Report No. 16

Investigation into the Installation of Wireless Facilities in Highway Right-of-Way in Louisiana

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Many state Departments of Transportation have been approached in recent years by telecommunication companies for permission to use highway right-of-way to locate telecommunications facilities. Generally, highway authorities have been wary in the past of permitting utilities in access-controlled facilities such as the Interstate system although widespread use has been made of the right-of-way of other highways. Interest in right-of-way of higher order roads has arisen because of the space in such roads, convenience of dealing with one owner and the existence of strips of land extending over long distances, sometimes over terrain (e.g. swamps) not traversed by other roads. Currently, interest is directed toward the location of telecommunication towers in state and Interstate highway right-of-way.

This report documents an investigation into practice in other states regarding the location of telecommunication towers and fiber-optic cable in highway right-of-way. The study was commissioned by the Louisiana Department of Transportation and Development in February, 1998. The investigation involved a review of the literature and a survey among state Departments of Transportation and telecommunication companies.

The report first summarizes practice as documented in the literature. The surveys are then described followed by an analysis of the survey results. The report is concluded with an interpretation of the results and a list of recommendations.

2. LITERATURE REVIEW

2.1 Trend in official stance of highway authorities

In general, the position held by highway authorities regarding the location of utilities in highway right-of-way, particularly controlled-access highway right-of-way, has changed over time. The policy of the American Association of State Highway and Transportation Officials (AASHTO) in the early 1980's was to preclude locating a utility in controlled-access highway right-of-way unless it could be shown that the utility would not adversely affect the safe and efficient operation of the facility, not interfere with future expansion of the facility, would be accessed from outside the facility and any alternative location for the utility would not be in the interest of the public (AASHTO, 1982, section 2). Most states abided by the AASHTO policy at the time.

However, in 1986 the Federal Highway Administration (FHWA) issued a Notice of Proposed Rule Making (NPRM) in which comments were solicited from all interested parties on proposed revisions to regulations governing the permitting of utilities and private lines in the right-of-way of Federal-aid and direct Federal highway projects (51 Federal Register 45479, FHWA Docket No. 86-15). Comments were received from 40

state Departments of Transportation, 15 utility companies, 4 governors, 4 contractors, 6 national organizations, 7 private citizens, and 13 others including state and local agencies and universities. Of those that commented specifically on whether longitudinal placement of utilities in Federally-supported highway right-of-way should be permitted or not, 32 supported the notion while 42 opposed it. Of the 34 state DOTs that commented on this specific question, 24 opposed it while 10 supported it. Of the 14 utilitiy companies that responded to the question, 8 supported it while 6 opposed it. Among the remainder, support for and opposition to the proposition were more or less evenly matched.

The Notice of Proposed Rulemaking led, in 1988, to the U.S. Department of Transportation granting authority to state DOTs to decide themselves on the longitudinal installation of fiber-optic and other utility lines in controlled-access highway right-of-way. Following the granting of this authority, a study conducted by the National Cooperative Highway Research Program (NCHRP) of the Transportation Research Board found, in 1992, that 19% of the states were prepared to allow transmission-type utilities in controlled-access highway right-of-way (NCHRP, 1995). However, a survey conducted among the same state DOTs in 1995 by the Louisiana Transportation Research Center found that 50% of the responding 38 states in that survey were prepared to permit fiber-optic cable in controlled-access highway right-of-way (Wilmot, 1995).

AASHTO approved the longitudinal installation of fiber-optic cable in controlled access highway right-of-way in 1989 (AASHTO, 1989). Subsequent publications have added to that policy (AASHTO, 1994, AASHTO, 1997). Federal legislation passed in 1996 encouraged the use of all highway right-of-way for the location of utilities although it did not take authority away from state and local authorities to administer roads in the overall interest of the public. This legislation manifested the growing liberalization regarding the use of highway right-of-way by utilities, and an increase in requests for use of this land has occurred at state and local level.

2.2 Legislation

The Telecommunications Act of 1996 encourages states and other public authorities to permit the use of highway right-of-way for telecommunications service. Section 253 (a) states “No state or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service”. However, section 253 (b), which follows, makes it clear that state and local authorities retain the responsibility for safe and efficient operation of the highway facilities. In addition, section 253 (c) affirms the right of state and local authorities to demand a “..fair and reasonable compensation.” for use of the right-of-way.

One of the issues grasped upon by the telecommunications industry following passing of the Telecommunications Act was that state or local authorities could not prohibit any entity from providing telecommunications service, as stated in section 253 (a) of the act above. However, if the safety of highway travelers or the flow of traffic is significantly affected, section 253 (b) of the Act makes it clear that state and local authorities do retain the right to decline a permit application. The Federal Communication Commission (FCC) endorses this position as documented in the FCC Fact Sheet of April, 1996 (FCC, 1996). In a section of the Fact Sheet dedicated to answering frequently asked questions, their answer to "Do local zoning authorities have any authority to deny a request for tower siting?" is "Yes. The Telecommunications Act of 1996 specifically leaves in place the authority that local zoning authorities have over placement of personal wireless facilities." Some people go further and say that the use of right-of-way of highways without control of access already provides sufficient access to telecommunications providers throughout the country. Thus, to claim that failure to gain access to controlled-access highway right-of-way prohibits them from providing telecommunications service is fallacious (Lindley and Williams, 1998).

Section 704 of the Telecommunications Act of 1996 states that a state, local government or "...instrumentality thereof shall not unreasonably discriminate among providers of functionally equivalent services". Thus, the law specifically disallows any discriminatory treatment of providers such as those providing cellular telephone service, personal communications service (PCS), and specialized mobile radio (SMR) (see Glossary for descriptions). This means that allowing one provider requires allowing another. If there are many providers or this principle is extended to all utilities, permitting one service may lead to a large number of services in the right-of-way.

Act 1035 of 1997 of the Louisiana State Legislature, sets the permit fees for locating utilities in highway right-of-way in Louisiana. For highways without control of access, the annual fees range from $20 to $1,500. For controlled-access highways, the installation of fiber-optic cable requires an unspecified one-time flat fee for each permit while those providing wireless communications must pay an unspecified flat fee for each permit (House Bill 1481, paragraph 381.2, A(2) and B(2), respectively). This legislation appears to require one-time payments even for wireless communications facilities, a requirement that is at variance with practice in most other states. Currently, permit fees for other utilities in Louisiana highway right-of-way are annual payments and it would seem highly desirable that this pattern be maintained.

2.3 Issues

2.3.1 Ownership

One of the issues that has to be addressed before a state or local government authority decides on whether to permit utilities to locate in highway right-of-way, is to

establish that the right-of-way is truly owned by the public authority. In some cases, public right-of-way has been acquired by donation or dedication. This has been done by landowners who were either required to do so as a condition for development of adjacent property or who thought it would be in their interest to have a highway bordering on their property (FHWA, 1996, p.21-22). Donation involves transfer of ownership but dedication only grants use of the land as an easement. In such a case, a public authority probably does not have the authority to permit use of the land to a third party and cannot charge a fee for the use of the land. The state of California has amended its legislation to accommodate such eventualities (FHWA, 1996, p. 22).

2.3.2 Authority for public bodies to enter public-private partnerships

The establishment of public-private partnerships creates entities in which neither public nor private sector operating procedures apply. For example, to what extent would the tax exemption status accorded to public bodies, apply to a joint public-private organization? Is the organization allowed to make a profit? To whom is the organization responsible, taxpayers or shareholders? In addition, can an organization like a state Department of Transportation enter into a public-private partnership involved in renting out real estate when their official function and responsibility is to provide transportation service to the public? Some states have passed special legislation to authorize state departments to participate in such activities (FHWA, 1996, p. 23).

2.3.3 Legislation preventing compensation

Legislation in some states expressly forbids charging a fee for the use of public highway right-of-way by utilities. In California, a law which was introduced in the previous century to promote development in the state, still prohibits the state or local authorities from charging telephone companies for the use of highway right-of-way (FHWA, 1996, p.18). Utility companies in California claim telephone company status, even if their main function is not telephone service, in order to benefit from this law. A similar situation exists in South Carolina where no charge is levied on utilities in highway right-of-way. In these cases, highway officials have typically denied utility companies the use of state and Interstate highway right-of-way because their presence is only a liability during reconstruction or realignment of a highway.

2.3.4 City-wide agreements

In urban areas with several independent local authorities, telecommunications companies understandably do not want to establish an agreement with individual local authorities since this limits their service area. Usually, they require city-wide agreements, or at least access to several contiguous areas, to permit uninhibited servicing of the urban area (FHWA, 1996, p. 25).

2.3.5 Tax implications

Earning money from the leasing of public property has tax implications for the public agency. Firstly, states and local authorities are generally exempt from federal taxation but deviating from normal 'governmental functions' may disqualify them from tax exempt status in regard to those functions (FHWA, 1996, p.44). Secondly, public projects enjoy tax-exempt bond financing but may lose that status if a private organization benefits more than a minimal amount from the facility funded by the bond or if the private organization pays more than a minimal amount of the debt service on the bond (FHWA, 1996, p.44-53).

2.3.6 Exclusivity

Exclusivity refers to whether the right to install and operate telecommunications facilities in highway right-of-way is reserved for one telecommunications company in a particular section of road or not. The strictest form of exclusivity is when this right is granted to a single private sector company and no other company may use the facility. A less restrictive form of exclusivity is when one company is granted the right to install and operate telecommunications facilities in highway right-of-way but other interested companies are permitted, or are required to be granted, the opportunity to sublease antenna space, cable or conduit from the company granted the permit. Arrangements must be worked out and written into the contract that permit the advantage of limited facilities but do not limit entry to the market or stifle competition (FHWA, 1996, p.55-58).

2.3.7 Types of property rights

The issue of whether a utility company is granted an easement, lease, franchise or license to use public highway right-of-way implies varying levels of freedom for the utility company in exercising their permit (FHWA, 1996, p.59-61). This may affect the term for which agreement is recognized, what the utility company can do on the ground and whether they are responsible for maintenance of the property. Generally, easements and leases give the user rights to the land while franchises and license arrangements do not. However, provisions can be tailored within each contract to suit the situation at hand.

2.3.8 Relocation costs

It has been common in the past to require utility companies to pay for the cost of relocating utilities in highway right-of-way when road realignment or roadway improvement required relocation of the utilities. This practice evolved from the fact that many utilities in the past were located in highway right-of-way at little or no cost, and since they were permitted there as a favor, they were expected to fund any expenses

incurred by their presence. However, as higher order roads have been used to locate utilities, fees have increased dramatically. Under these circumstances, it may no longer be appropriate to require utility companies to cover relocation costs entirely on their own. Companies may feel they have paid for the right to use the land as offered and they should not be held responsible for any changes initiated by the other party. They may even contest the need for road realignment or road improvement in certain cases. It is advisable to include arrangements within the contract that allows equitable handling of relocation costs, notice periods and limits on the time that is allowed to complete the relocation.

2.3.9 Liability

Liability surrounding telecommunication facilities in highway right-of-way can evolve from (FHWA, 1996, p. 68):

- failure of the telecommunication system due to physical damage to the facility or malfunctioning of the system,
- vehicle accidents involving the telecommunication facility, and
- breach of warranty.

Physical damage to the telecommunication facility is usually the responsibility of the party inflicting the damage, that is, the state department or utility provider. More serious is the interruption in service caused by physical damage or malfunctioning of the system such as power failure, flooding, damage or equipment failure. These issues must be addressed in the contract.

Vehicle accidents can damage the facility and result in tort action on behalf of the injured or killed or those affected by the breakdown of the system. If negligence can be shown, the contract should grant liability to the responsible party. Other contracts, referenced in section 2.7.2, should be consulted in preparing this aspect of a contract.

Breach of warrantly occurs if the telecommunication providers do not provide the service they undertook to provide. This could occur due to problems solely within the domain of the telecommunications provider such as bankruptcy, faulty equipment or failure to bring the system into operation on time. It could also arise from at least partial failure on the part of the state to provide necessary input to the process, such as electrical power, or damage to the system during maintenance or construction. In either case, the telecommunication users may hold the provider and the state responsible for a breach in service.

2.4 Costs

2.4.1 Telecommunication towers

While towers vary considerably in size and type, a representative value may be obtained from the experience of those that have installed such facilities. In Ohio, state DOT officials note that they found each site to cost about $250,000 to construct (Ohio DOT, 1997). Private communication with a company which erects and leases telecommunication towers in the South revealed that it cost them approximately $200,000 to erect each tower.

2.4.2 Installation of fiber-optic cable

Hess et. al (1988) identified typical costs of installation of fiber-optic cable along types of right of way. The collected data showed wide variation in values but using the more reliable values from the data, representative values shown in table 1 were obtained (FHWA, 1996, p. 40).

Table 1: Cost of installing fiber-optic cable by type of right-of-way

Cost of installing fiber-optic cable ($/mile)				
Interstate Highway[a]		Non-Interstate Highway[a]	Private Land[b]	Railroad[c]
Median	Fence Line			
$44,800	$50,800	$61,800	$57,800	$56,800

Notes: [a] excludes land acquisition costs.
[b] includes land acquisition costs of $1,000 per linear mile of right-of-way.
[c] includes one-time acquisition costs of $12,000 per mile.

2.5 Valuation

2.5.1 Valuation methods

When state DOTs offer the use of their highway right-of-way to accommodate telecommunications facilities, they need to know what compensation to require. Methods that have been suggested to determine appropriate fees include (FHWA, 1996, p.31-39):

- competitive auction;
- valuation of adjacent land;

- cost of next best alternative;
- needs-based compensation[1];
- historical experience; and
- market research.

Usually, more than one of the above approaches will be employed in arriving at a reasonable figure.

2.5.2 Factors affecting value

It has been suggested that the main factors affecting the value of locating towers in highway right-of-way are (FHWA, 1996, p. 28):

- micro location of the facility (i.e. urban versus rural)
- macro location of the facility (i.e. location in the country, for example, New Jersey versus New Mexico);
- position within the right-of-way (i.e. median versus against the fence line);
- infrastructure security;
- allocation of financial responsibility for accidental damage and forced relocation;
- term of contract;
- length of right-of-way;
- connectivity to the remainder of the system;
- maintenance needs of facility; and

[1] When the compensation requested by the public organization is derived from what that organization needs rather than what the private sector may be willing to pay.

- capacity of the facility.

2.6 Revenue

2.6.1 Telecommunication Towers

The literature does not contain much information on fees charged for the location of telecommunication towers in highway right-of-way. However, some indirect references to fees do exist. For example, the Ohio Department of Transportation reported that they expected to generate more than $20 million a year from approximately 1,000 tower sites, suggesting an average fee of $20,000 per site per year (Ohio DOT, 1997). In a study conducted by Arthur D. Little, Inc. (1990), it is stated that an annual fee of $12,000 per site is "reasonable".

The U.S. Department of Agriculture's Forest Service has published fees for the location of telecommunication facilities on forest land (Federal Register, 1997, p. 68079). A portion of the table is reproduced below in table 2. When a tower carries more than one service, a "base" fee is established as the most expensive service on the tower. Additional services on the tower are charged at 25% of the fees shown in table 2 and added to the base fee to determine the total fee for the site.

Table 2: Annual Payment for Telecommunication Sites on National Forest Land

	Annual Payment (1998)		
Population	Cellular telephone	Private Mobile Radio Service	Microwave
5m plus	$ 12,631.92	$ 10,526.60	$ 10,526.60
2.5m - 5m	$ 10,526.60	$ 6,315.96	$ 8,421.28
1m - 2.5m	$ 8,421.28	$ 6,315.96	$ 7,368.62
0.5m - 1m	$ 6,315.96	$ 4,210.64	$ 5,789.63
0.3m - 0.5m	$ 5,263.30	$ 2,631.65	$ 2,631.65
0.1m - 0.3m	$ 4,210.64	$ 2,105.32	$ 2,105.32
0.05m - 0.1m	$ 3,157.98	$ 1,052.66	$ 1,578.99
0.025m - 0.05m	$ 2,631.65	$ 631.60	$ 1,578.99
<0.025m	$ 2,631.65	$ 368.43	$ 1,578.99

2.6.2 Fiber-optic cable

Fees charged for the longitudinal use of highway right-of-way for fiber-optic cable show considerable variation. Some of this variation is due to the variation in land value from site to site and other published values are due to the vintage of the data. Using data collected by Hess et. al (1988), table 3 below was produced by the authors of the 1996 FHWA study (see page 41) to provide representative values.

Table 3: Fees charged for fiber-optic cable in highway right-of-way

		Fees charged for accommodation of fiber-optic cable in highway right-of-way ($/mile/year)					
State	Facility type	Rural		Suburban		Urban	
		Median	Edge	Median	Edge	Median	Edge
Florida	Turnpike	$736[a]					
Georgia	non-Interstate highways		$1,000-$2,000[b]				$5,000[b]
Illinois	Toll road				$1,500		
Iowa	Highways	$1,500[c]				$4,500[c]	
Indiana	Toll road	$1,800 + capacity[d]					
Massachusetts	Turnpike					$5,000-$7,500	
New York	Thruway				$5,280		
Ohio	Turnpike	$1,600-$1,850 + capacity[d]					

Note: [a] Fees no longer apply because DOT has taken over this roadway and cannot charge fees.

[b] Actual rate in rural areas depends on average daily traffic; fees are considered reimbursement for administrative costs, including permitting and insurance factor.

[c] The Iowa DOT reserves the right to negotiate the fee charged for occupancy dedicated solely to state governmental use (Iowa Accommodation Policy, §115.24(12)(c).

[d] These are the rates negotiated in 1985 with Litel; contract gives the Turnpike the option of free utilization of a stated amount of capacity at any time in the future.

A survey conducted among the state DOTs in 1995 by the Louisiana Transportation Research Center, found that the average fee charged to accommodate fiber-optic cable in controlled access highway right-of-way was approximately $5,000 per mile per year in urban locations and $1,300 per mile per year in rural locations (Wilmot, 1995, p.11).

2.7 Agreements

2.7.1. Revue of permit applications

Some state DOTs have revue procedures that are applied to evaluate permit requests. An example of this is the "Telecommunication Air Space Lease Request Checklist" used by Washington state DOT, attached as APPENDIX 1. The revue provides a checklist screening those applications that qualify from those that do not.

A more comprehensive review of the factors surrounding an application is suggested in a publication of the Federal Highway Administration (FHWA, 1996, p.77-79). The process is summarized in figure 1 below (FHWA, 1996, p.77).

Figure 1: Moving Toward a Contract
Key Decisions and Supporting Information

1. Determine Applicability	*2. Determine Options for Compensation*	*3. Refine Partnership Structure*
● **Investigate existing authority**	● **Estimate public telecom needs**	● **Examine tradeoffs among partnership options**
● **Analyze market influences**	● **Address legal authority relating to compensation**	● **Determine geographic scope**
● **Evaluate institutional factors**	● **Estimate ROW value**	● **Address contract issues**
	● **Analyze types of consideration**	

2.7.2 Sample site leases

Sample site leases are attached as APPENDICES 2 -7. They represent a diversity in levels of detail but collectively form a comprehensive base of most of the issues that should feature in a contract.

3. SURVEY

3.1 State Survey

A questionnaire was prepared to determine current practice in other states and to learn from the experience of those states that had already permitted telecommunications towers in highway right-of-way. A copy of the questionnaire sent to all states in the union is attached as APPENDIX 8. In an effort to promote a high response rate, all respondents were promised a summary of the results and, if they requested it, a copy of the data. Forty-three states returned a completed questionnaire. All but one state requested a copy of the data.

3.2 Private Industry Survey

Private industry representatives that had attended DOTD meetings on telecommunications issues in the previous few years were used to compile a list of candidates for the survey. A questionnaire was prepared which set out to elicit practice, experience and preferences from the respondents. The questionnaire included several open-ended questions to allow the respondents to respond freely to issues they consider important. The questionnaires were mailed out on March 26, 1998, and a reminder letter mailed on April 6. A copy of the questionnaire is provided in APPENDIX 9.

A total of 37 questionnaires were distributed to telecommunication companies. They were distributed at the same time as the state DOT survey. A total of 11 responses were obtained of which 9 directly addressed the questionnaire. The other two responses provided information regarding the services provided by the individual companies represented and did not relate to the questions in the questionnaire.

Approximately 60% of those responding to the private industry questionnaire were from companies that provide telecommunications service; others provide various services within the telecommunications industry such as the construction and rental of telecommunications towers or the provision of management arrangements that concentrate on linking the private and public sector in shared resources schemes.

Over 90% of those responding to the questionnaire owned telecommunication towers or monopoles and yet, at the same time, 67% of these also leased antenna space from other tower owners, suggesting that there is a great deal of sharing of tower space in the telecommunications industry.

4. ANALYSIS AND RESULTS

4.1 State Survey Results

4.1.1 Preparation of survey response data

The data collected in the state DOT survey was transcribed into an Excel spreadsheet file. Each line in the data file is for a particular state. A copy of the data file is attached as APPENDIX 10. The format of the data and it's coding is described in a coding manual attached as APPENDIX 11. The results of the state survey are summarized in a table attached as APPENDIX 12, but are discussed in narrative form below.

4.1.2 Proportion of states permitting erection of towers

The survey shows that, currently, telecommunication towers are permitted on DOT property in approximately one-quarter of the states. Approximately half of the states do not currently permit it, while the remaining quarter are in the process of formulating policy as to whether to allow it or not. The fact that roughly 75% of the states are either undecided or currently do not permit telecommunication towers on their property, suggests that the issue of telecommunication towers on state DOT property is relatively new and topical.

Among those states permitting telecommunication towers on DOT property, there is a slightly higher percentage (34%) that permit it in non-Interstate highway right-of-way than in Interstate right-of-way (24%). Ten states (23% of the respondents) currently permit telecommunication towers at rest areas while eleven (31%) also permit the use of other DOT property such as maintenance yards, park-and-ride lots, weigh stations, office buildings, terminals and excess parcels of land.

4.1.3 Position of tower

The preferred position of towers in highway right-of-way is near the perimeter. For Interstate highways, 69% of the states require that towers be located at the perimeter while 81% of the states require that location on non-Interstate highways. For rest areas, only 50% of the states require that towers be located at the perimeter. At other areas,

such as maintenance yards, park-and-ride lots, and so on, most states (83%) allow conditions at each site to dictate the appropriate position for a tower.

4.1.4 Towers per site

A clear preference is evident in the data for a limited number of towers per site. Most (73%) of the states that currently permit towers on DOT property, limit the number of towers to one per site. They subsequently require that tower owners allow other users to rent antenna space on the tower that is granted a permit. The survey among private industry telecommunication firms reported in the next section shows that a great deal of tower sharing exists in the market today, so tower sharing is not a new nor unwelcome concept in the industry.

4.1.5 Basis for issuing permits

The data indicates that tower permits are issued on demand (i.e. on a first come, first served basis) in 69% of the states which issue permits. The remainder (31%), issue them competitively.

4.1.6 Tower ownership

The majority of states (67%) have towers that are privately owned but some states (20%) have both publicly-owned and privately-owned towers. The remainder (13%), have only publicly-owned towers.

4.1.7 State liability with subleasing of tower space

The question whether the state shares liability with tower owners in maintaining service to antenna space sublessees evoked a strong indication to the contrary from state DOTs. Of the 13 states responding to this question, all but one indicated that they did not share any liability to tower sublessees. However, the state may share in the liability to interruptions to service purely by virtue of the fact that it is the landowner such as occurs in tort litigation associated with highways.

4.1.8 Payment to the state

From the survey results, approximately three-quarters of the states (75%-81%) that receive compensation for use of DOT property, receive cash payments. The other quarter receive shared resources as a means of compensation.

Monetary payments are in the form of annual payments, rather than one-time payments, 52% to 60% of the time. In most cases, both one-time and annual payments are required although some states require only one or the other. One state, New York,

shares in the revenue generated by the facility.

Payment varies widely among states. Some states literally have no charge, others charge only the cost of issuing the permit, while others charge fees as high as $175,000 for one-time payments and $144,000 in annual payments per site. There are only small differences in the payment by type of road (i.e. Interstate versus non-Interstate) and location (i.e. highway right-of-way versus other DOT property). Overall, the average fee to locate a telecommunications tower on DOT property is in the order of $44,000 as a one-time fee and $21,400 as an annual fee per site.

Beside the variation in fees that is observable between states, variation in fees within states also occurs. However, in this case, two factors are the main causes of fee change - whether the tower is in an urban or rural location, and how many antenna the tower is designed to carry. Two examples illustrate this point.

In California, the state is divided into "prime urban", "urbanized" and "rural" geographical areas. Towers are classified as "microcell" if they carry up to three antenna and the area required for the tower and equipment building is less than 300 square feet, "minicell" if the tower carries between four and eight antenna and/or the area required for the tower and equipment building is between 300 and 500 square feet, and "macrocell" if the tower carries between nine and 16 antenna and/or the area required by the tower and equipment building is greater than 500 but less than 2,500 square feet (Caltrans, 1997, p. 6). The annual fee charged per site in California based on the above categorization is shown in the table below. Fees for sites which exceed the specification of a "macrocell" are negotiated on an individual basis.

Table 4: Annual Site License Fees in California

	Microcell	Minicell	Macrocell
Prime urban	$15,000	$18,000	$21,000
Urbanized	$12,000	$15,000	$16,200
Rural	$ 9,900	$12,000	$12,000

In Ohio, a similar categorization of location and tower capacity is used. The counties in the state are categorized as being either "urban", "suburban", "rural/suburban", or "rural". Towers are categorized as "microcell" facilities if they carry between 1 and 4 antennas per site, have omni and directional antennas up to 8 feet in height and have

equipment building space occupying up to 300 square feet. "Minicell" facilities have five to nine antennas per site, directional antennas up to 6 feet in height and omni-directional towers up to 17 feet in height and equipment building space up to 525 square feet. "Macrocell" facilities have 10 to 16 antennas per site, directional antennas up to 6 feet in height and/or omni-directional towers up to 17 feet in height and equipment building space up to 750 square feet. An annual fee is charged based on the location and size of the facility as shown in the table below. If a facility does not fit within the categories described above, fees are established by negotiation. The fee schedule shown below automatically increases by 3.5% per year starting on July 1, 1998 for five years. Thereafter the fee schedule can be renegotiated.

Table 5: Annual Site License Fees in Ohio

	Microcell	Minicell	Macrocell
Urban	$14,000	$17,000	$22,000
Surburban	$12,000	$15,000	$18,000
Rural/Suburban	$ 8,000	$13,000	$14,000
Rural	$ 8,000	$10,000	$11,000

New Jersey also has a fee schedule that varies by location and size of the tower. However, Massachusetts, by contrast has a fixed schedule of $175,000 one-time fee plus a $25,000 annual fee per site irrespective of the location and size of the tower.

Shared resources involves rent-free use of space on the tower in 82% of the cases reported in the survey. For the remaining 18%, limited access to the telecommunication capabilities of the tower facility is provided. Such access is usually foreseen as providing the potential for real-time vehicle monitoring and control (e.g. variable message signs), electronic toll and roadside emergency systems among the various uses to which enhanced telecommunication capability can be put.

4.1.9 Payment from sublessee to state for antenna space on tower

The reported payment for antenna space on towers varies from a one-time payment of $40 to an annual fee of $144,000 per site. The average payment is $28,000 per year per site per sublessee. The payments are those made to the state by the sublessees and do not include payments made to the tower owners.

4.1.10 Payment to state to lay fiber-optic cable in highway right-of-way

Payment to lay fiber-optic cable in highway right-of-way is quite different if the highway is Interstate or non-Interstate. For Interstate highways, one-time payments vary from zero to $175,000 (average approximately $30,000) and $5,500 to $7,000 per mile. Annual payments range from zero to $25,000 and $1,500 to $6,600 per mile. In non-Interstate highway right-of-way, more than 80% of the states reported charging either no fee or the cost of processing the permit. One-time fees varied from zero to $175,000 but had an average of only approximately $8,500. Annual fees varied between zero and $25,000 irrespective of the length of the facility and zero to $5,000 per mile with an average of $1,300 per mile.

Another difference between the compensation received by state DOTs for fiber-optic cable in Interstate and non-Interstate highway right-of-way is that shared resources is more prominent in Interstate (25%) than in non-Interstate (3%). In addition, payment is more likely to be a one-time payment in the case of non-Interstate (97%) than in non-Interstate (67%).

4.1.11 Payment for fiber-optic cable attached to bridges

More than 76% of the states reporting do not charge to attach fiber-optic cable to bridges. For those that do, the dominant form of compensation to state DOTs is payment (95%). Most payments (82%) are one-time payments which vary widely ($0 to $175,000 or $0.5 to $1.25/foot/lb. weight per foot). Those that are annual payments vary between zero to $25,000 per year and $0.15 to $0.30/foot/lb. weight per foot.

4.2 Private Industry Survey Results

The survey among telecommunication companies provided interesting insights to the perceptions and opinions held in private industry in general. While the positions reflected by the different companies are not the same, similarities and consistencies are apparent in the results. A summary of the results of the survey is attached as APPENDIX 13.

Regarding the question as to what regulations (if any) the Department should institute to ensure the safe installation and maintenance of telecommunication towers in highway right-of-way, almost half of the respondents (40%) suggested that existing regulations were adequate. These regulations emerged from earlier discussions between the Department and private industry and are attached to existing permit applications for the installation of fiber-optic cable in highway right-of-way, DOTD document 03-41-0593 (Rev. 8/97). A copy of the regulations are attached as APPENDIX 14.

Some companies (30% of those responding), felt that there should be no

regulations at all while the remainder (40%), suggested that regulations of the following type would be appropriate:

1. No less than 90 days notification period on relocations.
2. Wind load analysis conducted with full complement of attachments.
3. Only approved equipment may be attached to tower.
4. Minimum distance from edge of road to tower structure.
5. Fence surrounding structure and equipment shelters.
6. No guyed towers allowed; monopoles and self-supporting towers only.
7. Annual tower inspections.
8. Adequate lightning and electrical grounding.
9. Indemnity insurance.
10. Safe ingress and egress from site.
11. Safe parking for maintenance and service vehicles.

The question of what needs to be done to ensure fair and continued access to telecommunications towers, elicited the response from 40% of the respondents that existing DOTD regulations were adequate, 30% felt that no regulation on the part of the Department was necessary, while 40% felt that regulations such as those listed below would be appropriate:

12. Require that tower owners share antenna space on the tower.
13. DOTD to monitor operations at all towers and penalize any user who is not abiding by the regulations.
14. Require that with construction of new towers, all users be notified at least 90 days in advance to allow exploration of colocation possibilities.

The fee to be charged by tower owners for antenna space on towers was suggested by 43% of the respondents as varying between $1 and $1.50 per foot height per antenna for ⅞0 and *1*⅝0 cord cable, respectively. The majority of the remaining respondents (29% of the remaining 57%) suggested that market forces determine the fee to be charged.

As to whether an escalation clause be built into the lease fee for tower space, most (75%) of the respondents felt that no escalation clause be included. Of those that did support an escalation clause in the lease agreement, the escalation was suggested as fairly moderate (5% per annum).

One of the topics that produced the most diversity in response was that related to the fee the DOTD should receive from tower owners for use of highway right-of-way. On one hand, some telecommunication industry respondents feel that the Department should charge only the costs associated with processing the application for permission to allow erection of a tower, or, alternatively, to charge only a nominal fee of less than $1,000 per

year. Others suggest annual fees of $10,000 and more per tower. No respondents suggested shared resources as a means of compensation to the Department, suggesting that the industry prefers to pay for the benefit of using highway right-of-way to house their towers rather than share resources with the highway authorities. This position is supported by opinions in the literature and by quotes of private industry spokespersons in public statements (see APPENDIX 15).

Other issues raised by private industry is their interpretation of the Telecommunications Act of 1996 as requiring states to not prohibit private industry from using public right-of-way for telecommunications purposes. One respondent also stated that the Service Providers Committee of the Louisiana Telecommunications Task Force had recommended that state land and facilities be made available for the deployment of telecommunications infrastructure. However, the Telecommunications Act of 1996 or other provisions do not guarantee the use of highway right-of-way to telecommunications providers since highway authorities remain responsible for the safe and efficient operation of highways. If the location of any utility or service in highway right-of-way detracts from the proper functioning of the highway, it can be prohibited. As mentioned in section 2.2, Lindley and Williams (1998, p. 6) point out that the Telecommunications Act of 1996, section 253, only bars states and local authorities from prohibiting "... the ability of any entity to provide any interstate of intrastate telecommunications service." They suggest that highway right-of-way in which telecommunications facilities are already permitted is so extensive (according to them, in excess of 2 million miles), that there can be no suggestion that telecommunications companies are being prevented from providing a service when application to use controlled-access highway right-of-way is declined.

5. CONCLUSIONS AND RECOMMENDATIONS

The trend among state DOTs regarding the use of state and Interstate highway right-of-way to accommodate utilities appears to be toward allowing them to locate but to charge them market prices for doing so. The Telecommunications Act requires that state DOTs be cooperative in considering applications from telecommunication providers for use of highway right-of-way although state authorities retain the authority to refuse permission if they have sufficient reason.

Fees charged for use of highway right-of-way varies considerably by state and by location within the state. The number of antennae carried by the tower and the location of the tower with respect to urban or rural location, are the two most significant factors determining the magnitude of the fee. From a review of practice in other states, and considering the conditions in Louisiana, the following recommendations are made:

15. Telecommunication towers be permitted in all types of highway right-of-

way provided its design and construction meets LaDOTD standards and its erection, repair and maintenance does not present an unacceptable hazard or hindrance to traffic flow on the highway.

16. Guyed telecommunications towers are not to be permitted.

17. Permit holders for telecommunication towers be required to design and construct their towers to accommodate additional capacity to that which they themselves require, and that they be required to lease space on the tower to other telecommunication companies without discrimination.

18. The fee structure for telecommunications towers be as shown in table 6. No shared resource or one-time access fee is required. Under existing legislation, the annual fee is achieved by establishing one-year contracts that are annually renewable.

Table 6: Recommended fees for telecommunication towers

Type of tower	**Location**		
	Urban	**Suburban**	**Rural**
Self-supporting tower	Tower owner: $25,000/site/year Additional service provider: $15,000/attachment/yr.	Tower owner: $15,000/site/year Additional service provider: $10,000/attachment/yr.	Tower owner: $10,000/site/year Additional service provider: $7,000/attachment/yr.
Monopole	Tower owner: $15,000/site/year Additional service provider: $7,000/attachment/yr.	Tower owner: $10,000/site/year Additional service provider: $5,000/attachment/yr.	Tower owner: $5,000/site/year Additional service provider: $3,000/attachment/yr.
Small attach-ments to exist-ing utility poles	$5,000/attachment/yr	$4,000/attachment/yr	$3,000/attachment/yr

19. Relocation costs, liability and access procedures during maintenance must be addressed in the contract.

20. Fiber-optic cable be permitted in all types of highway right-of-way provided it's installation and maintenance does not present an unacceptable hazard or hindrance to traffic flow on the highway.

21. Permit holders for fiber-optic cable be required to install additional conduit at the time of construction in order to lease capacity to other telecommunication providers without discrimination.

22. The fee for fiber-optic cable in controlled-access highway right-of-way be $0.30/foot/year in rural areas, $0.70/foot/year in suburban areas, and $1/foot/year in urban areas. The fee for fiber-optic cable attached to bridges be left at current rates.

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GLOSSARY OF TERMS

Cellular telephone

"A cellular system operates by dividing a large geographical service area into cells and assigning the same frequencies to multiple, non-adjacent cells. This is known in the industry as frequency reuse. As a subscriber travels across the service area, the call is transferred (handed-off) from one cell to another without noticeable interruption. All the cells in a cellular system are connected to a Mobile Telephone Switching Office (MTSO) by landline or microwave links. The MTSO controls the switching between the Public Switched Telephone Network (PSTN) and the cell site for all wireline-to-mobile and mobile-to-wireline calls."
(source: http://www.fcc.gov/wtb/tower.html)

Customer

An individual, business, organization, or agency that is paying a facility owner or tenant for communications services and is not reselling communication service to others.
(source: Federal Register, volume 62, number 249, Chapter 40, Section 48.1 (5), Tuesday December 30, 1997, pages 68083).

Facility

A building, tower, and/or other physical improvement that is built, installed, or established to house and support authorized communications uses.
(source: Federal Register, volume 62, number 249, Chapter 40, Section 48.1 (5), Tuesday December 30, 1997, pages 68083).

Facility Manager

The holder of a communications use authorization who leases space for other communication users. A facility manager does not directly provide communications services to third parties.
(source: Federal Register, volume 62, number 249, Chapter 40, Section 48.1 (5), Tuesday December 30, 1997, pages 68083).

Personal Communications Service (PCS)

"Personal Communications Services (PCS) deliver low power phone service similar to cellular services. The difference here is that these services use more closely spaced repeaters and antennas than today's cellular services. In some cases, PCS repeaters can be located on utility poles. Due to the lower transmission power of a PCS system, they will require ten to twenty times as many repeaters and antennas as cellular service."
(source: http://www.abag.ca.gov/bayarea/telco/other/moura.html)

Tenant

A communications user who rents space in a communications facility and operates communications equipment for the purposes of re-selling communications services to others for profit. Tenants may hold separate authorizations, without subtenancy rights, at the full schedule fee based on the category of use.

(source: Federal Register, volume 62, number 249, Tuesday December 30, 1997, pages 68084).

Specialized Mobile Radio (SMR)

"A traditional SMR system consists of one or more base station transmitters, one or more antennas and end user radio equipment which often consists of a mobile radio unit either provided by the end user or obtained from the SMR operator."
(source: http://www.fcc.gov/wtb/tower.html)

Utility

"Utility facility - privately, publicly or cooperatively owned line, facility, or system for producing, transmitting, or distributing communications, cable television, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, storm water not connected with highway drainage, or any other similar commodity, including any fire or police signal system or street lighting system, which directly or indirectly serves the public. The term utility shall also mean the utility company inclusive of any substantially owned or controlled subsidiary. For the purposes of this part, the term includes those utility-type facilities which are owned or leased by a government agency for its own use, or otherwise dedicated solely to governmental use. The term utility includes those facilities used solely by the utility which are a part of its operating plant."
(source: Code of Federal Regulations, Title 23, Chapter I, Subchapter G, Part 645, Subpart A, section 207).

APPENDIX 1: Washington State DOT Permit Request Checklist

APPENDIX 2: Washington State DOT Wireless Communications Site Lease

APPENDIX 3: Florida State DOT Wireless Communications Technical Guidelines

APPENDIX 4: Massachusetts State DOT ‘Wiring Massachusetts’ Document

APPENDIX 5: Radiofone's License For Rooftop Antenna Space & Lease For Antenna Space

APPENDIX 6: Louisiana DOT Draft Wireless Permit

APPENDIX 7: Louisiana DOT Draft Fiber Optic Permit

APPENDIX 8: State DOT Questionnaire

APPENDIX 9: Private Industry Questionnaire

APPENDIX 10: State DOT Survey Data

APPENDIX 11: Coding Manual For DOT Survey Data

APPENDIX 12: Summary of State Dot Survey Results

APPENDIX 13: Summary of Private Industry Survey Results

APPENDIX 14: DOTD Regulations Attached to Fiber-optic Cable Permit Application.

APPENDIX 15: Excerpts from Miscellaneous News Reports