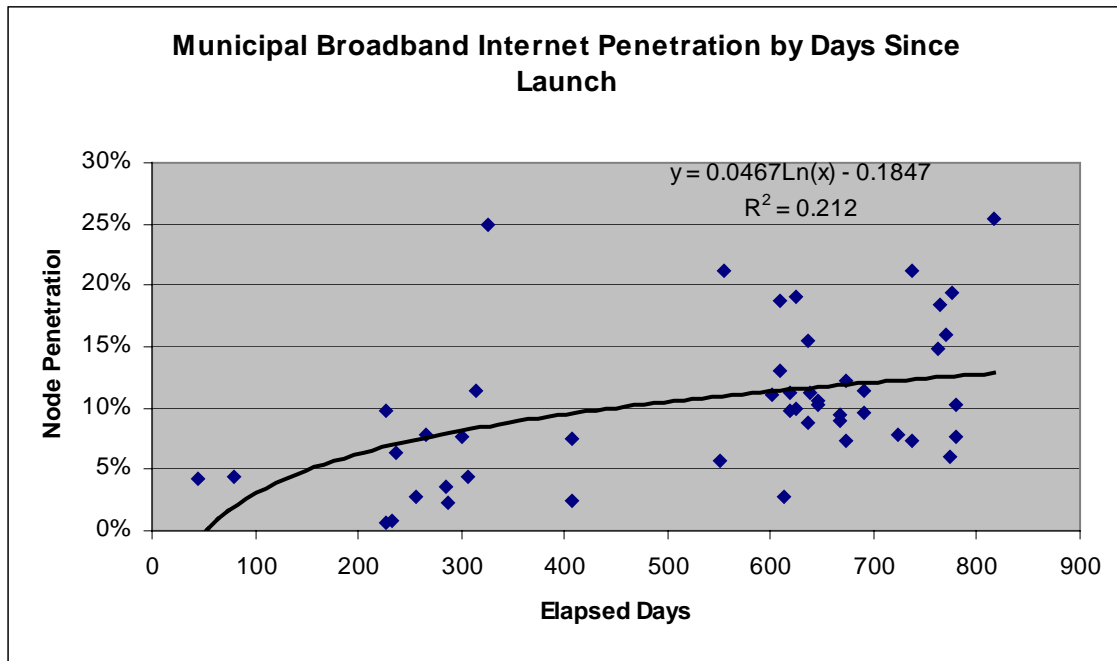
Uptown took the node-level penetration data supplied by one peer market (Market E) and created a Diffusion Curve for both the video and Internet products. These are presented in Exhibits 19 and 20 respectively. The intent of this approach is to establish the most likely rate of penetration growth over time such that revenues are accurately forecasted in the business case. The example market (a major urban area in the western US) has some nodes that are over 800 days old, while its most recent activations are less than 100. As expected, there is significant variability in the realized market share from node to node. When taken collectively, however, a viable diffusion curve emerges that can be used to define the speed at which the County can likely achieve market share in Los Alamos. For video (Exhibit 19) and Internet (Exhibit 20), a logarithmic curve indicates that rapid achievement of penetration occurs in the first 24 months since launch.

Exhibit 19 – Video Diffusion Curve



Because the demand for alternative broadband services varies across markets, these penetration levels are not indicative of the Los Alamos market. Rather, the rate of penetration growth (diffusion) is the relevant information from this data. Accordingly, Uptown estimates that 75% of the ultimate penetration level will be realized within two years. Given this information, Uptown defines the diffusion rate for broadband services in the revenue model as summarized in Exhibit 21. Exhibit 22 provides overall perspective of this diffusion curve compared to the rate of subscriber growth in other municipal broadband markets.

Exhibit 20 - Internet Diffusion Curve



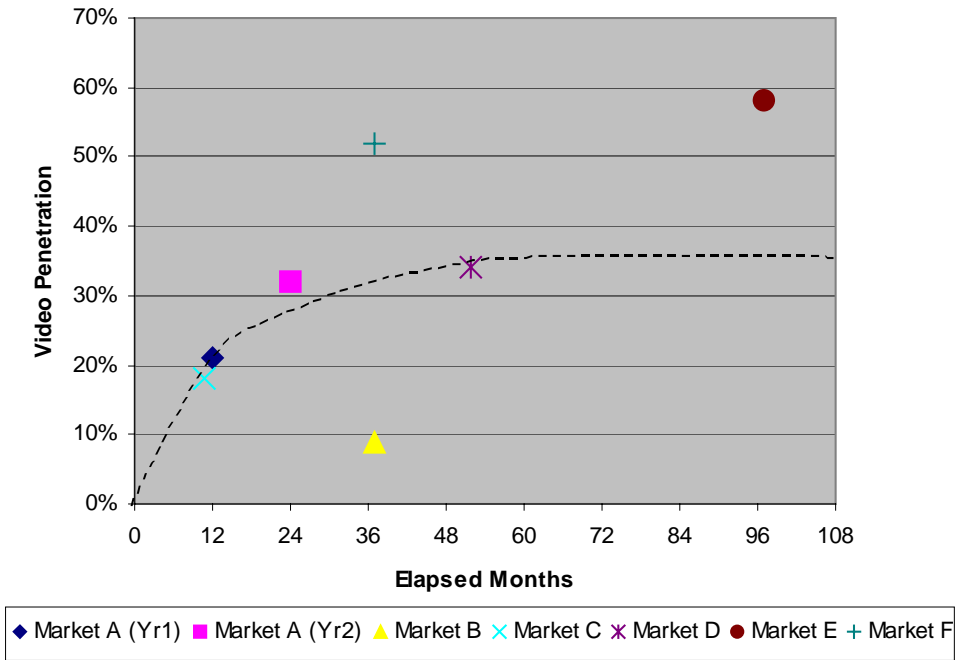
Source: Uptown Services Analysis, 2003

Exhibit 21 - Diffusion and Penetration Rates (Years 1 to 5)

	Year 1	Year 2	Year 3	Year 4	Year 5
Diffusion	60%	75%	90%	95%	100%
Penetration	21.6%	27.0%	32.4%	34.2%	36.0%

Source: Uptown Services Analysis, 2003

Exhibit 22 – Los Alamos Diffusion Curve



Source: Uptown Services Analysis, 2003