Unsubstantiated Expert Opinions or Assumptions

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3.1 NETWORK INTERFACE DEVICE (NID)	15	The labor estimate assumes a crew installing network interface devices throughout a neighborhood (in coordination with the installation of drops, terminals, and distribution cables). A work time of 25 minutes was used, based on the opinion of a team of outside plant experts. A loaded labor rate of $35 per hour excludes exempt material loadings which normally include the material cost of the NID and Drops.	25 minutes $35 per hour 25 minutes
3.2.1. Drop Distance	18	HM 5.3 assumes that drops are run from the front of the property line. House and building setbacks therefore determine drop length. Set-backs range from as low as 20 ft., in certain urban cases, to longer distances in more rural settings. While HM 5.3 assumes that lot sizes are twice as deep as they are wide, it is assumed that houses and buildings are normally placed towards the front of lots.	Various
3.2.2. Drop Placement, Aerial and Buried	19	The opinions of expert outside plant engineers and estimators were used to project the amount of time necessary to attach a drop wire clamp at a utility pole, string the drop, and attach a drop wire clamp at the house or building..	20 to 30 minutes
3.2.2. Drop Placement, Aerial and Buried	19	The labor estimate assumes a crew installing aerial drop wires throughout a neighborhood (in coordination with the installation of NIDs, terminals, and distribution cables), and consists of.	10 minutes per drop plus 10 minutes for each 50 ft. of drop strung $23.33 to $11.67 per foot
3.2.2. Drop Placement, Aerial and Buried	19	Of the quotes that were received for suburban and rural buried drop placement, several of them price buried drop placement at the HM 5.3 default values. Because buried drops are rare in urban areas, the expert opinion of outside plant experts was used in lieu of verifiable forward looking alternatives from public sources or ILECs.	$0.50 to $5.00 per foot
3.2.3. Buried Drop Sharing Fraction	21	It is the judgment of outside plant experts that buried drops will normally be used with buried distribution cable. Although many cases would result in three-way sharing of such structure, a conservative approach was to use 50% sharing.	50% sharing
3.2.4. Aerial and Buried Drop Structure Fractions	21	It is the judgment of outside plant experts that aerial drops will normally be used with aerial distribution	Aerial .43 to .85 Buried .57 to .15

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		cable and buried drops with buried and underground distribution cable. Therefore, the percentage of aerial drops equals the percentage of aerial distribution cable (see Section 3.5), including any building and riser cable that may be present in the upper two density zones.	
3.3 RISER CABLE INVESTMENT	24	Riser cable is assumed to cost more than aerial copper distribution cable. Material cost is slightly higher, and the amount of engineering and direct labor per foot is higher than aerial cable.	$0.80 to $25.00
3.4.1. Pole Investment	28	Outside plant engineering experts have concluded that a typical anchor plus anchor rod material investment is $45, and the typical guy material investment is $10. Also, one anchor and downguy per 1,000 feet would be typical.	Therefore the embedded anchor and guy exempt material loading included in the default value of $216 is approximately $8.25 - $13.75 per pole.
3.5. BURIED, AERIAL, AND UNDERGROUND PLACEMENT FRACTION	30	Poles are assumed to be 40 foot Class 4 poles	40 foot Class 4 poles.
3.5. BURIED, AERIAL, AND UNDERGROUND PLACEMENT FRACTION	30 footnote 7	In the two highest density zones, aerial structure is also assumed to consist partly of intrabuilding riser cable and "block cable" attached to buildings.	In HM 5.3 this portion of “aerial” structure does not include poles.
3.5.2 Buried Fraction Available for Shift	33	A team of outside plant engineering experts recommends that the allowed range of the shifted buried fraction be only 75% of the input buried percentage.	75%
3.5.3. Block / Building Fraction of Total Distance	34	HM 5.3 conservatively assumes that the ILEC will own all building riser cable, as well as distribution cable attached to the outside walls of buildings.	HM 5.3 applies pole costs in each density zone, including the two highest density zones, except that pole costs will be applied only to that fraction of aerial cable that remains after the block and intrabuilding cable fraction represented by this fraction is subtracted.
3.7.5. Sidewalk / Street Fraction	39	This dense urban cluster is assumed to be square, which means each side of the cluster is approximately 915 feet long.	0.20
3.7.7. Feeder Steering Enable	39	The HAI Model will normally assume that four feeder routes emanate from each wire center in the four cardinal directions of north, east, south, and west. When the “Feeder Steering Enable” indicator is selected, the model will adjust the direction of a	Disabled

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		main feeder route to be closer to the more distant serving area interfaces.	
3.7.8. Main Feeder Route/Air Multiplier	40	The Model in default mode assumes right angle routing to accommodate these various obstacles. However, when feeder steering is enabled, the model accounts for non-direct routing through the use of a route-to-air distance multiplier.	Route to Air multiplier 1.27
3.12.2 Pairs per DS-1 Loop	45	While there are single-pair DS-1 services available in the marketplace, they are not nearly as extensively deployed at this time, so the model conservatively assumes two pairs are required	Two pairs
3.12.5 Fiber Strands per Optical Service, incl. DS-3	46	Assumes individual customers are served by a redundant pair of transmit and receive fibers, consistent with common industry practice for providing high-reliability fiber connections to customers.	4
3.12.6 DS-3 Wire Center Terminal Investment	46	Central office/wire center labor costs are based on information in the Digital Loop Carrier section of the HIP, and on expert opinion.	Various
3.12.7 DS-3 Premises Equipment	47	The breakdown of investment costs that follows is based on estimated task times as supported in the Digital Loop Carrier section, for Engineering times, Technician times, and Material costs, with several exceptions. For the customer premises installation, those exceptions include engineering of the drop cable and multiplexer site, for which three hours is more than sufficient for the simple tasks involved; and, the placing, turn up & test of the multiplexer at the customer premises, which is based on expert opinion (Such multiplexers may be ordered for 110 volt wall outlet power, and are self-testing upon powering up the system.).	Various
3.12.9 DS-1 Wire Center Equipment	48	Support: The Wire center DS-1 shelf and common component investment per shelf (copper feeder) and the Wire center plug-in investment per DS-1 (copper feeder) investment inputs are based on expert opinions of members of the model development team, including discussions with data LEC representatives, as well as information filed by	Various

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		Qwest Corporation in its publicly filed DS-1 Model for ADC Soneplex equipment in the State of Oregon. The number of DS-1s per shelf is based on expert knowledge and vendor claims. The sizing factor is based on expert opinion, with the knowledge that this type of equipment is modular and capacities can be rapidly increased or decreased.	
4.1.4. Copper Feeder Pole Investment	55-56	The exempt material load on direct labor includes ancillary material not considered by FCC Part 32 as a unit of plant. That includes items such as downguys and anchors that are already included in the pole placement labor cost. Outside plant engineering experts have concluded that, and the typical guy material investment is $10.. Therefore the embedded anchor and guy exempt material loading included in the default value of $216 is approximately $8.25 - $13.75 per pole.	a typical anchor plus anchor rod material investment is $45 Also, one anchor and downguy per 1,000 feet would be typical
4.1.6. Innerduct Material Investment per Foot	57	Outerduct is similar to innerduct, but can be used in aerial or buried construction. Although commercially available, it is not recommended for use by outside plant engineering experts working with the HM 5.3 developers.	$0.30
4.1.8 Amount of Feeder Structure Common with Distribution	58	Support: "the model uses an assumption that 55% of the feeder facilities will use the same structure as distribution facilities based on the evidence from several regulatory proceedings that 1) approximately 75% of the feeder facilities share the same structure as distribution facilities and 2) about 75% of those joint routes are assumed to share the same structure.	0.55
4.2.1. Fiber Feeder Structure Fractions	61	Our outside plant engineering experts recommend that only 75% of the buried percentage be allowed to shift to aerial.	75%
4.4.2. DLC Installed Common Equipment Investment	66	Support: Support for the DLC Installed Common Equipment Investment cost is detailed and thorough. Material costs for DLC electronic equipment continues to fall at the rate of 4% to 7% per year.[32] The following information is based on the expert opinion of engineering consultants, a review of industry available public data, and observations of	Various

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		costs across a number of ILECs.	
4.4.2. DLC Installed Common Equipment Investment	76	A variety of sources were consulted, including personal experience of members of the engineering team, as well as costs obtained from ILECs, in estimating appropriate default values for CEV structure and equipment costs. The following breakdown of costs has been deemed reasonable by engineering experts.	Various
4.5.1. DLC Coin Channel Unit Density and Investment	82	Cost per card is based on the assumption that such a card cost is 125% the cost of a Regular POTS card, which is deemed to be reasonable by consultations with engineering consultants and observation of ILEC line card costs in a number of states.	Various
4.5.2. DLC DS-1 Channel Unit Density and Investment	83	Cost per card is based on the expert opinion of engineering consultants and observation of ILEC line card costs in a number of states.	Various
4.5.3. DLC Line Card Investment Increase for ADSL functions	83	Support: The increased cost per card over the cost of a POTS line card is based on the expert opinion of engineering consultants, and consultations with xDSL providers such as Covad and Rhythms and observation of ILEC line card costs in a number of states.	Various
4.7.4. Additions for Central Office Cabling and MDF Investment per UDLC Line	88	The incremental investment per line for central office cabling and MDF terminations is based on the expert opinions of the model developers and their consultants.	$12.00
4.8. MANHOLE INVESTMENT – COPPER FEEDER	89	Costs for various excavation methods were estimated by a team of experienced outside plant experts. Additional information was obtained from printed resources. Still other information was provided by several contractors who routinely perform excavation, conduit, and manhole placement work for telephone companies. Results of those inquiries validated the opinions of outside plant experts and are revealed in the following charts.	Various
5.1.1. ATM Switch Investment	93	Support: Based on HAI expertise and knowledge of typical ATM switch products being used in conjunction with ADSL today.	$25,000
5.1.2 ATM Switch Capacity, Gbps	93	Same as above	2.0 Gbps

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5.1.3 ATM Switch Fill Factor	93	Support: Modeling assumption by HAI Model developers.	0.90
5.1.5 ATM Switch Interface Port Rate, Mbps	93	Support: Based on HAI expertise and knowledge of typical ATM switch products being used in conjunction with ADSL today.	$14,000
5.2.11. Processor Feature Loading Multiplier	98	It is based on consultations with AT&T and WorldCom subject matter experts.	1.2
5.2.12. Business Penetration Ratio	99	Support: This is an HAI estimate of the point at which the number of business lines will cause the 20 percent processor load addition. It is based on consultations with AT&T and WorldCom subject matter experts.	0.30
5.3.5. Construction Costs, per Square Foot	101	Support: This is an HAI estimate. Although cost per square foot generally decreases as building size increases, the construction cost per square foot is assumed to increase with the number of lines served to account for higher prices typically associated with greater population densities where larger switches tend to be located.	Various
5.3.6. Land Price, per Square Foot	101	Support: This is an HAI estimate. Land cost per square foot are assumed to increase with the number of lines served to account for higher prices typically associated with greater population densities where larger switches are located.	Various
5.4.9. Local Business/Residential DEMs Ratio	103	Support: This is an HAI estimate, based on consultations with AT&T and WorldCom subject matter experts.	1.1
5.4.10. Intrastate Business/Residential DEMs	103	Support: This is an HAI estimate, based on consultations with AT&T and WorldCom subject matter experts.	2
5.4.11. Interstate Business/Residential DEMs	104	Support: This is an HAI estimate, based on consultations with AT&T and WorldCom subject matter experts.	3
5.5.2. Number of Fibers	106	Support: The default value is consistent with common practices within the telecommunications industry and reflects the engineering judgment of HAI Model developers.	24
5.5.5. EF&I, per Hour	107	Support: This is a fully loaded labor rate used for the most sophisticated technicians. It includes basic	$60 per hour

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		wages and benefits, Social Security, Relief & Pensions, management supervision, overtime, exempt material and motor vehicle loadings. A team of experienced outside plant experts estimated this value.	
5.5.6. EF&I, Units	107	Support: This amount of labor was estimated by a team of experienced engineering experts. It includes the labor hours to install and test the transport equipment involved in interoffice facilities.	32 hours
5.5.12. Transmission Terminal Fill (DS-0 level)	109	Support: Based on outside plant subject matter expert judgment.	0.90
5.5.15. Interoffice Structure Percentages	110	Support: These are average figures that reflect the judgment of a team of outside plant experts regarding the appropriate mix of density zones applicable to interoffice transmission facilities.	Various
5.5.22. Fraction of Interoffice Structure Common with Feeder	114	In the opinion of a team of outside plant engineers, the additional structure required exclusively for interoffice transport is no more than 25 percent of the distance. Therefore, 75 percent of the interoffice route is assumed by the HM 5.3 to be shared with feeder cables.	0.75
5.5.23. Interoffice Structure Sharing Fraction	114	Sharing with other utilities is assumed to include at least two other occupants of the structure.	0.33
5.7.5. Remote-Host Fraction of Interoffice Traffic	119	Support: Based on HAI judgment.	0.10
5.7.6. Host-Remote Fraction of Interoffice Traffic	119	Support: Based on HAI judgment.	0.05
5.7.8. Ring Transiting Traffic Factor	120	Support: Based on HAI judgment of the amount of traffic between wire centers on different rings versus total interoffice traffic and the number of rings that must be transited between the originating and terminating wire center.	0.40
5.7.9. Intertandem Fraction of Tandem Trunks	120	Support: Based on HAI judgment.	0.10
5.7.10 Fraction of High-Cap Loops Requiring Interoffice Transport	120	Support: Based on HAI conversations with ILEC representatives.	0.50
5.8.1. Real Time Limit, BHCA	121	Support: Industry experience and expertise of HAI. These numbers are well within the range of the BHCA limitations NORTEL supplies in its Web site.	750,000

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		See 4.1.1.	
5.8.4. Maximum Trunk Fill (Port Occupancy)	122	Support: This is an HAI estimate, based on consultations with AT&T and WorldCom subject matter experts.	0.90
5.8.6. Tandem Common Equipment Intercept Factor	122	Support: Value selected to allow tandem common equipment investment to range from $500,000 to $1,000,000 which is the appropriate range based on expertise of HAI.	0.50
5.9.2. STP Maximum Fill	123	Support: The STP maximum fill factor is based on HAI engineering judgment and is consistent with maximum link/port fill levels throughout HM 5.3.	0.80
5.10.1. Investment per Operator Position	128	Support: Based on AT&T experience in the long distance business.	$6,400
5.10.2. Maximum Utilization per Position, CCS	128	Support: Industry experience and expertise of HAI in conjunction with subject matter experts.	32 CCS
5.10.3. Operator Intervention Factor	128	Support: Industry experience and expertise of HAI.	10
5.13.1. Line Sizes	135	Support: The line size ranges resulting from these default values, for instance, 0 to 640 lines, are considered by subject matter experts to be ranges within which the constant and per-line switch investment components are approximately fixed. Those components may, however, change from one range to the next (See default values in Section 5.13.2).	Various
6.4. STRUCTURE SHARING FRACTIONS	138	Support: Industry experience and expertise of HAI and outside plant engineers; Montgomery County, MD Subdivision Regulations Policy Relating to Grants of Location for New Conduit Network for the Provision of Commercial Telecommunications Services; Monthly Financial Statements of the Southern California Joint Pole Committee; Conversations with representatives of local utility companies. See the structure sharing discussion in Appendix B.	Various
6.5.9. End Office Usage-Sensitive Cost Fraction	142	Definition: The fraction of the total investment in digital local switches that is assumed to be usage sensitive.	0%
6.5.12. NID Expense, per Line, per Year	142	Support: The opinion of outside plant experts indicate a failure rate of less than 0.25 per 100 lines	$1.00

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		per month, or 3 percent per year. At a replacement cost of $29, this would yield an annual cost of $0.87. Therefore, the current default value is conservatively high.	
7.1. UNDERGROUND EXCAVATION	147	Costs for various trenching methods were estimated by a team of experienced outside plant experts. Additional information was obtained from printed resources[63]. Still other information was provided by several contractors who routinely perform excavation, conduit, and manhole placement work for telephone companies. Results of those inquiries are revealed in the following charts. Note that this survey demonstrates that costs do not vary significantly between buried placements at 24" underground versus 36" underground. Therefore the HAI Model assumes an average placement depth ranging from 24" to 36", averaging 30".	Various
7.2. UNDERGROUND RESTORATION	147	Same as above	Various
7.3. BURIED EXCAVATION	151	Costs for various excavation methods were estimated by a team of experienced outside plant experts. Additional information was obtained from printed resources[64]. Still other information was provided by several contractors who routinely perform excavation, conduit, and manhole placement work for telephone companies. Results of those inquiries are revealed in the following charts. Note that this survey demonstrates that costs do not vary significantly between buried placements at 24" underground versus 36" underground. Therefore the HAI Model assumes an average placement depth ranging from 24" to 36", averaging 30".	Various
7.4. BURIED INSTALLATION AND RESTORATION	151	Same as above	Various