DRAFT REPORT

FAIR MARKET VALUE ANALYSIS FOR A FIBER OPTIC CABLE PERMIT IN NATIONAL MARINE SANCTUARIES

AUGUST 2001

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
NATIONAL MARINE SANCTUARY PROGRAM

I. INTRODUCTION

The National Oceanic and Atmospheric Administration's (NOAA's) National Marine Sanctuary Program (NMSP) evaluates special-use permit applications by companies seeking to install and leave placed fiber optic cables in National Marine Sanctuaries. The National Marine Sanctuaries Act allows the NMSP to issue a special use permit for the presence of cables on the sanctuary floor and, if an application is approved, NMSP may collect certain administrative and monitoring fees. In addition, NMSP is entitled to receive fair market value for the permitted use of sanctuary resources.

This document develops an approach to assessing fair market value for the presence of a submarine fiber-optic cable in a National Marine Sanctuary. It is based on dozens of industry and government sources and draws on the collaboration and review of numerous experts in the business, legal and technical arenas. A final determination of fair market value should include consideration of the most recent data available, in addition to the analysis contained in this report.

The research and analysis is organized as follows: Part Two presents an overview of the marine sanctuary system, the fiber-optics industry, and the permitting process. Part Three describes the major approaches to valuing the permitted use, relying on the analogous transaction of a right-of-way purchase on private lands. Part Four describes the protection of sanctuary resources and the role of economic incentives. Part Five summarizes permitting activities at other government agencies. Part Six presents the analysis of fair market value based on market trends and the relevant valuation methods. Part Seven presents recommendations on methodology only and conclusions.

II. BACKGROUND AND OVERVIEW

National Marine Sanctuaries

The National Marine Sanctuary Program was established in 1972, coinciding with the 100th anniversary of the founding of the first national park. The Program's mission is to designate areas of the marine environment that have special natural or cultural significance and manage and protect them for future generations. There are currently thirteen national marine sanctuaries encompassing ocean gardens, near-shore coral reefs, whale migration corridors, deep-sea canyons, and underwater archeological sites. They range in size from Fagatele Bay Sanctuary, covering one-quarter square mile in American Samoa, to Monterey Bay Sanctuary, one of the largest marine protected areas in the world, covering over 5,300

square miles along the coast of California. Total sanctuary territory encompasses just under 18,000 square miles, about the size of Vermont and New Hampshire combined.

The sanctuaries are monitored for water quality, the ecological impact of fishing, the accidental release of chemicals and other environmental concerns. Many lie adjacent to some of the country's most pristine coastlines, including protected coastal habitats and national parks. While some activities are regulated or prohibited, certain others are allowed or encouraged. For example, such economically significant uses as shipping and commercial fishing are generally allowed within sanctuaries, although these activities may be restricted to protect sanctuary resources. Recreation, research and educational activities are encouraged, along with outreach efforts to foster resource protection and conservation awareness.

Fiber Optics Industry Overview

Through higher transmission capacity, decreased interruptions in service, greater security and improved cost efficiency, fiber optic telecommunications cables are meeting increased demand for faster and better quality telephone, internet, and data transmission. In the face of such demand, global fiber optic capacity has been expanding rapidly. In the United States, both land-based networks and undersea intercontinental connections have added thousands of miles of new routes over the past few years. This growth is expected to continue for the foreseeable future.

Investment in undersea optical-cable networks rose from less than $2 billion annually in 1998 to $6 billion in 2000. Total investment is expected to approach $14 billion in 2001. Currently announced plans for capacity expansion amount to about $12 billion of submarine cable investment in 2002, and about $8 billion of investment in 2003.[1] The time from the announcement of expansion plans to final deployment is as short as 18 months, so additional investment to 2003 and beyond is not reflected in current estimates. Total investment in submarine cable networks from 1986 to 1998 was $17 billion, representing about 400,000 route kilometers.[2]

Most existing undersea fiber optic cables are in the Atlantic and Pacific Oceans. The bulk of future deployment is expected to continue to service connections between the United States, Europe and the Pacific Rim. Planned growth in trans-Pacific cables is especially dramatic, amounting to $13 billion in the years 2000 through 2002. Most of these trans-Pacific cable systems will connect Japan and the United States.[3]

As of the date of this report, three fiber optic cable projects have been allowed to transit marine sanctuaries. They are the "Hibernia Transatlantic Project" (with a connection from Boston to Ireland that crosses the Stellwagen Bank Sanctuary), "Pacific Crossing 1" (from Japan to Seattle crossing the Olympic Coast sanctuary) and "Alaska United" (from Alaska to Seattle crossing the Olympic Coast sanctuary). The permits for the Pacific Crossing 1 and Hibernia projects included language requiring payment of the fair market value of the use of sanctuary resources once the appropriate value is assessed.

The Permitting Process and Fair Market Value

The National Marine Sanctuaries Act (NMSA) authorizes the Secretary of Commerce to issue special-use permits authorizing the conduct of specific activities and establishing conditions of access and use for marine sanctuary resources. The presence of a fiber-optic cable on the floor of a sanctuary is a use for which a permit may be issued. According to the NMSA, the Secretary may assess and collect a fee that includes the cost of issuing the permit, as well as monitoring and other costs incurred as a result of the permitted activity. In addition, the fee must include "an amount which represents the fair market value of the use of the sanctuary resource."

In addition to issuing a special-use permit, Sanctuary authorities must review and authorize an Army Corps permit for any cable project that includes a sanctuary crossing. The permitting process of the Army Corps of Engineers covers installation, maintenance and removal for an entire undersea cable project. Potential harm to the undersea environment from cable installation is examined in an appropriate environmental review under the National Environmental Policy Act. NMSP is developing a set of principles to guide the installation of cables in marine sanctuaries and is working to ensure that environmental impacts will be minimal and appropriately mitigated. Those principles were published for comment in an advance notice of proposed rulemaking (65 FR 51264, Aug. 23, 2000). NOAA is currently reviewing comments received on this notice.

Installation, maintenance, and removal of the cables are covered by sanctuary authorization of the Army Corps permit. Because some amount of injury may occur during cable installation, and because by law the special-use permit cannot be applied to any activity causing injury, the special use being authorized by NMSP is to allow the use of sanctuary resources by the long-term presence of the cables on the sanctuary seabed.

In 1993 the Office of Management and Budget (OMB) issued its most recent directive concerning fair market value and fees charged for the use of Federal resources. OMB Circular No. A-25[4] requires federal

agencies to assess a user charge against each identifiable recipient for a service or privilege that confers special benefits. As with the granting of a fiber-optic permit, such a privilege "enables the beneficiary to obtain more immediate or substantial gains or values (which may or may not be measurable in monetary terms) than those that accrue to the general public." A government service is also designated as a special benefit if it is "performed at the request of or for the convenience of the recipient." The directive further states, "user charges will be based on market prices."

The issue of "fair market value" or "market price" for the use of a sanctuary resource is complicated by the presence of non-market amenities. The value of a marine sanctuary lies in the conservation of a marine environment deemed to have special significance. Many people receive pleasure in knowing that the sanctuaries exist and are protected. These individual values, added up over millions of people, may have tremendous value, but little economic information about the extent of this value is revealed in market transactions. Additionally, installing a cable in a marine sanctuary can provide economic benefits to the public**.** This fair market value analysis will take account of these potential economic benefits to the public.

This report relies on a comparison between the granting of a fiber optic permit and the sale of a fiber-optic right of way. Numerous private-market precedents exist for the appraisal and sale of such right-of-way easements. This report also considers the amenity value of a sanctuary, but for a number of reasons this value is not specifically estimated and is not part of the calculation of fair market value. It is believed that the analysis of market transactions results in a reasonable special-use fee based on sound and thorough economic considerations.

III. VALUING RIGHTS OF WAY

As noted previously, right-of-way transactions are a close analogue to the issuance of a permit allowing a fiber optic cable to cross a marine sanctuary. This section explores the concept of fair market value in the appraisal of right-of-way easements, relying on precedents and practices from several sources. Private sector practitioners use a variety of rules and methodologies to assist in easement negotiations. Numerous judicial proceedings have examined the appropriate use of fair market value in compensation for eminent domain takings. There is also a considerable body of literature in appraisal and real estate journals that explores the available approaches to assessing right-of-way values.

There is currently some debate regarding which set of legal and market precedents are appropriate for fair market analysis by the government. In the granting of easements on federal land, the focus has

traditionally been on the loss to the seller. Historically, the decline in the value of a property due to buried cables was considered to be relatively small. In the private sector, the gain to the buyer has received greater emphasis in price negotiations. The enormous revenues generated by the fiber optic industry have recently resulted in rapidly increasing prices for fiber-optic rights of way. While government valuations have traditionally been lower than market figures, some recent right-of-way agreements involving government resources have reflected the increasing market values.

In the sections that follow, guidance from the available sources is presented and four general approaches to valuation are described. First, a set of land-based appraisal methods is examined. This traditional appraisal approach relies on the value of adjacent land and an assessment of relevant damage to solve the valuation problem. Second, the concept of a willing buyer and seller is described. By examining the incentives of the parties involved, characteristics of a fair market outcome can be explored. Next, examples of income-based valuation are presented. These methods employ the notion that a communications right of way is a valuable part of a business enterprise and that a portion of enterprise income should be allocated to this right-of-way asset. Finally, the use of comparable market transactions is described. Past transactions are rarely an exact precedent, but they serve as a guide to price levels and overall market trends.

Land-Based Appraisal

Appraisal techniques for right-of-way transactions frequently rely on the value of the occupied land. Such land-based or “fee-simple” values focus on the property rights bestowed by the seller. The essential terms and methods are described below. These concepts often overlap and may be understood in the context of several related techniques. While land-based valuation is no longer the practice in the intensely competitive telecommunications market, it is the method customarily used in other kinds of right-of-way appraisal. Aspects of this basic approach are still reflected in more current methods described in later sections.

One measure of the value of an easement is the loss due to the presence of the easement. Referred to as the “before and after rule,” it is the difference between two estimates of a parcel’s value: one before the easement is granted and one after the new use is in place. Ownership of a property is thought to entail a “bundle of rights” for the owner. Some of these rights are sold off when a right of way is granted, but those rights remaining may still represent some value. The before-and-after rule results in modest value estimates based on loss to the seller.

In applying the before-and-after rule, some benchmark value is needed for the land under consideration. The across-the-fence (ATF) rule holds that a given parcel is worth about the same as similar neighboring land. The ATF approach generates a "fee-simple" value for a parcel. That is, it ignores any special use of the land that might create additional value. A railroad right of way that crosses several states, for example, would be valued based on total land area. The fact that the land is composed of a continuous corridor rather than a collection of disjointed parcels would not affect the ATF estimate of value.

In contrast to the ATF approach, what is called "corridor value" explicitly accounts for the assemblage of land parcels into a contiguous right of way. ATF values for land along a right of way may be multiplied by an "assemblage factor" or "corridor enhancement factor" to reach an appropriate estimate. Alternatively, the corridor itself can be treated as an entity to be valued, and estimation can proceed based on analysis of the income generated or other considerations. Some analyses have determined that corridor values typically exceed ATF appraisals by a factor of two to six.[5] In more recent transactions involving fiber optic corridors, the prices paid exceed the ATF land values by much higher multiples.

The most important legal concept in the analysis of land-based values is "highest and best use." Defined as the "most profitable likely use"[6] at the time of appraisal, this standard of fair market value is frequently applied in eminent domain proceedings. Applying the before-and-after rule, for example, would involve two distinct estimates of highest and best use, one with the easement and one without. Thus, if the presence of a pipeline on a property prevents the construction of a home, the pipeline easement could have considerable value. The use under consideration must be physically possible, appropriately supported, and financially feasible for the given parcel.

Whether value realized by the purchaser of a right of way can be included in highest-and-best-use analysis is a matter of debate. In the *Appraisal Journal* (January 1989), George Karvel argues that the high rents arising out of value to the buyer must be ignored in eminent domain appraisals. "Regardless of the benefits to be derived or costs to be avoided, a public utility with the right of eminent domain is responsible only for the diminution in value or loss to the principal corridor occupant."[7] In a response, Charles Seymour agrees that compensation should not include any "special" value to the buyer. But one of the damages incurred by the occupant "is surely the loss of the right to sell to someone else who would pay more than [the buyer] suggests, as indicated by market data."[8] Both authors agree that appraisals for private market transactions should account for values to both the buyer and the seller.

A Willing Buyer and Seller

Private market outcomes reflect mutually beneficial agreements between a willing buyer and seller. One approach to fair market value estimation involves the attempt to replicate the results of free-market bargaining and negotiation. The following court opinion describes this approach as a legal standard for eminent domain proceedings:

> In determining this fair market value, a court must consider what a rational seller, willing but not obliged to sell, would take for the property, and what a rational buyer, willing but not obligated to buy, would pay for the property, and must take into account "[a]ll considerations that might fairly be brought forward and given substantial weight in bargaining between an owner willing to sell and a purchaser desiring to buy."[9]

In right-of-way transactions, the seller will be concerned with the value of alternative uses of the land and the likelihood of finding a better offer. The buyer will be concerned with the income generated and the costs of acquiring some other route. The difference between the seller's alternative value and the buyer's alternative cost represents the cooperative surplus of the potential right-of-way sale. In "Valuing Easements: A Simple Bargaining Framework"[10]authors Joseph Trefzger and Henry Munneke advocate dividing the surplus based on case-by-case considerations.

The cost of acquiring an alternative route, or "build-around cost," has played an increasingly important role in recent fiber-optic transactions. Much of this has to do with the rapid expansion of the market for fiber capacity and the competitive advantage that accrues to those with early access to a fiber network. The cost of delay in acquiring alternative routes is in many cases more significant than any drawbacks of additional construction or technical network constraints. While build-around cost represents an upper bound on the price of a right of way, a large build-around cost increases the buyer's willingness to pay and enhances the bargaining position of the seller.

Income-Based Methods

Numerous assets contribute to the income and value of an enterprise. These include the building in which a company's headquarters are housed, the patents a company owns, and even the intangible asset referred to as "good will." These assets produce value for an enterprise based on the role they play in an integrated business strategy. A corporate headquarters in Manhattan may be extremely valuable to one company or an egregious waste of money for another.

With income-based methods for valuing rights of way, the route used to create a fiber-optic network is viewed as an income-generating asset. Such an asset would be expected to earn a reasonable return. In some cases the owner of a right of way might wish to retain ownership and earn a return in the form of annual payments. An example of this would be the New York State Thruway Authority, which collects a percentage of "user fees" generated by the length of fiber-optic cable installed.[11] In other cases, projected future returns can be added together as an estimate of current market value. An example of this approach will be presented later in this report.

Comparable Transactions

Prices paid in actual market transactions provide direct data on fair market value. This appraisal method depends on the availability of comparable sales data, verification of the data, and the degree of comparability. Proper analysis of comparable sales also requires adjustment for time differences and analysis of historical trends. Market prices fix the higher limit of value in a declining market and the lower limit of value in a static or advancing market.[12] A wide variety of conditions and prices can create difficulties in finding the right comparison. A verifiable set of comparable sales must be viewed as a tool for identifying market trends and a basis for establishing a range of possible appraisal values.

Three important factors used in comparing relevant transactions are worth describing. First is exclusivity. An agreement providing an exclusive right of way is worth more than a nonexclusive sale. Most fiber optic agreements are nonexclusive in nature. Any agreement significantly limiting access to competing fiber-optic companies can be subject to challenge under the Telecommunications Act of 1996. Second is geographic location. Traditionally, a right of way in an urban setting was worth more than a right of way that crosses rural terrain. This difference was based largely on the higher land values that prevail in populated areas. Today, the importance of geographic location is based more on the position of a route in a larger network. For example, a right of way that connects two major centers is especially valuable. Finally, the length of a right of way is significant. Longer right-of-way routes are typically assessed at a lower value per mile. This pricing pattern arises out of certain fixed costs to the seller associated with each transaction, such as the time and expense of the negotiation process. There may also be increased bargaining persistence on the part of the buyer when a larger total sum is involved.

An analysis of comparable transactions has the advantage that values in the marketplace account for much of the information described in previous sections. Market transactions are negotiated by willing buyers and sellers. Agents in the transactions have an incentive to investigate the value of a right-of-way corridor

and the price of adjacent land. In a well functioning market, any right-of-way sale represents an implicit accounting of potential future income and a reasonable return.

IV. PROTECTING SANCTUARY RESOURCES

The valuation methods described in the previous section provide guidance in determining the market value of a right of way. These market-based appraisal techniques do not attempt to capture the amenity value of a protected natural resource. Allowing the presence of fiber-optic cables on the floor of a sanctuary may create a minimal intrusion, but it may represent a retreat from established environmental protections. Part of the value of a sanctuary depends on the trust that is placed in future decision-makers to conserve and protect these designated areas, even in the face of unforeseeable economic and political demands. Some will argue that no permit should be granted. If it is granted, a fair and reasonable price must account for the importance to the public of conserving the resources of a sanctuary.

The following section presents a brief description of the environmental impacts associated with allowing fiber-optic cables in marine sanctuaries. If allowed, the impacts are anticipated to be small and the cables will not traverse areas of high sensitivity. In the second paragraph, the role of the fair market fee in creating the appropriate economic incentives is explored. To the extent that the value of marine sanctuaries is reflected in the price of access, excessive burdens on sanctuary resources will be prevented.

The Environmental Impacts of Undersea Cables

The installation of an undersea fiber optic cable may be allowed in certain sanctuaries if it is determined to have appropriately limited impacts. In general, installation of cables will not be allowed in sensitive ocean habitats, such as sea grass, kelp forests, or coral reefs. At ocean depths shallower than 1,000 meters, a cable slightly thicker than one inch is generally buried one to two meters deep in the ocean floor. Burial of cables helps prevent accidents where the cable is snagged by anchors or fishing equipment. The technology for cable trenching is improving, and often cables are buried at ocean depths greater than 1,000 meters. The burial is accomplished by a remote-control “sea plow” device that lifts ocean sediment from the cable trench and disturbs a path one to two meters wide. The plow moves slowly, and many animals on the ocean bottom drift to one side as the plow goes by then drift back into place as sediment is washed into the open trench by natural ocean currents. If repair of a cable is required, a hook may be dragged along the ocean bottom to locate the cable and lift it out of the trench. The cable is spliced and may be reburied.

At significant ocean depths trenching is not feasible, and the cable is simply laid across the ocean floor. The cable used in these stretches is composed of the inner core of the buried cable, and is about 0.75 inches in width. This is the method of cable installation for most of a transoceanic route. However, it is likely that most if not all of the territory in marine sanctuaries where cables may be permitted would be traversed by trenching and cable burial.

Once properly installed, the existence of cables on the ocean floor is currently expected to have no adverse environmental impacts. A variety of telecommunications cables have been installed on the ocean floor over many decades, and a reasonably extensive record exists for examining potential impacts. Fiber optic cables use pulses of light to carry data instead of electricity as in the past, but most fiber optic cables carry some electric current to supply amplifiers for the fiber optic signal. The NMSP is in the process of gathering information on the documented effects of such cables.

Some amenity loss from the presence of undersea cables in sanctuaries may occur apart from any direct environmental impacts. There is value in the status of a sanctuary as a protected area, sheltered from encroachment by new economic uses and managed with a bias toward relieving the burdens of human use rather than adding new ones. Even if the cables could be installed without any disturbance to ocean creatures or habitat, some measurable loss in environmental value is likely to occur.

The Role of Economic Incentives

From the standpoint of economic efficiency, any social cost or loss to the public should be passed on to those responsible. That is, if the economic benefit of installing a fiber optic cable across a marine sanctuary exceeds the costs, including environmental loss, the cable should be installed. If the loss exceeds the benefit, the cable should not be installed. If the relevant environmental costs are reflected in the price of access to a marine sanctuary, government authorities can ensure that the company seeking a permit will make the business decision with the greatest benefit for all.

Assessment of fair market value will help create the proper economic and environmental incentives. While there is uncertainty about the true public benefit to limiting intrusions in the Sanctuaries, it is reasonable to believe that the recommended fee, based on market prices alone, is high enough to account for some environmental loss. Any significant injury to ocean resources would be subject to a separate claim of compensatory damages. Since the special-use permit does not apply to activities that cause injury, there is no direct legal mechanism for incorporating such environmental loss into the price for

such a permit. The ultimate responsibility for minimizing injury to sanctuary resources lies within the Army Corps permitting process and the review of that permit by sanctuary authorities.

V. PERMITTING POLICIES AT OTHER FEDERAL AGENCIES

Several agencies of the federal government have authority over extensive public lands. These include the Bureau of Land Management, the Forest Service, the Fish and Wildlife Service, the National Park Service and the Bureau of Indian Affairs. In recent years the issue of permits for fiber-optic cables has come to the attention of all of these agencies. All of them are directed to collect fair market value for the permits under both OMB Circular A-25 and individual agency regulations. The current status of permit fee policies at these agencies is summarized below.

The Bureau of Land Management (BLM) and the Forest Service have been involved in a joint effort to determine the appropriate fair-market fee for fiber-optic permits. Ultimately, the agencies expect to incorporate revised, market-value fees into regulations governing their permitting activities. To the best of our knowledge, that effort is currently on hold.

The Bureau of Land Management (BLM) administers 264 million acres, most of it in the western states including Alaska. Public lands in the National Forest system amount to 192 million acres. Together, BLM and the Forest Service issue dozens of right-of-way permits to fiber-optic companies each year. Both agencies currently assess right-of-way fees based on land values using a schedule developed in the 1980s. Those fees are typically paid annually. Converted to a one-time fee in perpetuity, the fees amount to $100 to $200 per mile. Forest Service and BLM permits include a clause requiring permit recipients to pay revised fair-market fees should an updated policy be established.

The trust lands of the Fish and Wildlife Service consist mainly of the National Wildlife Refuge system, totaling about 90 million acres. Right-of-way permits are issued if a refuge manager determines that the authorized use does not conflict with the management mission of conservation and resource protection. Fair market value is determined at the regional level in the Division of Realty using case-by-case appraisals. There is no system-wide policy regarding fiber-optic permits.

The National Park System comprises 378 areas covering more than 83 million acres in 49 States. Park Service appraisers in the various regional divisions assess fair market value for special-use permits. There is no standardized schedule of fees. Based on analysis of comparable transactions and guided by reports by both the General Accounting Office and the Inspector General urging higher fees, some park

authorities have responded to the new fiber-optic market conditions. Some of these efforts are described later in this report.

The U.S. trust lands administered by the Bureau of Indian Affairs total 56 million acres, most of it consisting of Indian reservations. Indian tribes are free to negotiate right-of-way settlements on reservation territory and to agree to terms as they see fit. However, BIA officials have established rules requiring that right-of-way payments reflect fair market value. A selection of available data indicates that these payments range from $30,000 per mile to well over $100,000 per mile.

VI. ANALYSIS OF SANCTUARY SPECIAL USE PERMIT FAIR MARKET VALUE

In the sections that follow, information and analysis from a variety of sources is presented regarding the determination of fair market value for a fiber-optic cable special use permit. First, recent price trends are examined, showing the rapid rise in right-of-way fees in the private sector and highlighting the current average price. Next, the incentives of a willing buyer and seller are explored, including the minimum and maximum price of a freely negotiated outcome. In the third section, values are estimated using an income-allocation approach. Finally, several recent transactions are presented in detail. Each of them was based on a thorough research effort and they serve as reliable indications of important market characteristics. As noted previously, market conditions are subject to change. A final determination of fair market value should include consideration of the most recent data available, in addition to the analysis presented below.

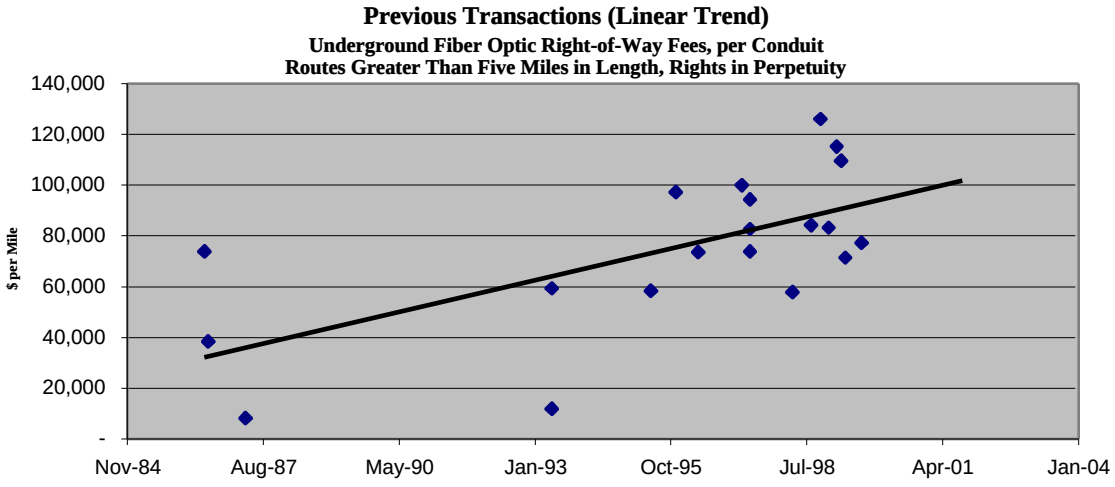
Market Trends in Fiber Optic Rights Of Way

Right-of-way transactions traditionally involved oil and gas pipelines and cables for telephone and power transmission. The right-of-way buyers were typically government agencies or regulated utilities with the power of eminent domain. Valuation emphasized traditional appraisal techniques, such as across-the-fence values and the before-and-after rule, and compensation reflected measurable losses to the seller.

In 1984 MCI installed the world's first fiber-optic cable, running along the Amtrak right of way between Washington D.C. and New York City. Since then the market for right-of-way access has been transformed, as highly profitable, unregulated firms have responded to the burgeoning demand for fiber-optic capacity. Informed sellers, cognizant of the telecommunication industry's ability and willingness to pay, have negotiated easement values dramatically upward. Loss to the seller was discarded as a standard of value in the private sector, with greater emphasis placed on the value to the buyer and the costs to cable companies of selecting alternative routes.

The current market is still in flux. Negotiated values vary widely as market participants attempt to learn from recent transactions while keeping pace with potentially profitable plans for new capacity expansion. Despite the variation, a rapidly increasing price trend is evident. A study performed for the National Park Service collected a series of historical right-of-way transactions. For purchases of underground fiber-optic rights of way greater than 5 miles in length, price levels rose from $8,026 per mile in 1987 to $11,880 per mile in 1993 to $100,042 in 1997.[13] Other figures for shorter distances followed a similar trend. Throughout this paper, all figures are converted to per-mile one-time charges for easements in perpetuity unless otherwise noted. Values for shorter time periods should be adjusted accordingly.

Figure 1 below shows the pattern of rising right-of-way fees for fiber-optic access over the past 15 years. The few data available for the mid-1980s show an average price per mile of about $35,000 in that period. Better data are available for the period 1993 to 1999, when the price trend increased from roughly

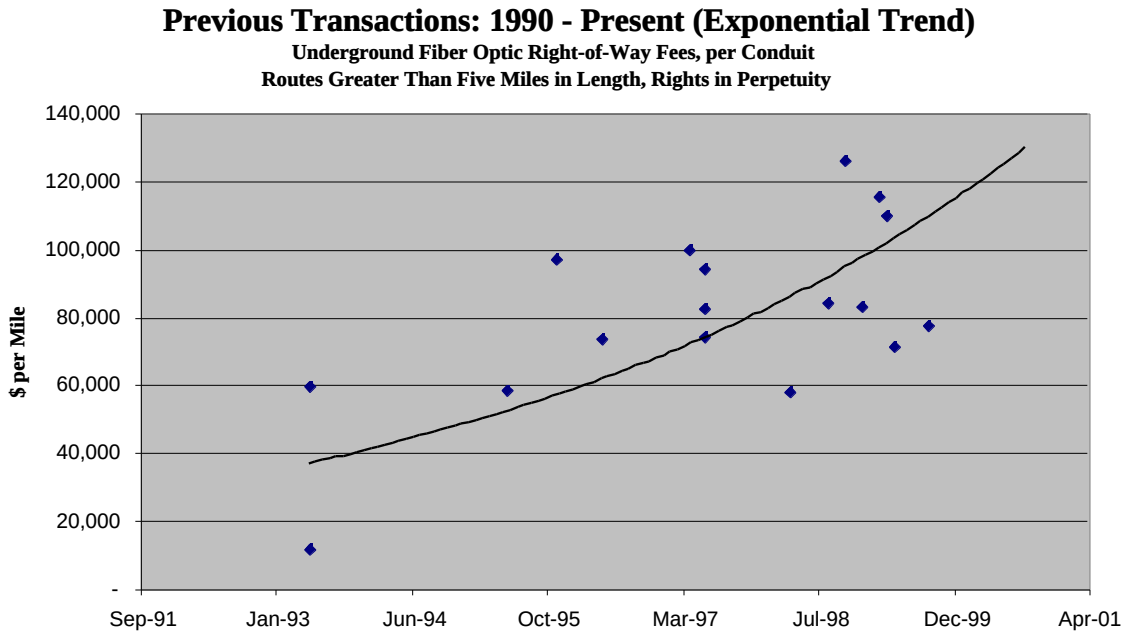


$60,000 per mile to over $90,000 per mile. The trend line shown reflects an assumption of linear growth, and is trended forward to June 2001 for the purpose of estimating an average current figure. Other possible assumptions about the form of the growth trend, such as an exponential or polynomial pattern, were similar in their statistical fit. They produced current estimates ranging from $90,000 to $110,000.

Any attempt to systematically analyze right-of-way transactions will be flawed due to the confidentiality of many agreements. Even data on transactions that are not confidential are only sporadically available, with much of it traded informally among appraisers and industry experts. The accompanying figure presents all the data able to be obtained at the time of this report, with transactions limited to underground fiber-optic cables and routes at least five miles in length. Fees for shorter routes are excluded because

they are comparatively erratic and are often not negotiated on a per-mile basis. Fees for overhead fiber-optic cables were deemed less relevant to a sanctuary special use permit. When several conduits are buried in a single right-of-way, the fee was averaged over the total length of all conduits to arrive at a conservative figure. Any transactions involving in-kind payments, such as free fiber-optic capacity, are difficult to value and are therefore excluded.

Data for the period 1990 to the present are analyzed separately in the graph below. With data for this period consistently available from year to year, isolated data points are less likely to skew results and a better-defined trend is discernable. The estimated current trend value, based on the assumption of exponential growth, is $120,000. Sensitivity analysis using a variety of possible growth trends produces a range of end-point estimates from $90,000 to $120,000. Data for both of these graphs is presented in the supporting table entitled "Calculation of Selected Right-of-Way Fees."



Federal and state governments have neither embraced nor rejected the new market conditions. Some officials maintain that the only fair assessment reflects current land values and the allegedly minimal damages involved. Some officials, especially at the state level, are hesitant to charge high fees that might discourage investment or be perceived as unfriendly to business. The state administration in Alaska called for charges of $316 per mile for fiber-optic easements as recently as 1997. The state legislature responded

by passing a "sense-of-the-House" measure, a rarely used parliamentary procedure, directing the state administration to charge market rates for fiber-optic easements.[14] In San Francisco, officials commissioned a study that determined a fee of over $350,000 per mile for a seven-mile right of way that crossed the grounds of the Presidio and the Golden Gate Bridge.[15] Officials there are actively encouraging the use of market-level fees that have the potential to raise considerable amounts of revenue. They argue that below-market rates confer unjustified benefits on particular industry interests and deprive taxpayers of an equitable return on government resources. At the higher end of the spectrum, officials in Austin, Texas charged the equivalent of $126,316 per mile for an easement on 31 miles of transit-authority right of way.[16]

The Willing Buyer and Seller Scenario

The range of possible outcomes in a market transaction is limited on the low end by the value to the seller on the high end by the value to the buyer. Value to the seller can be viewed as the environmental loss caused by the intrusion of cables in a sanctuary. This is the minimum price of access. The value to the buyer is the "build-around" cost, that is, the cost of acquiring some alternative route. As previously noted, the special-use permit does not apply to any environmental damage that may be caused by cable installation. The minimum price of the "seller" is therefore beyond the scope of this analysis. Furthermore, the maximum price is generally unknown to all but the company applying for a permit, though some conclusions can be drawn.

Sanctuaries typically cover large territories and cable companies have a limited number of preferred landing sites for undersea cables. Thus, alternative routes of a reasonable cost in the company's view may not be available in some cases. In a free-market bargaining scenario, the negotiated price would therefore be high. The appropriate market comparisons would be other transactions that allow a buyer to avoid significant costs, such as railroad or highway rights of way or a route crossing a large territory under single ownership.

A specific figure for build-around cost for a sanctuary would vary from project to project and would be difficult to estimate. The business strategies and technological constraints of a particular telecommunications company are unknown to policymakers. The costs of alternative routes involve additional construction, but also include the unknown variables of right-of-way negotiation and cable network reconfiguration. These factors become especially problematic in the context of undersea cables. For example, a company planning to avoid a sanctuary could build around the perimeter and land the cable in the original location or could choose another landing altogether. The variables influencing the

choice would be numerous and the cost consequences for a given company would depend on internal company information.

The Income Allocation Approach

Participants in fiber-optic transactions have increasingly taken the view that a right of way is an asset that has value to an enterprise and that income allocation is the key to asset valuation. These income-based transactions take two forms. Many recent agreements stipulate that a percentage of "user fees" for the installed cable must be paid to the right-of-way owner. Under such arrangements the landholder essentially retains ownership of the route and collects periodic payments that represent a reasonable return for use of the asset. Other transactions involve the sale of a right of way, with the selling price based on discounted future cash flows. This report recommends against the reasonable-return approach because of its excessive requirements for future financial monitoring and the additional uncertainty involved.

NMSP commissioned two analyses of fair market value using a one-time fee, discounted-cash-flow approach. Those studies are contained in Appendix One of this report.[17]

The income-based analysis by the Center for Applied Research applies industry-wide profitability figures to two examples of cable projects in national marine sanctuaries. The Global Crossing project traverses the Olympic Coast sanctuary and is already complete. The Global Photon example is a proposed project that would traverse the Monterey Bay sanctuary. Results from the analysis are presented below. Figures are calculated assuming a 25-year lease, a term length common in many right-of-way contracts. For each cable project, two figures are given for fair market value. The first is based on route-miles: that is, net income from fiber-optic operations is allocated based on total miles traversed by a fiber-optic network. The second figure is based on fiber-miles. This means that income is allocated based on the total length of buried fiber in a cable network. The per-fiber value is then multiplied by the number of fibers in a particular cable segment. A fiber-optic cable might include as few as four fibers or may contain 144 or more. The route-miles analysis views a right of way as a land-based commodity, with a market price determined by the typical fiber-optic installation. This view is still common in the marketplace, especially with regard to comparable transactions, where route-miles are the standard units of comparison. By contrast, the fiber-miles analysis accounts for differences in capacity and reflects recent transactions that charge based on the quantity of buried fiber.

A complete description of the methodology is contained in the Appendix. Generally, data was collected from a group of companies that operate fiber-optic networks. The study emphasizes large, mature

companies and does not consider any companies whose profits are negative. Many of these businesses are in the early phases of development, and it is reasonable to assume that their projections of future performance at least match the current performance of mature companies in the same industry.

For the companies chosen, a portion of each company's total income was allocated to its communications business. A portion of that income was allocated to its fiber-optic network. Of the income stream attributed to the network, 50 percent was then allocated to the use of the land and the right-of-way asset. This figure was then divided by either total route-miles or total fiber-miles, and 25 years of annual income was discounted to the present to arrive at the fees shown below.

	Global Crossing: Olympic Coast Route-Mile Analysis	**Global Crossing: Olympic Coast** Fiber-Mile Analysis	**Global Photon: Monterey Bay** Route-Mile Analysis	**Global Photon: Monterey Bay** Fiber-Mile Analysis
Total Valuation	$8,426,444	$1,970,826	$30,464,835	$21,375,885
Miles	65	65	235	235
Per-Mile Fee	$129,638	$30,320	$129,638	$90,961

The choice to allocate 50 percent of network income to the land rights requires some discussion. First, the contractor who prepared the income study has used similar methodology to value rights of way in the past. These valuations, using the 50-percent figure, have been the basis for successful negotiations with fiber-optics companies. The relevant transactions are listed in a table that accompanies the study. Second, many market transactions using the "reasonable return" approach collect a similar percentage of income. For example, the New York State Thruway Authority collects 50 percent of cable income over the next twenty years on 540 right-of-way miles.[18] In another arrangement involving three miles of tunnels in Chicago, city authorities will collect at least eight percent of the leasing company's gross revenues.[19] That charge could be similar to 50 percent of income, depending on the specifics of the agreement and the size of future cash flows.

The second income-based study estimating right-of-way value relies on projected revenues from the sale of undersea fiber-optic capacity, or circuits. This approach most closely resembles the type of business analysis a telecommunications company would use in evaluating the decision to install an undersea cable.

An analysis using this approach was commissioned by NMSP and appears in Appendix One. The study was undertaken by KMI Corporation, a leading research consulting firm in the fiber-optics industry.

Two important trends are incorporated into the KMI study. First, technology is changing rapidly. The amount of capacity available for a given cable increases dramatically as characteristics of the transmission signal are improved. Second, market conditions are changing. The addition of new cables adds to available capacity and creates downward pressure on prices. Regarding the income a cable generates, increasing cable capacity offsets declining prices.

Using a range of possible assumptions about the technology employed, and relying as before on the allocation of 50 percent of income to the right of way, the KMI study computes two sets of potential right-of-way values. For Atlantic routes, the KMI study computes a range of $12,762 to $76,925 per mile. The average for Atlantic routes is $43,748. For Pacific routes, the range of estimates is $93,927 to $214,576, with an average per-mile fee of $141,733.

Selected Historical Transactions

The transactions described below were selected to illustrate market conditions and recent trends. The first transaction involves a Nevada Bell right of way on federal lands, and represents an early attempt by a government authority to respond to the changing fiber optics market. The remaining examples are private-sector transactions. They should be viewed as reliable market indicators in that each of them is well documented and based on a thorough negotiating process between informed parties.

Nevada Bell: June 20, 1994

Nevada Bell sought a fiber optic easement running 14,144 feet along U.S. Highway 50A in Lyon County, Nevada. The Bureau of Reclamation (BOR) performed an appraisal based on highest and best use, arguing that a fiber-optic right of way was in fact the most profitable likely use, and that market value was therefore the appropriate standard. At that time, according to the BOR report, research indicated that market prices ranged from $1,000 to $50,000 per mile. A range of $2,000 to $8,000 per mile was determined to include the most representative market transactions. A fee of $1.05 per foot, or $5,544 per mile, was selected for the Nevada Bell easement.

The BOR report noted that government valuation of fiber optic easements up to that time had not responded to the changing market conditions. Traditional across-the-fence or “fee-simple” values were the most common approach. In the private sector, however, prices were being negotiated based on market

factors such as the convenience of a particular geographical route, the income stream generated, and proximity to a metropolitan area. The report concluded "supply and demand influences have driven the value of this type of easement to levels way beyond the fee-simple value."[20]

Massachusetts Turnpike Authority: March 31, 1999

The Massachusetts Turnpike Authority, which built and maintains Interstate 90 for the state of Massachusetts, sold access to its 135-mile right of way in an arrangement valued at $50 million.[21] This non-exclusive fiber-optic agreement came on top of a similar agreement only a week earlier. The terms of the $50 million 25-year contract, signed with Level 3 Communications of Boulder, Colorado, included $2 million in up-front payments and annual fees for each fiber-optic "interduct," or conduit, installed. The company planned to install up to 20 interducts all at once. Treating each interduct as a separate right of way, the stipulated payments are equivalent to a one-time fee of $112,477 per mile.[22] Treating the interducts together as a single right-of-way purchase could imply a one-time right-of-way fee of well over $1 million per mile.

AT&T Class Action: May 12, 1999

In a closely watched legal settlement, AT&T agreed to pay $45,000 per mile for a perpetual right of way on 80 miles of abandoned railroad track in Indiana.[23] The case was part of a nationwide class action involving fiber optic lines installed along thousands of miles of abandoned and operating railroad tracks. The railroads sold right-of-way access for the lines to AT&T, but the plaintiffs argue that only a portion of the right of way was owned by the railroads in the first place. The remaining ownership stake belonged to thousands of landowners along the railroad routes. These landowners could potentially receive hundreds of millions of dollars in compensation as the remaining portions of the class action suit are litigated.

The settlement figure of $45,000 only pertains to the portion of ownership rights that allegedly did not belong to the railroads. AT&T had already paid at least $11,500 for the estimated one-third that did belong to the railroads. Furthermore, the settlement awards $15,000 per mile in attorney's fees. Based on these considerations, the total value of the fiber optic easement may be significantly greater than $45,000 per mile.[24]

The court determined that the class action settlement was fair and reasonable. "[A]nybody evaluating this settlement needs to recognize that it is the last or at least the latest chapter after several years of vigorous litigation, and then approximately a year of adversarial arm's length negotiation over the terms of the

settlement. That is probably the best assurance that a proposed settlement will be fair, reasonable, and adequate to the class."[25]

California State Lands Commission

The state of California has recently issued four permits charging a right-of-way fee for installation of submarine cables. The rights of way relate to submerged lands off the coast of San Luis Obispo County, extending from various points on the shoreline out to the three-mile limit of state jurisdiction. The four routes vary in length from five miles (a single route) to nine miles (including a route into and out of a single landing station). The contract fees are described in terms of acreage, and range from $116,000 to $254,000 per year. With right-of-way width specified at 10 feet, the equivalent fee in linear terms comes to about $280,000 per mile for rights in perpetuity.[26]

This data point was excluded from the analysis of previous transactions presented in the earlier part of this section. If added to that analysis, it would raise the average significantly and point to a higher current trend value. It was excluded for the sake of keeping overland rights of way separate from undersea routes. The Lands Commission transaction is also a relatively short route leading to valuable landing sites. As more information becomes available over time, it will become clear whether these recent undersea transactions represent a good estimate of fair market value.

VII. CONCLUSIONS AND RECOMMENDATIONS

The authors of this report recommend the analysis of comparable previous transactions as the appropriate approach to determining fair market value. While market data varies considerably and could support a range of reasonable fair market value estimates, the analysis of market data is superior to the alternative approaches. Most appraisers have rejected land-based, across-the-fence methods as inadequate to address the current market realities in the fiber optic communications market. The scenario of the willing buyer and seller leads to the concept of build-around cost as an upper bound on market value for rights of way. However, the information required to evaluate build-around cost, particularly for submarine cables, is difficult to obtain and, therefore, prohibitive. Income-based analysis also requires substantial information that is not readily available in most cases. Furthermore, expectations about future income are already incorporated into previous market transactions.

The analysis of market comparables should emphasize recent transactions. In addition, emphasis should be placed on selected transactions that are particularly relevant. For example, long-haul routes, especially submarine cable routes, are important market comparables. Rural, rather than urban, rights of way are

better precedents for undersea cable fees. Transactions between an informed buyer and seller should also be emphasized. Finally, in a market characterized by rapid change and wide variation in transaction data, average price trends over time are an important indication of fair market value.

[1] "Submarine Network Deployment Continues Unabated." *Lightwave*, June 26, 2001, http://lw.pennwellnet.com/home.cfm. (Tab 1)
[2] "Undersea Fiber Business Thrives on Today's Demand for Global Connectivity." *Lightwave*, September 1999, page 1. (Tab 2)
[3] "Submarine Network Deployment Continues Unabated." *Lightwave*, June 26, 2001, http://lw.pennwellnet.com/home.cfm. (Tab 1)
[4] Circular No. A-25 Revised, *Memorandum for Head of Executive Department and Establishments*, July 8, 1993. (Tab 3)
[5] Estimates vary widely. Two good sources are Clifford A. Zoll, "A Logical Approach to Appraising Railroad Right of Ways," *The Appraisal Journal*, October 1998 (Tab 4) and Clifford A. Zoll "Rail Corridor Markets and Sale Factors," *The Appraisal Journal*, October 1991 (Tab 5).
[6] Eaton, J.D. *Real Estate Valuation in Litigation*, 1982, page 62. (Tab 6)
[7] Karvel, George R. "Easements in Railroad Right-of-Ways," *The Appraisal Journal*, January 1989, page 101. (Tab 7)
[8] Seymour, Charles F. "Letters to the Editor," *The Appraisal Journal*, October 1989, page 595. (Tab 8)
[9] *United States v. 104 Acres*, 666 F.Supp. 1017 (W.D. Mich. 1987). (Tab 9)
[10] Trefzger, Joseph and Henry Munneke. "Valuing Easements: A Simple Bargaining Framework," *Journal of Real Estate Research*, Number 2, 1998. (Tab 10)
[11] "Emerging Trends and Paradigms in Shared Resource Projects," Nossaman, Guthner, Knox & Elliot, LLP and Apogee/Hagler Bailly, 1998. (Tab 11)
[12] Eaton, J.D. *Real Estate Valuation in Litigation*, 1982, page 136.(Tab 12)
[13] See supporting table entitled "Calculation of Selected Right of Way Fees." (Appendix I)
[14] "House Urges Market Rates for Land Use, Fiber Optic Plans Delayed," *Anchorage Daily News*, April 24, 1998, page 1A. (Tab 13)
[15] "PG&E Corridor Rental Analysis," provided by the Presidio park service. ($6.34 per foot x 5,280) / 0.095 = $352,371 per mile. Since no agreement to use the right of way has been reached, this figure was not included in the "Previous Transactions" data supporting the two graphs. (Tab 14)
[16] See supporting table entitled "Calculation of Selected Right of Way Fees." (Appendix I)
[17] "Establishing the Value of Permits for Fiber Optic Installations in National Marine Sanctuaries," The Center for Applied Research, Inc., May 28, 2000; and "Revenue-Based Rights-of-Way Fee Estimates," KMI Corporation, September 2000. (Appendix I)
[18] "Emerging Trends and Paradigms in Shared Resource Projects," Nossaman, Guthner, Knox & Elliot, LLP and Apogee/Hagler Bailly, 1998. (Tab 15)
[19] "High Tech Help City Mine Tunnels," *The Chicago Tribune*, December 3 1985, page 4A. (Tab 16)
[20] Appraisal for 14,144-foot easement to Nevada Bell. Bureau of Reclamation, June 20 1994, page 7. (Tab 17)
[21] "Firm to Pay Pike $50 M for Use of Right of Way," *The Boston Herald*, April 1 1999, page 14. (Tab 18)
[22] The figure from the supporting table entitled "Calculation of Selected Right of Way Fees" is adjusted for inflation. 109,734 x 1.025 = 112,477. (Appendix I)
[23] *Hinshaw v. AT&T Corp*. "Certain Indiana 'Telecommunication Cable' Class Settlement Agreement," Civil Action No. IP99-0549-C-T/G, April 1999. (Tab 19)
[24] See supporting table entitled "Calculation of Selected Right of Way Fees." (Appendix I)
[25] *Hinshaw v. AT&T Corp*. Concluding Remarks by the Court, September 17 1999, page 6. (Tab 20)
[26] For the contract entitled "Calendar Item C11" we have 11 acres multiplied by 43,560 square feet per acre to get 479,160 square feet. Divided by the width of 10, we have 47,916 feet, or 9.075 miles, in length. The annual fee per mile is thus $242,075/9.075=$26,675 per year. Divided by 0.095 we get $280,788 per mile in perpetuity. The same calculation for the other three leases produces similar linear fees. (Tab 21)