WADING THROUGH THE RHETORIC OF THE TELECOMMUNICATIONS ACT OF 1996: UNCERTAINTY OF LOCAL ZONING AUTHORITY OVER WIRELESS TELECOMMUNICATIONS TOWER SITING

INTRODUCTION

Increasingly, millions of Americans are enjoying the convenience of some form of cellular communications service while on the move.[1] At the same time, many Americans—even cellular customers—are publicly opposing attempts by service providers to install the cellular antenna towers that are necessary to support service.[2] In the middle of the controversy are local governments who must grant telecommunications service providers approval for the construction or modification of antenna towers.[3] This role has taken on increasing importance for local planners, as 100,000 new cellular antennas are expected by 2003, compared to the approximately 20,000 existing antennas.[4]

Zoning is the primary means of land use control used by local governments.[5] Its early development arose largely from conflicts between

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1. *See* Mark Butler, *Eliminate Cellular Static, But Not From My Back Yard: Love-Hate Relationship Between Customers and New Tower Sites*, CORP. LEGAL TIMES, Apr. 1995, at 11 (quoting a prediction that the customer base for cellular communications is increasing by 50% each year); *see also* Michelle Gregory, *Local Planning Issues in Siting Cellular Towers*, ZONING NEWS, June 1995, at 1 (reporting that cellular technology added an average of 7,300 users per day in 1992 and continued to grow, reaching more than 24 million by the end of 1994).

2. *See* Butler, *supra* note 1, at 11.

3. The erection or modification of a cellular antenna tower within a local jurisdiction is subject to local zoning regulations just as the development or modification of any other type of structure would be. *See* Susan Lorde Martin, *Communities and Telecommunications Corporations: Rethinking the Rules for Zoning Variances*, 33 AM. BUS. L.J. 235, 245 (1995) (pointing out that the procedure typically consists of a telecommunications company applying for a variance or a special use permit to erect a tower where the use or height is prohibited by local zoning laws). The federal government has not granted telecommunications service providers special status as a public utility or otherwise exempted them from local zoning regulations. However, individual states or their courts may choose to recognize telecommunications service providers as a public utility and thus greatly decrease or totally eliminate the local government's power over siting cellular towers. *See, e.g.*, East Hartford v. Connecticut Siting Council, No. CV91-0503484-S, 1993 WL 466023, at *2 (Conn. Super. Ct. Nov. 4, 1993) (holding that the town had no standing to appeal the decision of the state public utility agency which had exclusive jurisdiction over siting telecommunications towers); Cellular Tel. Co. v. Rosenberg, 624 N.E.2d 990 (N.Y. 1993) (holding that a cellular telephone company is a public utility).

4. *See* Gregory, *supra* note 1, at 1 (estimating the number of cellular transmission sites at 17,920 at the end of 1994); *see also* Michelle Gregory & Douglas Martin, *Cellular Facilities: A Survey of Current Zoning Practices*, ZONING NEWS, Apr. 1996, at 1 (estimating that at least 100,000 cellular towers will be needed by 2003 to accommodate growth in the industry); Wesley Loy, *Rising Use of Towers Raises Residential Ire: High-Tech Vision for Future Goes up Against Citizens' View*, KNOXVILLE NEWS-SENTINEL, July 14, 1996, at A5 (estimating the number of cellular transmission sites at 22,000 in 1996).

5. *See* INTERNATIONAL CITY MANAGEMENT ASSOCIATION, THE PRACTICE OF LOCAL GOVERNMENT PLANNING 251 (Frank S. So & Judith Getzels eds., 2d ed. 1988).

industrial and other, less intensive land uses.[6] In both growing communities and large cities, homeowners and merchants sought local government protection of their interests in health, safety, and aesthetics.[7] Today, concerns of local citizens and governments regarding cellular towers generally involve similar interests. There is a perception that towers will have adverse impacts on aesthetics, property values, or health and safety.[8] There is also concern about the sheer number of tower requests that local zoning authorities are receiving.[9] Like historical land use conflicts, opposition to towers commonly arises when they are proposed in or near residential areas.[10] And now, as in the past, local government zoning remains the primary safeguard for local interests.

The telecommunications industry would prefer to bypass the local zoning process altogether, if it had a choice, because the process adds time and costs to constructing a cellular tower.[11] At the very least, the process requires filing an application for permission, a notice period, and a public hearing.[12] But the

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6. *See id.*

7. *See id.*

8. *See* SAN DIEGO ASSOCIATION OF GOVERNMENTS, WIRELESS COMMUNICATIONS FACILITIES ISSUES PAPER 3 (1995) [hereinafter SANDAG] (stating that a telephone survey of the 19 local governments within the San Diego region revealed that their primary concerns regarding wireless communications facilities are visual impacts and health and safety issues); *see also* AMERICAN PLANNING ASSOCIATION, CELLULAR TOWER SURVEY 1, Nov. 8, 1995 (finding in a survey of 230 cities' and counties' planning departments that "[t]he primary concern related to cellular tower siting is aesthetic appearance, followed by structural integrity and health risks"); *CCC, WCC to Focus on Land Use Before San Diego City Council in Fight with PBMS*, PCS WEEK, Mar. 20, 1996, at 3 (reporting concern over visual effects of antennas); Hillorie S. Morrison, *Telecommunications Facilities: Are They Safe?*, STATE & LOC. L. NEWS, Winter 1997, at 5 (reporting public insecurity with potential harmful effects of emissions from telecommunications facilities); *PCS Hopefuls Beware: Locals Don't Want Monopoles in Their Backyards*, PCS WEEK, Aug. 9, 1995, at 5 [hereinafter *PCS Hopefuls Beware*] (reporting local concern over effect of cellular antenna facilities on property values).

9. *See* Thomas J. Ragonetti, *A Towering Problem? Land Use Regulation of Commercial Broadcasting Towers*, ZONING & PLAN. L. REP., Feb. 1992, at 11; *see also* Howard Fine, *Sprouting Ears: Pac Bell, Cox Scramble for Municipal Approvals to Build Microwave Networks*, ORANGE COUNTY BUS. J., June 24, 1996, at 1 (reporting that local communities are overwhelmed with the number of cellular tower applications being filed); Paul Holley, *Consumers Could Be the Big Winners in Wireless Communications Race*, BUS. J., June 1, 1996, at 24 (reporting that Kenosha County Planning and Development Director's main concern with cellular towers is the quantity).

10. *See* Martin, *supra* note 3, at 245 (discussing frequent opposition to cellular towers in residential communities); *see also PCS Hopefuls Beware*, *supra* note 8, at 5.

11. *See Speakers Discuss New Methods for Breaking Site-Acquisition Bottleneck*, LAND MOBILE RADIO NEWS, Apr. 14, 1995, at 4 (discussing difficulties in acquiring proper sites for antennas and base stations). Industry opposition to local zoning is clear, since "[t]he cellular industry lobbied hard for federal preemption of local siting powers. Its argument for federal preemption focused on efficiency: Given the imminent proliferation of cellular phones, pagers, and other emerging PCS technology, . . . the nation would be better served by national standardization of facility siting requirements." Gregory & Martin, *supra* note 4, at 1.

12. *See* Martin, *supra* note 3, at 245-46.

process is neither uniform nor streamlined. Each locality has its own set of zoning regulations and procedures, and telecommunications companies must wade through them every time they wish to construct a tower.[13]

While the telecommunications industry pushed the federal government to preempt local zoning authority over cellular tower siting, the Telecommunications Act of 1996 (TCA) put the question to rest by explicitly leaving that authority to local governments.[14] The TCA is the first major overhaul of federal telecommunications law since the Federal Communications Act of 1934.[15] The 1996 Act is generally intended to encourage competition in the telecommunications industry and, consequently, includes measures to remove regulation of telecommunications providers.[16] However, despite this deregulatory spirit, Congress included language that preserves rather than preempts state and local government authority over zoning and land use matters, specifically, the placement of personal wireless communications facilities.[17]

Section 704 of the TCA includes a provision titled "Preservation of Local Zoning Authority," which recognizes that general authority over "decisions regarding the placement, construction, and modification of personal wireless service facilities" remains with state and local governments.[18]

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13. *See* Butler, *supra* note 1, at 11 (reporting that some municipalities are in the process of revising zoning codes to address cellular technologies and some do not accommodate cellular sites at all); *see also* Gregory, *supra* note 1, at 1 (pointing out that some jurisdictions regulate cellular towers specifically, while others have regulations that apply to "communication towers" generally).

14. Telecommunications Act of 1996, 47 U.S.C.A. § 332(c) (West 1991 & Supp. 1997); *see* News Release by American Planning Association, *Survey Shows Cellular Industry Exaggerates Regulatory Burden—Most Local Tower Permits Approved*, Nov. 8, 1995 (reporting that the House-Senate Conference Committee was considering a telecommunications industry-backed provision in the House-passed telecommunications bill, H.R. 1555, that would preempt local government authority over the siting of cellular towers) (on file with author).

15. 47 U.S.C. §§ 151-152 (1994); *see* MILLER, CANFIELD, PADDOCK & STONE, P.L.C., NATIONAL ASS'N OF COUNTIES ET AL., IMPLEMENTING THE NEW TELECOMMUNICATIONS LAW: A COUNTY AND LOCAL OFFICIALS GUIDE TO THE TELECOMMUNICATIONS ACT OF 1996, at 1 (1996).

16. *See* MILLER, CANFIELD, PADDOCK & STONE, P.L.C., *supra* note 15, at 1.

17. *See* 47 U.S.C.A. § 332(c)(7)(A).

18. *Id.* 47 U.S.C.A. § 332(c) states in part:

> (7) Preservation of Local Zoning Authority
>
> (A) General Authority
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> Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.
>
> (B) Limitations
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> (i) The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof—
>
> (I) shall not unreasonably discriminate among providers of

However, the preservation of local authority is not absolute.[19] The manner, effect, or speed of local actions may be scrutinized against exceptions which may place such actions outside the realm of preserved authority.[20]

Congress' attempt at both preserving local authority and retaining the TCA's broad federal goal has created many uncertainties. Perhaps the most ambiguous limitation, the prohibition clause, prohibits a state or local government from regulating the placement, construction, and modification of personal wireless service facilities in a manner that "prohibit[s] or ha[s] the effect of prohibiting the provision of personal wireless services."[21]

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functionally equivalent services; and

(II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.

(ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.

(iii) Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

(iv) No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.

(v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

(C) Definitions

For purposes of this paragraph—

(i) the term "personal wireless services" means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;

(ii) the term "personal wireless service facilities" means facilities for the provision of personal wireless services; and

(iii) the term "unlicensed wireless service" means the offering of telecommunications services using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services (as defined in section 303(v)).

47 U.S.C.A. § 332(c).

19. *See id.* § 332(c)(7)(B).

20. *See id.*

21. *Id.* § 332(c)(7)(B)(i)(II).

Whether regulatory actions have the "effect of prohibiting" service is a question of both law and science. Technical limitations determine when service cannot be provided. Therefore, whether a denial to construct a cellular tower at a particular location makes it technically infeasible to provide service is a question of science. Where to draw the line, or how far to push technology are questions of law. Answers to the latter question depend upon an understanding of the infrastructure of cellular systems and the land necessary to erect such a system.

Section 704 of the TCA provides that any questions raised about the prohibition clause, in the form of challenges to local zoning actions, will be played out in local courts, not before the Federal Communications Commission (FCC).[22] Therefore, decisions about what actions have the effect of prohibiting the provision of cellular services will not be made by a single regulatory entity but by individual courts whose interpretations may vary among jurisdictions.

The purpose of this Note is to explore possible judicial approaches to applying the prohibition clause of TCA section 704. Part I opens the discussion with an introduction to federal inducements for the new infrastructure. Part II provides an overview of cellular communications technology. Part III addresses the practical considerations of implementing a wireless communications network, such as the equipment involved and its demand for land. Part IV discusses statutory interpretations of the prohibition clause and also explores judicial reasoning in public utility siting cases. Public utility siting cases offer valuable insight because they involve parallel issues with telecommunications siting cases, and recent telecommunications cases have compared telecommunications companies and public utilities. Part V considers possible judicial approaches to challenges brought under the prohibition clause.

I. FEDERAL INDUCEMENT FOR THE NEW INFRASTRUCTURE

A. The TCA's Goals

The competition-promoting goals of the TCA require no less than the nationwide creation and expansion of wireless telecommunications networks. In essence, this means that the nation's cities and counties must be retrofitted with a new layer of infrastructure. One extremely important aspect of this infrastructure is the land necessary for the siting of antennas. Unlike conventional telecommunications infrastructure that connects users with wires

22. *See id.* § 332(c)(7)(B)(v).

stretched overhead or underground, wireless telecommunications technology utilizes the radio frequency spectrum to connect a mobile user.[23] The radio spectrum is utilized by means of broadcasting and receiving antennas.[24] These antennas typically are perched on towers, though not as large as those which broadcast commercial music radio stations.[25] However, their smaller size means that there must be more of them.[26] Thus, the federal goals of the TCA translate into a mandate for thousands of new antennas to emerge across the country, touching every community that the telecommunications industry serves.

B. The FCC Mandate

Aside from splitting up the radio frequency spectrum for various uses such as for cellular communications and PCS (personal communications systems) communications, the FCC also has the task of auctioning off licenses that entitle mobile communications providers to utilize parts of the available spectrum.[27] This process began in 1974 when the FCC opened up the 800 MHz band of the spectrum for cellular communications.[28] Since then, the FCC has auctioned more of the spectrum for various wireless communications services.[29] Most recently, the TCA made available additional portions of the spectrum for PCS licenses.[30] Each PCS license allows its holder to utilize a specified portion of the radio spectrum for wireless communications services in a defined geographic area; however, licensees are also required to meet a deadline before which they must serve a minimum percentage of the population or a minimum land area within the geographic boundaries covered by the license.[31] Cellular system licenses, similarly, have geographic

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23. *See* SANDAG, *supra* note 8, at 9.

24. *See id.* at 11-12; *see also infra* text accompanying notes 100-05.

25. *See* Jaymes D. Littlejohn, *The Impact of Land Use Regulation on Cellular Communications: Is Federal Preemption Warranted?*, 45 FED. COMM. L.J. 247, 248 (1993); *see also infra* notes 109-19 and accompanying text. One can infer from the heights given that telecommunications antennas are smaller than commercial broadcasting antennas.

26. *See id.*

27. *See* SANDAG, *supra* note 8, at 21.

28. *See id.* at 125.

29. *See id.*

30. *See id.* at 126.

31. *See id.* at 127 (noting that 47 C.F.R. § 24.103 (1996) requires holders of national PCS licenses to provide service to 37.5% of the national population or cover an aggregate area of 750,000 km^2 within 5 years, and provide service to 75% of the national population or cover 1.5 million km^2 within 10 years. Further, it requires holders of regional PCS licenses to provide service to 37.5% of the regional population or cover an aggregate area of 150,000 km^2 within 5 years, and provide service to 75% of the regional population or cover 300,000 km^2 within 10 years).

constraints and also carry a mandate to provide reliable service to all who request it.[32]

II. TECHNOLOGY OF CELLULAR SYSTEMS

Because personal wireless telecommunication is a product of complex science, an overview of its components and how it functions will demystify the topic for those who are unfamiliar with the technology. With an understanding of the antenna siting demands of this technology, the reader is better able to decide what local actions have the effect of prohibiting the provision of personal wireless services and can better appreciate the complexity of the task for local governments in establishing this new layer of infrastructure.

The TCA employs the phrase "personal wireless services" in its facilities siting section to refer to the range of services to which the section applies.[33] This broad wording is used for good reason. The telecommunications industry has significantly expanded the types of services available since the first car phone and is currently working toward providing types of services that can only be described as visionary.[34] While the term "cellular" is used freely in reference to most telecommunications companies and their services, this has increasingly become an imprecise label. This Part explains the cellular concept, its origin, and the evolution of other similar technologies that have a name of their own.

A. The Cellular Concept

The concept of cellular or wireless communications relies on the transmission of such communications via radio waves.[35] Unlike the massive, high-power, one-way broadcasts of commercial music radio stations, cellular radio communications are point-to-point, low-power, two-way transmissions.[36] The wireless customer is linked to the wired telephone network by means of antennas and supporting equipment (base stations) distributed around the service area that transmit and receive radio waves of various frequencies.[37] The antennas both transmit communications from the wired network *to* the

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32. *See* 47 C.F.R. §§ 22.901, 22.911 (1996).

33. 47 U.S.C.A. § 332(c)(7) (West 1991 & Supp. 1997).

34. *See* Peter A. Ramsdale, *Modern Personal Radio Systems Requirements and Services*, *in* MODERN PERSONAL RADIO SYSTEMS 1 (R.C.V. Macario ed., 1996); *see also infra* Part II.B.2.

35. *See* SANDAG, *supra* note 8, at 9.

36. *See* Gregory, *supra* note 1, at 2.

37. *See* R.C.V. Macario, *Cellular Radio Principles*, *in* CELLULAR RADIO SYSTEMS 3, 5-6 (D.M. Balston & R.C.V. Macario eds., 1993).

mobile device (mobile station)—for example, a car phone—and receive transmissions *from* the mobile device for routing back through the wired network.[38] Due to the limited availability of the radio frequency spectrum, wireless communications service requires a technique called frequency reuse, which is the basis of the cellular concept.[39]

The FCC makes available only a limited part of the radio frequency spectrum for cellular and other types of wireless communications services.[40] Because each transmission to or from a mobile station requires an individual frequency (channel), the number of calls that can be made (service capacity) in a frequency range at any given time is extremely limited.[41] Therefore, in order to maximize the use of the available frequency range, the cellular radio system implements a technique called frequency reuse.[42] The concept of frequency reuse is the use of radio frequencies repeatedly in a grid of geographic cells across a land area.[43] That is, the available radio channels are assigned to individual geographic cells among a pattern of cells (cluster).[44] The geographic pattern is then repeated across the service area with the same radio channels such that the reused channels do not interfere with each other.[45] The manner in which providers configure their cell patterns largely determines the degree of frequency reuse and, thus, the area's service capacity.[46]

Because frequency reuse determines the service capacity, it is a crucial concern of the cellular service provider. Indeed, without frequency reuse the number of calls a provider could accommodate on its available frequency range would merely be in the hundreds,[47] while customers surely number in the thousands.

The model cell structure resembles a honeycomb of contiguous hexagonal cells.[48] The hexagon is widely used in cell structures largely because it can be laid out side-by-side, providing seamless coverage.[49] Each hexagonal cell contains a "base station" at its center which gives radio

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38. *See id.* at 6.

39. *See* Ramsdale, *supra* note 34, at 6.

40. The FCC must allocate a fixed range of the radio spectrum among many competing demands. For example, cellular radio uses the 800 to 900 MHz part of the spectrum. *See* SANDAG, *supra* note 8, at 9.

41. *See* ROBERT G. WINCH, TELECOMMUNICATION TRANSMISSION SYSTEMS 425 (1993).

42. *See* Ramsdale, *supra* note 34, at 6.

43. *See id.* To visualize this concept, imagine a grid overlaid on a land area. Each box of the grid is a cell, and within each cell is a base station.

44. *See* Macario, *supra* note 37, at 9.

45. *See* Ramsdale, *supra* note 34, at 6. To prevent interference, frequencies cannot be repeated in adjacent cells. *See* Macario, *supra* note 37, at 9.

46. *See* SANDAG, *supra* note 8, at 15.

47. *See id.*

48. *See* Macario, *supra* note 37, at 9-11.

49. *See id.* at 9.

coverage to that cell and connects into the wired telephone network.[50] Cell sizes may vary over a service area depending on the service demand.[51] Because the number of calls one cell can handle at any given time is fixed, the cell's size must approximate an area such that its calling capacity will not be exceeded. For example, in an area where many calls are being made (high service demand), cells tend to be smaller.[52]

Cell cluster sizes, as well as cell sizes, may vary across a service area.[53] Each cell cluster uses the same radio frequency range, and the frequency range is reused over different geographic areas. The number of clusters in a service area defines the amount of frequency reuse and therefore, the service capacity of the area. The geographic size of a cluster is determined by the size of its individual cells. Since service demand determines the size of cells, greater demand results in smaller clusters and lower demand results in larger clusters.[54]

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50. *See* WINCH, *supra* note 41, at 400.

51. *See* Macario, *supra* note 37, at 13.

52. It follows that cells tend to be smaller in urban areas and larger in less populated areas.

53. *See* Macario, *supra* note 37, at 13. Cell clusters vary in size from three or four to seven cells, or any multiple of these numbers. Although the seven cell cluster is the most popular model, this may vary depending on the number of channels available or externalities affecting signal reception. *See id.* at 13-15.

54. It may also be helpful to understand how the cells and clusters function with each other and as a network. Before a call is even made to a mobile station, its geographic location must be known to the wireless network so that the appropriate base station can connect the call with the mobile station. *See* WINCH, *supra* note 41, at 400. The appropriate base station is the one serving the cell in which the mobile station is located. The cellular network is divided into location areas, each having its own area identity number. *See* Macario, *supra* note 37, at 16. This number is transmitted regularly from the base stations in the location area. *See id.* At the same time, when a mobile station is on, it locks onto the control channel of the nearest base station and informs the network of its location. *See id.* In this way, the network is able to keep a record of a mobile station's current location. *See id.* Therefore, when the mobile station needs to be connected with the wireless network, the network will know which area to call.

Mobile switching centers (MSC) direct traffic around the wireless network. *See* Ramsdale, *supra* note 34, at 10. Whether they originate from the wired or wireless network, all calls are routed to and from mobile stations via MSCs. *See id.* If a call is initiated to a mobile station, the MSC sends out a signal over the base stations in the appropriate location area like a pager. *See* WINCH, *supra* note 41, at 425. Unlike a pager, however, the mobile station automatically responds and the MSC then knows which base station is nearest the mobile station. *See id.* This established, the MSC assigns available channels for the connection: one for transmission to the mobile station and one for receiving from the mobile station. *See id.* The MSC then makes the connection, and the call may commence. *See id.*

If the mobile station moves from one cell to another during the call, a process called handoff occurs to connect the mobile station with the base station serving the new cell. *See id.* As the mobile station approaches the border of the cell it is in, the signal quality of the adjacent cell becomes better than that of the serving base station. *See id.* When this occurs, the serving base station sends a signal to instruct the mobile station to retune to a channel served by the adjacent cell's base station. *See id.* In an instant, the first base station shuts down its signal and the mobile station locks onto a channel in the second base station. *See id.* A very brief interruption occurs in the service that is often unnoticed by the customer. *See id.*

B. Wireless Communications Evolution

Many different types of wireless communications services are available today, and the TCA also addresses technologies which are largely visionary.[55] While these technologies are all based on the cellular concept,[56] they have different technical requirements and capabilities and, therefore, different land demands. Consequently, it is important to understand the basics of these technologies in order to understand what types of demands they will place on communities.[57]

1. Cellular Radio

Cellular radio was originally developed in the United States in the 1970s.[58] In 1974, the FCC made available to the public a portion of the radio spectrum for the development of cellular radio networks for mobile car telephones.[59] In 1979, Bell Labs designed a cellular mobile system called Advanced Mobile Phone System (AMPS) which is still the basis for the analog cellular systems in operation today.[60] Analog systems electronically replicate and amplify voice messages as they are carried from the transmitting antenna to the receiving antenna.[61] One problem with this technology is the often poor quality of the transmission due to noise picked up in the amplification procedure.[62] However, analog cellular radio systems, which were developed through 1985, have since been technologically surpassed by digital cellular radio systems.

The cellular industry has begun using digital transmission signals both to reduce noise and increase calling capacity per channel.[63] Digital technology converts voice messages into binary digits that represent sound intensities at

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55. PCS is an emerging technology that has yet to become widely available to consumers. *See, e.g.*, Gregory & Martin, *supra* note 4, at 1 (discussing PCS technology as an emerging technology and estimating future numbers of customers).

56. *See* SANDAG, *supra* note 8, at 9.

57. Unlike the technologies addressed in this section, paging is not a two-way communication system. However, because it is also based on a cellular structure, paging poses similar demands on local governments. Paging systems work on a high frequency; therefore, paging antennas are typically placed at greater densities than cellular communications systems. In addition, cellular antennas are normally placed at lower elevations. *See id.* at 19.

58. *See* Ramsdale, *supra* note 34, at 7.

59. *See* Gregory, *supra* note 1, at 1; *see also* Gregory & Martin, *supra* note 4, at 1; Ramsdale, *supra* note 34, at 8.

60. *See* WINCH, *supra* note 41, at 423-24.

61. *See* SANDAG, *supra* note 8, at 17.

62. *See id.*

63. *See id.*

specific points in time.[64] This process greatly reduces background noise, making for a clearer transmission. The process also creates more calling capacity from the same amount of radio spectrum by eliminating natural pauses in the conversation.[65] Thus, digital technology reduces the need for additional base stations.

The degree to which base station demand is reduced depends, in part, on the type of digital technology utilized. Two forms of digital technology currently exist: time division multiple access (TDMA) and code division multiple access (CDMA).[66] Both of these technologies attempt to provide multiple access over one channel.[67] TDMA is expected to increase calling capacity three to ten times above analog technology, and CDMA is expected to increase calling capacity by ten to twenty times.[68]

2. Personal Communications Systems

The next generation of wireless communications technology is called Personal Communications Systems (PCS). Just as a frequency range was made available for cellular communications years before the first cellular network, the FCC has allocated a portion of the radio frequency band for this up-and-coming generation of wireless communications. The concept of PCS transcends the notion of communications as place-oriented.[69] Instead, voice, data, and other services will all be directed to a person.[70] The PCS concept has been described in the following way:

> The vision of personal communications focuses on the provision of high quality two-way telecommunication services—speech and data—to both business users and consumers on the move, outdoors and indoors. The requirements of personal communications are essentially a service concept rather than a radical change in network technology. However, advanced technical solutions are needed to deliver a high-capacity service of speech, data and supplementary

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64. *See id.*
65. *See id.*
66. *See id.*
67. *See id.*
68. *See id.* The FCC has allocated the 800 MHz band for cellular mobile radio. Each call requires a channel for each direction of the transmission—one from the base station to the mobile station and one from the mobile station to the base station. The base transmit frequency range is 870-890 MHz, and the mobile transmit frequency range is 825-845 MHz. *See* WINCH, *supra* note 41, at 407-09. This total available bandwidth of 40 MHz yields 666 available channels. *See id.* It is from this foundation that all cellular service providers must operate. Thus, the significance of analog versus digital technology becomes more clear.
69. *See* Ramsdale, *supra* note 34, at 1.
70. *See id.*

> services at a high quality level from a competitive cost base. Such solutions enable personal communication systems to replace services in both fixed and mobile markets. [PCS] is the first system attempting to bring both fixed and mobile applications together; a personal service from one handset, not a separate mobile and fixed phone.[71]

PCS will function on the same type of cellular network as the original cellular communications.[72] The underlying concepts of the honeycomb structure (sector cell configuration), central control point, and handoff among cells still apply to PCS.[73] However, fundamental differences exist between PCS and cellular communications. PCS will function completely using digital technology and on a much higher frequency.[74] The use of digital technology means that the radio frequencies yield greater calling capacities than analog networks. However, the higher frequency on the radio spectrum also means that PCS cells must be smaller than cellular radio cells.[75] In addition, the low power output capability of some pocket-sized mobile telephones restricts the distance which they can send a return signal.[76]

III. PRACTICAL CONSIDERATIONS OF IMPLEMENTING A WIRELESS COMMUNICATIONS NETWORK

Having analyzed the basic structure and functioning of a cellular network, this discussion now turns to practical considerations that arise when this model is applied to real communities. To create a context for this discussion, some estimates of service demand are first presented, then practical considerations of implementation are addressed.

A. Service Demand

Since 1982, telecommunications industry analysts estimate that fifteen thousand cellular towers have been built in the United States, serving twenty-five million cellular customers.[77] Analysts estimate 167 million PCS users by 2003, and that the supporting networks will demand at least a hundred

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71. *Id.* at 2.
72. *See* SANDAG, *supra* note 8, at 18-19.
73. *See id.* at 19.
74. PCS will function in a range of 1,850 to 2,200 MHz. *See id.* at 18.
75. *See id.* at 18-19.
76. *See* WINCH, *supra* note 41, at 404-05.
77. *See* Gregory & Martin, *supra* note 4, at 1.

thousand additional antenna towers.[78] In addition, paging providers currently serve forty million customers, and demand is increasing.[79] It can be inferred that the service demand of current and future pager customers will require about the same geographic dispersion of transmitters as that for PCS technology.[80]

In recent years, the explosive demand for various forms of cellular communications has been accompanied by a corresponding jump in the number of applications submitted to local governments for cellular towers.[81] The proliferation of cellular towers is expected to be exacerbated by the deregulatory provisions of the TCA which allow multiple telecommunications providers to offer similar services.[82] Consequently, local governments can expect an onslaught of requests by the increasing numbers of providers.[83] Experts have predicted that as many as ten wireless telecommunications companies may approach the same municipality to request permission to site cellular towers.[84]

B. Practical Considerations

Issues related to cellular tower siting are best approached with an understanding of the physical makeup and demands of cellular towers. Practical considerations of tower siting include their geographic dispersion, necessary support structures, and the different structural forms of the tower itself.

1. Geographic Dispersion of Base Stations

The geographic dispersion of base stations is determined in large part by the size of cells in a given cluster.[85] With one base station per cell, a geographic area will have more base stations if the cells are small, and fewer

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78. *See id.*

79. *See* SANDAG, *supra* note 8, at 19.

80. *See id.*

81. *See* Gregory & Martin, *supra* note 4, at 1.

82. *See* MILLER, CANFIELD, PADDOCK & STONE, P.L.C., *supra* note 15, at 1.

83. *See* Loy, *supra* note 4, at A5. The author states that "[i]f experts are right, [cities] . . . could be facing an even greater onslaught of tower building by a telecommunications industry recently unleashed by Congress to exploit what promises to be a new golden age of wireless." *Id.*; *see also* Jayne Noble, *Garland Expected to Revise Communications Tower Rules*, DALLAS MORNING NEWS, July 11, 1996, at 1Z. The author points out that "[c]ity officials [have reported] a growing demand for cellular technology, and new companies are getting into the business and petitioning the city for antenna sites." *Id.*

84. *See* MILLER, CANFIELD, PADDOCK & STONE, P.L.C., *supra* note 15, at 1.

85. *See* Macario, *supra* note 37, at 7-12. A base station consists of an antenna, support tower, and equipment building. *See* SANDAG, *supra* note 8, at 11-15.

if the cells are larger.[86] In general, cells using analog technology have a radius of between two and five miles in densely populated areas and between five and eight miles in sparsely populated areas.[87] In contrast, PCS, using digital technology, will utilize microcells expected to be 80 to 1,200 feet in radius and macrocells expected to be approximately 1.2 miles in radius.[88] Consequently, some PCS providers estimate that PCS networks will require two to three times as many transmission sites as cellular networks.[89]

The actual positioning of base stations within the model cell structure is essential to the success of the network. One practical consideration is that the optimal location within a cell may not be available for antenna placement. This is perhaps the most difficult hurdle for service providers. Studies of the flexibility of cellular antenna location have found that an antenna may be located no more than one-fourth of the cell radius away from the optimal location at the center of the cell.[90]

Aside from cell size, geographic dispersion of base stations may also be affected by topography and base station height.[91] Obstacles or uneven terrain within a cell often cause interference with signal reception, resulting in a misshapen cell coverage area.[92] Obstacles are typically trees in rural areas, houses and trees in suburban areas, and buildings in urban areas.[93] Terrain conditions that cause interference consist of rolling hills, isolated mountains, and slopes.[94] Antenna height can affect the signal strength over various obstacles and terrain. In some cases, a higher base station antenna can increase signal strength.[95] But an antenna's required height is also dictated by the service demand within its radius.[96] Higher towers that cover a larger geographic area generally have lower service demand.[97] Shorter towers cover smaller areas with a more concentrated service demand.[98] Because these factors affect the strength of signals to and from base stations, they must be considered when deciding where to place base stations in order to provide the best signal coverage over the given terrain.

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86. *See id.*
87. *See* SANDAG, *supra* note 8, at 16.
88. *See id.* at 18.
89. *See id.*
90. *See* Littlejohn, *supra* note 25, at 250.
91. *See* Macario, *supra* note 37, at 8.
92. *See* WINCH, *supra* note 41, at 409-10; *see also* Macario, *supra* note 37, at 8.
93. *See* WINCH, *supra* note 41, at 410.
94. *See id.*
95. *See id.* at 412.
96. *See* Gregory, *supra* note 1, at 2.
97. *See id.*
98. *See id.*

2. Base Stations

A base station is made up of three components: antenna, support structure, and equipment building.[99] Antennas make it possible to transport communications without wires. They are the instruments that transmit and receive communications through the air via radio waves.[100] Three types of antennas are used in wireless communications: whip antennas,[101] panel antennas,[102] and dish antennas.[103] Whip and panel antennas transmit and receive radio waves carrying conversation signals.[104] These antennas are linked to a computer switching system throughout a mobile conversation by dish antennas.[105]

Support structures are just as important to wireless communications as the antennas themselves because they provide the elevation necessary for antennas to perform their functions.[106] Because wireless communications antennas function on a line-of-sight transmission, their height in relation to one another is crucial for the transmission and reception of signals.[107] This makes height a determining factor in the design and siting of base stations. In addition, support structures are perhaps the most important consideration for a community interested in aesthetics and neighborhood character. Indeed, the support structure puts the *tower* in *cellular tower*. The support structure is a base station's main aesthetic burden on a landscape. How an antenna is supported may make the difference between community conflict and community concession.[108]

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99. *See* SANDAG, *supra* note 8, at 11-15.

100. *See id.* at 11.

101. Whip antennas, also called stick, omnidirectional, or pipe antennas, emit signals in a 360 degree horizontal plane and a compressed vertical plane. They are shaped cylindrically with diameters between two and six inches and heights between one and eighteen feet. *See* SANDAG, *supra* note 8, at 11-12.

102. Panel antennas, also called sector antennas, aim signals in specific directions on vertical and horizontal planes. They generally measure four to five feet in height, six to twelve inches in width, and six to eight inches in depth. *See id.*

103. Dish antennas, also called microwave dishes, emit microwaves between computer switching systems and transmitting or receiving antennas. They generally measure four to six feet in diameter and one-and-a-half to three feet in depth. Their function is to facilitate handover by allowing a switching station to transfer a call between appropriate antennas. *See id.*

104. *See id.*

105. *See id.*

106. *See id.* at 13.

107. *See* WINCH, *supra* note 41, at 412.

108. *See* Loy, *supra* note 4, at A1 (monopole shortened in deference to local residents); *see also* Noble, *supra* note 83, at 1Z (reporting that the city of Garland, Texas was revising its city ordinance to encourage cellular communications companies to share towers with their competitors and place antennas on existing tall buildings, water towers, or utility poles rather than constructing new towers); Gregory, *supra* note 1, at 2 (reporting that Jefferson Parish, Louisiana requires that all cellular towers be disguised as trees).

There are three commonly used types of antenna support structures: lattice towers, monopoles, and building-attached facilities.[109] Lattice towers are structures consisting of three or four legs connected by a lattice pattern of supporting beams.[110] They generally range from sixty to two hundred feet in height and can accommodate cellular, PCS, or paging antennas.[111] In addition, these structures can support multiple antennas.[112] They are generally used when great height is needed, co-location is required, or weather demands a structurally sound design.[113] However, while lattice towers can accommodate multiple users, this concentration of towers creates the potential for the greatest negative aesthetic impact.[114]

Monopoles are structures consisting of a single pole, approximately three feet in diameter at its base and tapering to about 1.5 feet in diameter at the top.[115] They generally range from 25 to 125 feet in height and can accommodate any of the previously mentioned antennas.[116] Monopoles are typically used where buildings are not sufficiently high to meet line-of-sight transmission requirements.[117] They are also commonly found near freeways and in rural areas.[118] Monopole height for PCS networks is anticipated to be less than is required for cellular networks.[119] Consequently, some PCS providers have proposed using existing streetlight poles as monopoles.[120]

Building-attached antennas accommodate both cellular and PCS technologies, and occur in two general forms: roof-mounted and building-mounted.[121] Antennas have also been known to be mounted on silos, water tanks, windmills, or smokestacks.[122] However, since these methods of mounting rely on existing structures, there is no guarantee that such structures will meet height or locational requirements. If an antenna can be successfully mounted on a building, visual impact may be minimal if located in the center of the roof or painted to match the color and texture of the building.

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109. *See* SANDAG, *supra* note 8, at 13-15.
110. *See id.* at 13.
111. *See id.*
112. *See id.*
113. *See id.*
114. *See id.*
115. *See id.* at 14.
116. *See id.*
117. *See id.*
118. *See id.*
119. *See id.*
120. *See id.*
121. Roof-mounted antennas are placed on the roofs of buildings and building-mounted antennas are mounted on the sides of buildings. *See id.* at 15.
122. *See id.*

Equipment buildings for cellular antennas generally measure about twelve feet by twenty-four feet.[123] PCS equipment buildings are smaller, "self-contained weatherproof cabinets about the size of a vending machine."[124] Equipment buildings demand a power supply on which to run their equipment,[125] which may be an additional consideration in determining the suitability of a site for a base station.

IV. WHAT DOES THE PROHIBITION CLAUSE MEAN?

The general purpose of the TCA is to promote competition, reduce regulation, and encourage new technological developments.[126] Amid this deregulatory spirit, section 704 anomalously preserves local zoning authority—with limited exceptions.[127] Unfortunately for interpretation purposes, section 704 speaks only briefly and vaguely about the limits on local zoning power, and wholly fails to set the bounds of local power in relation to the provision of service.[128]

One of the limits on local zoning power, the prohibition clause, may be section 704's broadest limitation on local authority.[129] This clause prevents local zoning actions that prohibit or have the effect of prohibiting the provision of personal wireless services. The "effect of prohibiting" personal wireless services, however, is unclear; and the statute does not specifically address the strict technical demands of the technology.[130]

As previously noted, numerous variables are involved in the provision of wireless telecommunications services.[131] While technology does have its limits, it allows some flexibility in the provision of service—from cell size to cluster configuration to tower height. Therefore, the "effect of prohibiting service" is a dynamic concept. Much depends on how courts interpret the statute and apply the necessary standards in a given situation. The balance of this Note addresses the uncertainties, with which courts and local governments must struggle, created by the prohibition clause of section 704.

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123. *See id.*

124. *Id.*

125. *See id.*

126. *See* MILLER, CANFIELD, PADDOCK & STONE, P.L.C., *supra* note 15, at 1.

127. *See id.* at 9.

128. *See id.*

129. "The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof . . . shall not prohibit or have the effec of prohibiting the provision of personal wireless services." 47 U.S.C.A. § 332(c)(7)(B)(i)(II) (West 1991 & Supp. 1997).

130. *Id.*

131. *See supra* Parts II & III.

A. The Prohibition Clause

Section 704 of the TCA contains a grant of general authority that purportedly preserves the existing authority of state and local governments over decisions regarding the siting and construction of new telecommunications facilities as well as the modification or expansion of existing facilities.[132] In preserving the status quo, the statute makes clear that the federal government is not preempting state and local authority over these matters.[133] At the same time, however, the prohibition clause of section 704 sets out a federal mandate that state and local governments allow for the provision of personal wireless services.[134] It essentially says that a state or local government is prohibited from using land use restrictions to prevent a telecommunications company from providing its service. But exactly what local actions are prohibited is unclear. Moreover, due to the TCA's relative infancy, few courts have so far considered the meaning of the prohibition clause. And because challenges based on the prohibition clause may be brought in any court of competent jurisdiction, interpretation and application of the clause may vary across jurisdictions. The following discussion considers various approaches to interpreting the prohibition clause. The basic rules of statutory construction provide a foundation for analysis including a consideration of the plain meaning, legislative history and purpose of the prohibition clause.

1. Plain Meaning

The first step in interpreting a statute is to look at its plain language.[135] A court must honor the plain meaning of statutory words unless it finds an ambiguity.[136] If the literal meaning of the statutory language is unclear, the court may consider congressional intent in legislative history or policy considerations to support a position.[137]

The prohibition clause of the TCA states that regulation of the placement, construction, and modification of personal wireless service facilities "shall not

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132. *See* 47 U.S.C.A. § 332(c)(7)(A).

133. *See id.*

134. *See id.* § 332(c)(7)(B)(i)(II).

135. *See* Blue Chip Stamps v. Manor Drug Stores, 421 U.S. 723, 756 (1975) (Powell, J., concurring).

136. *See, e.g.*, Board of Governors, FRS v. Dimension Fin. Corp., 474 U.S. 361, 368 (1986) (asserting that "[i]f the statute is clear and unambiguous, 'that is the end of the matter, for the court . . . must give effect to the unambiguously expressed intent of Congress'") (quoting Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837, 842-43 (1984)).

137. *See* Aaron v. Securities Exch. Comm'n, 446 U.S. 680, 695 (1979) (citing Ernst & Ernst v. Hochfelder, 425 U.S. 185, 214 n.33 (1975)).

prohibit or have the effect of prohibiting the provision of personal wireless services."[138] A plain language interpretation of "shall not prohibit" is that regulations may not completely ban cellular towers.[139] Less clear, however, is the meaning and intended scope of the accompanying phrase "effect of prohibiting." This phrase evokes two plain readings. It could be read as an extension of "prohibit," or it could be read independently.[140] If read as an extension of "prohibit," the phrase "effect of prohibiting" builds on "prohibit" and, thus, encompasses any actions that have the effect of a total ban on cellular towers. This is as if the statute read "shall not ban or have the effect of a ban." Therefore, violations are limited to regulatory actions that ban all cellular towers from an entire jurisdiction.[141]

Alternatively, if read independently, the plain meaning of the phrase "effect of prohibiting" (the provision of personal wireless services) is no longer limited to the figurative or geographic scope of "prohibit." Instead, it includes *any* regulatory action that prevents a particular company from providing its personal wireless services to any geographic area.[142] This plain reading widens the scope of the clause to include a range of much narrower actions.

The relatively specific location demands of cellular towers creates the possibility that something less than a total ban could have the effect of preventing the provision of service to a given area.[143] This reality draws actions such as individual site denials and bans from certain zones into the possible scope of the prohibition clause. In the extreme, any denial of a request to place, construct, or modify personal wireless service facilities could be subject to scrutiny.[144] However, the adaptability of cellular technology

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138. 47 U.S.C.A. § 332(a)(7)(B)(i)(II) (West 1991 & Supp. 1997).

139. There is support for this position in the legislative history. *See infra* note 147 and accompanying text.

140. A total ban on cellular towers could be accomplished in a number of ways, for example, through moratoria on accepting applications for permission to construct or modify a tower, moratoria on approving such applications, or by including a provision in the zoning code that prohibits cellular towers from the entire jurisdiction. Since no single method epitomizes a prohibition any more than another, a catch-all phrase such as "effect of prohibiting" is sure to cover all methods.

141. This reading leaves little ambiguity for courts, except perhaps for the issue of the duration of the ban, which the District Court of Washington addressed in *Sprint Spectrum v. City of Medina*, 924 F. Supp. 1036, 1040 (W.D. Wash. 1996). *See infra* note 202 and accompanying text.

142. A regulatory action less than a total ban on cellular towers could presumably have the effect of prohibiting the provision of personal wireless services. For example, if the local government has prohibited cellular towers in residential zones and a cellular tower is needed to provide service to a particular residential zone, the exclusion of the tower could have the effect of prohibiting the provision of service to that area.

143. *See supra* Parts II.A. & III.B.

144. It is not beyond imagination that a telecommunications company could pursue a cause of action under the prohibition clause claiming that the denial of a tower on a particular site has the effect of prohibiting the provision of service in the surrounding service area.

suggests that it may take something more than denying a cellular tower at a specific site to have the effect of prohibiting the provision of service.[145] This very issue, which relies on the technological demands and limitations of cellular technology, may become the central question for courts that choose to read the phrase "effect of prohibiting" independently.

2. Congressional Intent

Where there is ambiguity in the plain meaning of statutory words, a court may consider congressional intent to support an interpretation.[146] Two basic elements of congressional intent are legislative history and purpose. The brief legislative history of the prohibition clause is found in a conference committee report which states, "[I]t is the intent of this section that bans or policies that have the effect of banning personal wireless services or facilities not be allowed and that decisions be made on a case-by-case basis."[147] This statement has two parts. First, it prohibits any broad policy that acts to prevent the provision of personal wireless services. This seems to refer to moratoria on siting cellular facilities or zoning regulations that specifically exclude cellular facilities. Second, the statement indicates a preference for a case-by-case approach to siting decisions, presumably as opposed to the aforementioned broad policy approaches.

The other element of congressional intent—the purpose of the prohibition clause—can be inferred from the phrase "the provision of personal wireless services."[148] It is notable that Congress used this phrase rather than "personal wireless services facilities," since both phrases are defined in section 704 and each has a distinct meaning.[149] The former refers to the actual service, that is, the ability to provide wireless communications in a particular area.[150] The latter phrase refers to the physical facilities that make the provision of such services possible.[151] Congress' choice of the former phrase over the latter implies that the provision of service is the ultimate concern of the prohibition clause. Thus, it can be inferred that the statute's focus is not on facilities, but rather the actual provision of service. The conclusion to be drawn from this

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145. *See supra* Parts I.A. & II.B.

146. *See* Aaron v. Securities Exch. Comm'n, 446 U.S. 680, 695 (citing Ernst & Ernst v. Hochfelder, 425 U.S. 185, 214 n.33 (1975)).

147. H.R. CONF. REP. NO. 458, 104th Cong., 2d Sess., at 208 (1996).

148. 47 U.S.C.A. § 332(a)(7)(B)(i)(II) (West 1991 & Supp. 1997).

149. The statute defines "the term 'personal wireless services' [as] commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services." *Id.* § 332(a)(7)(C)(i). The statute defines "the term 'personal wireless service facilities' [as] facilities for the provision of personal wireless services." *Id.* § 332(a)(7)(C)(ii).

150. *See id.* § 332(a)(7)(C)(i).

151. *See id.* § 332(a)(7)(C)(ii).

distinction is that the relevant inquiry into a local government's decision is not whether it prohibits the construction or modification of a facility, but whether that prohibition prevents the provision of service.

There is apparent inconsistency between these two sources of congressional intent. For example, despite the prohibition clause's seemingly clear legislative history, it is not clear that mere compliance with the two stated requirements guarantees that a local government's actions are in harmony with the clause's presumed purpose of allowing the provision of service. It seems possible that a locality could achieve the effect of a ban and still comply with these requirements.[152] In addition, the clause's ultimate concern for the provision of service has led some commentators to conclude, inconsistent with legislative history, that there may be a situation where a total ban on cellular towers still allows the provision of wireless service.[153] For example, a community which is geographically small and is able to show that its residents receive satisfactory service from facilities located in neighboring jurisdictions may be able to prohibit facilities without having the effect of prohibiting the provision of service to its residents.[154] It appears from these inconsistencies that, like the plain language approach, the basic sources of congressional intent do not lead to a clear interpretation of the prohibition clause.

B. The Convergence of Law and Technology

If no clear meaning of section 704's function can be drawn from its plain language, legislative history, or purpose, it is at least clear that section 704 does not require deference to telecommunications companies. This is evinced in the tone of section 704 which emphasizes fair and nondiscriminatory treatment by regulating authorities.[155] Furthermore, section 704 is intended to forward the Act's larger goal of promoting competition by removing

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152. If a locality denied all requests on a case-by-case basis, the effect would be the same as if there were a ban. That section (a)(7)(B)(iii) requires that a denial of a request to place, construct, or modify personal wireless facilities be supported by substantial evidence contained in a written record is superfluous to common practice and adds no extra burden to a decision to deny such a request. Nevertheless, this has proved to be a sticking point for some localities that fail to offer even minimal explanations for their decision. *See, e.g.*, Illinois RSA No. 3 v. Peoria, 963 F. Supp. 732, 743-45 (C.D. Ill. 1997) (finding violation of § 332(c)(7)(B)(iii) where municipality offered no written statement of reasons for denial of petition for special use permit); Sprint Spectrum v. Zoning Bd. of App., No. 2871-97, 1997 WL 556252, at *3 (N.Y. Sup. Ct. Aug. 18, 1997) (finding the town's "vague" denial of an application for a special use permit a violation of the TCA's substantial evidence requirement).

153. *See* MILLER, CANFIELD, PADDOCK & STONE, P.L.C., *supra* note 15, at 15-16.

154. *See id.*

155. Language such as "shall not unreasonably discriminate" and "within a reasonable period of time" indicates this desire of Congress. 47 U.S.C. § 332(c)(7)(B)(i)(I), (B)(ii) (West 1991 & Supp. 1997).

barriers to competition rather than by imposing preferences for telecommunications companies.[156] Nevertheless, courts may treat them with the preferred status of public utilities, as telecommunications companies have encouraged.[157] Courts that have treated telecommunications companies as public utilities have essentially granted them favored status for zoning purposes. Such deference to telecommunications companies could be decisive in a court's resolution of a prohibition clause case.

Assuming a court reads the prohibition clause to encompass actions narrower than a complete ban on cellular towers, whether a denial to construct or modify a personal wireless communications facility amounts to a prohibition of the provision of service ultimately rests on existing alternatives. Theoretically, if an alternative exists, there is no prohibition to the provision of service. Therefore, how a court treats alternatives can determine the outcome of the case. If a denial is to be upheld, the service provider must be able to provide service in an alternative way. However, a court that is deferential to the telecommunications company may not consider alternatives to the proposed site. Although technology can usually provide alternatives, how much weight a court will give these alternatives is uncertain.

The many variables involved in cellular technology allow a range of alternatives in the provision of personal wireless services.[158] From a technical standpoint, there is an optimum cell site location at the center of a cell; but due to factors beyond the control of the local government or the telecommunications provider, that location is unlikely to be achieved.[159] Nevertheless, industry engineers consistently find alternative ways to provide service by manipulating the variables involved in cellular technology.[160] For example, the cell site location, antenna height, number of antennas, cell size, or cell configuration can be varied to provide service if the location in the optimum area cannot be achieved.[161]

The height of antennas or use of multiple relay antennas are variables that can be utilized to overcome topographic obstacles or locational difficulties.[162] While cell size is a variable that can increase the area in which

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156. *See id.* § 332(c)(7).

157. *See* Nynex Mobile Comm. Co. v. Hazlet Township Zoning Bd., 648 A.2d 724, 731 (N.J. Super. Ct. App. Div. 1994); Cellular Tel. Co. v. Rosenberg, 624 N.E.2d 990, 993 (N.Y. 1993); Hawk v. Zoning Hearing Bd., 618 A.2d 1087, 1090 (Pa. Commw. Ct. 1992).

158. *See supra* Parts II & III.

159. This is generally an issue of the ability to acquire ownership or a lease agreement at the optimum location. *See* Littlejohn, *supra* note 25, at 250; *see also Speakers Discuss New Methods for Breaking Site-Acquisition Bottleneck*, *supra* note 11, at 4 (discussing difficulties in acquiring proper sites for antennas and base stations).

160. *See supra* Part III.B.1.

161. *See supra* Parts II & III.

162. *See supra* notes 91-98 and accompanying text.

a cell site can be functionally located, the availability of this option is dubious given increasing service demand and the fact that enlarging a cell's size decreases its service capacity.[163] Furthermore, the trend in cellular networks is headed toward smaller cells.[164] As service demand of existing cells increases, the cells must shrink to accommodate such demand. An entire new network of considerably smaller PCS cells has yet to be phased in. Accordingly, the possible variation from the optimum cell site location is also decreasing. Applying the one-fourth radius rule, cell sites must be placed within a 0.5 to 1.25 mile radius of the optimum location for cellular communication and within a 20 foot to 0.3 mile radius for PCS.[165] Outside these area ranges, proper service may not be possible. Thus, denying a cell site inside the applicable range may have the effect of prohibiting the provision of service. Practically however, courts and local governments lack the ability to make this determination.

The site selection process is driven by industry engineers.[166] These experts lay out cell pattern configurations that ultimately determine the area in which a cellular tower must be located.[167] Once a general area is identified, they evaluate specific sites and make a selection based on numerous criteria.[168] Consequently, an industry engineer has the most credibility and expertise regarding the needs of the cellular network and the engineering constraints with respect to tower siting. On the other hand, in challenging a local government action, an industry engineer would likely be an advocate for the service provider and thus deserving of some skepticism. Whether a local government is in a position to say that its particular decision does or does not have the effect of prohibiting the provision of service is uncertain. Its position may be limited to making alternative sites available and arguing that they could be utilized to provide service in the area. How courts will resolve this highly technical issue, if they choose to address it at all, remains to be seen. However, the caselaw is not completely devoid of guidance and insight on the issue.[169]

State courts have been faced with similar situations in public utility siting cases.[170] When a public utility wants to construct a facility such as an electric

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163. *See supra* Part III.A.

164. *See supra* Part II.B.2.

165. *See supra* Part III.B.

166. *See* SANDAG, *supra* note 8, at 4.

167. *See id.*; *see also* Littlejohn, *supra* note 25, at 250.

168. *See* SANDAG, *supra* note 8, at 4.

169. *See* Sprint Spectrum v. Zoning Bd. Of App., No. 2871-97, 1997 WL 556252, at *3 (N.Y. Sup. Ct. Aug. 18, 1997). The court provides insight into at least one possible approach. *See id.* There, the court summarily rejected the town's alternatives, deferring to the cellular company's determination that they were impracticable. *See id.*

170. *See infra* Part IV.D.

substation, a power line, a water tower, or a nuclear cooling tower, a locality often finds that the particular use is not appropriate for the proposed area. Even if these areas are residential, a court may allow the facility based on a decision that considers the viability of alternative sites. How courts have approached public utilities siting cases offers insight into how other courts may approach prohibition clause cases. Even if courts do not grant telecommunications companies favored status as public utilities, public utility siting cases involve parallel issues and, therefore, offer guidance about possible judicial approaches to prohibition clause cases.

C. Public Utilities and Zoning

Public utilities are often exempted from local zoning restrictions when locating facilities because of their unique characteristics as service providers.[171] Traditional public utilities such as providers of water, gas, and electricity typically have monopoly status and are subject to some degree of public regulation.[172] Their service is a public necessity that must be available to the entire public.[173] Perhaps the most important characteristic related to locating facilities is that public utilities commonly face logistical problems in providing their service. For example, public utility facilities have specific locational demands because the product must be piped, wired, or otherwise served to individual users.[174] The user typically has no alternative source, and the supplier has no alternative means of delivery.[175]

Defining a public utility varies across states and localities. Most localities define public utilities in a category or exempt them from their zoning codes.[176] States may define a public utility in a state law granting regulatory authority to a state agency. The regulatory authority overseeing state public utility agencies varies by jurisdiction. They may or may not be empowered to exempt a utility from local zoning regulations.[177] Many times, this is a decision for a court.

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171. *See* Phillip E. Hassman, *Application of Zoning Regulation to Radio or Television Facilities*, 81 A.L.R.3d 1086, 1104 (1977).

172. *See* Cellular Tel. Co. v. Rosenberg, 624 N.E.2d 990, 993 (N.Y. 1993).

173. *See id.*

174. *See id.*

175. *See id.*

176. *See* Joseph Sabino Mistick, *Recent Developments in Pennsylvania Land Use Planning*, 34 DUQ. L. REV. 553, 547 (1996).

177. For example, the Connecticut Siting Council has exclusive jurisdiction over siting public utilities facilities. *See* Public Utility Environmental Standards Act, CONN. GEN. STAT. § 16-50x (1994). But the California Public Utilities Commission requires that public utilities comply with all local regulations. *See* SANDAG, *supra* note 8, at 23.

D. State Judicial Approaches to Public Utilities

State courts have given some degree of deference to public utilities when deciding if a local government's regulations excluding placement of a facility will stand. Some states empower public utilities with an exemption from local zoning regulations.[178] To exercise the exemption, a utility usually must show a necessity for its project.[179] Some courts take into account local zoning considerations and the feasibility of alternative sites when deciding whether to grant an exemption.[180] Other jurisdictions have held that public utilities are completely exempt from local zoning.[181]

Early Connecticut cases involving public utility siting conflicts held that the party opposing the site at issue had the burden of presenting viable alternative sites.[182] However, consideration of the alternatives was not a search for the best site. For the utility to prevail, Connecticut only required the utility to demonstrate that there were reasonable advantages to the proposed site.[183] Connecticut later changed the way it treats public utilities by creating the Connecticut Siting Council which now has exclusive jurisdiction over siting public utilities.[184] Today, Connecticut public utilities are completely exempt from local zoning.

In Massachusetts, public utilities have the opportunity to petition the state public utility department for an exemption from local zoning.[185] State courts have held that the Department of Public Utilities, in deciding whether to grant an exemption from local zoning, must find that the facility meets the reasonably necessary standard.[186] In applying this standard, courts have held that the Department of Public Utilities is not required to consider alternative sites at all.[187] Facilities need not be constructed in the best possible location; rather, they must be "reasonably necessary for the convenience or welfare of the public."[188]

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178. *See* Allan Manley, *Applicability of Zoning Regulations to Projects of Nongovernmental Public Utility as Affected by Utility's Having Power of Eminent Domain*, 87 A.L.R.3d 1265, 1269 (1978).

179. *See id.* at 1267.

180. *See infra* notes 190-99 and accompanying text.

181. *See infra* note 201 and accompanying text.

182. *See* City of Shelton v. Bridgeport Television, 362 A.2d 529, 531 (Conn. 1975); *see also* Gimbel v. Loughlin, 250 A.2d 329, 335-36 (Conn. Super. Ct. 1968); Wilson Point Prop. Own. Ass'n v. Connecticut Light & Power Co., 140 A.2d 874, 884 (Conn. Super. Ct. 1958).

183. *See Wilson Point*, 140 A.2d at 879.

184. *See* Public Utility Environmental Standards Act, CONN. GEN. STAT. § 16-50x(a) (1994).

185. *See* Wenham v. Dep't. of Pub. Utils., 127 N.E.2d 791, 793 (Mass. 1955).

186. *See* Braintree v. Dep't. of Pub. Utils., 647 N.E.2d 1186, 1189, 1191 (Mass. 1995); *see also* Martorano v. Dep't. of Pub. Utils., 516 N.E.2d 131, 134 (Mass. 1987); *Wenham*, 127 N.E.2d at 793.

187. *See Braintree*, 647 N.E.2d at 1191; *see also Martorano*, 516 N.E.2d at 136.

188. *Braintree*, 647 N.E.2d at 1191 (citing MASS GEN. LAWS ch. 40A, § 3 (1992)); *see also Martorano* 516 N.E.2d at 136.

Some courts have used more of a balancing approach in their decisions. Both New Jersey and New York courts apply a version of the reasonably necessary standard that demands a balancing of local interests with the welfare of the general public.[189] In deciding whether to grant an exemption from local zoning, the New Jersey State Public Utility Board must consider factors such as the zoning ordinance, community plan, suitability of the site, existing uses in the neighborhood, proximity of residential development, effect on abutting landowners, relative advantages and disadvantages with respect to the public welfare, and existence of alternative sites.[190] In considering alternative sites, New Jersey courts put the burden on public utilities to show the reasonableness of the proposed site and, if applicable, the greater expense of alternative sites.[191] The challenging party bears the burden of showing the feasibility of alternative sites.[192] If the court finds that the balance weighs equally on each side, the site is considered reasonably necessary, and the balance falls in favor of the public utility.[193]

New York does not provide a public utility exemption from local zoning, but courts have stepped in to order that a variance or special exception be granted to a public utility.[194] New York courts have considered factors similar to those addressed by New Jersey's courts in determining when there is a reasonable necessity, including the availability of alternative sites and degree of detriment to the neighborhood.[195] New York courts put the burden on public utilities to show both the reasonable necessity of constructing its facility at that particular location and the undue hardship that a denial would cause.[196] In *New York Electric & Gas v. McCabe*, this meant the utility had to show the unavailability of any other sites that were less disruptive to the community zoning plan.[197] Consistent with the balancing approach, however, the New York Court of Appeals has held that a public utility's burden of proof is proportional to the degree of intrusion on a neighborhood.[198] Therefore, the greater the intrusion, the greater the burden.

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189. *See infra* notes 191-98 and accompanying text.

190. *See* Monmouth Consol. Water Co. v. Board of Pub. Util. Comm'rs., 220 A.2d 189, 193 (N.J. 1966); *see also* Citizens Opposed to Power Towers v. Public Serv. Elec. & Gas, 241 A.2d 15, 20 (N.J. Super. Ct. 1968); Hackensack Water Co. v. Board of Pub. Util. Comm'rs., 125 A.2d 281, 289-90 (N.J. Super. Ct. 1956).

191. *See Hackensack Water*, 125 A.2d at 291.

192. *See id.* at 290.

193. *See id.*

194. *See* Consolidated Edison v. Hoffman, 374 N.E.2d 105, 109-11 (N.Y. 1978); *see also* New York Elec. & Gas v. McCabe, 224 N.Y.S.2d 527, 535 (N.Y. App. Div. 1961).

195. *See* Niagra Mohawk Power v. Fulton, 8 A.D.2d 523, 528 (N.Y. App. Div. 1959).

196. *See Hoffman*, 374 N.E.2d at 109-11; *see also McCabe*, 224 N.Y.S.2d at 535.

197. *See McCabe*, 224 N.Y.S.2d at 533-34.

198. *See Hoffman*, 374 N.E.2d at 111.

The balancing approach taken by the New Jersey and New York courts is not to be construed as holding that a public utility may be excluded from a locality—clearly, they cannot. The balancing approach simply holds that a public utility may not go wherever it wants, and that both local and overall public interests will be considered in determining whether the proposed site is reasonably necessary.

Returning to the question of whether a denial to construct or modify a telecommunications facility amounts to a prohibition of the provision of service, the issue is whether any alternatives exist. This is because service must be provided somehow, if not from the requested site.[199] This issue is parallel in public utilities and telecommunications facility siting conflicts. Common to public utility cases and prospective TCA cases is the fact that service may not be prohibited. In addition, the service provider has locational demands that limit the number of potentially feasible locations for the facility. The difference between public utilities and telecommunications cases is that a TCA challenge will be based on the prohibition clause while public utilities cases are based on zoning regulations and the state law notion that public utilities should be granted favored status. However, in application there may be little difference in how courts approach these situations.[200]

V. POSSIBLE JUDICIAL APPROACHES TO TCA CASES

Courts may approach legal challenges brought under the prohibition clause from one of two positions: first, they may find that the clause only applies to total bans; or second, they may find the clause applicable to governmental actions other than total bans.[201] The first position rests on the

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199. This is the question posed to courts that do not interpret the prohibition clause as only applying to total bans on cellular towers. *See supra* Part IV.B.

200. Courts have recently demonstrated an unwillingness to differentiate between public utilities and telecommunications companies. For example, New Jersey and New York courts have held that telecommunications providers are public utilities subject to state public utilities laws. *See* Nynex Mobile Comm. Co. v. Hazlet Township Zoning Bd., 648 A.2d 724, 731 (N.J. Super. Ct. App. Div. 1994); *see also* Cellular Tel. Co. v. Rosenberg, 624 N.E.2d 990, 993 (N.Y. 1993). In New Jersey, this means that telecommunications companies can seek a local zoning exemption from the State Public Utilities Board. In New York, this means that a telecommunications company is entitled to favored status in seeking a special use permit. The State of Connecticut has created a state agency, the Connecticut Siting Council, which has exclusive jurisdiction over siting public utilities, including cellular antenna towers. *See* Public Utility Environmental Standards Act, CONN. GEN. STAT. § 16-50x (1994). A Pennsylvania court has held that telecommunications companies can be treated as public utilities for zoning purposes even though the Pennsylvania Public Utility Commission does not consider them public utilities. *See* Hawk v. Zoning Hearing Bd., 618 A.2d 1087, 1090 (Pa. Commw. Ct. 1992). *But see* Crown Communications v. Borough of Glenfield, 679 A.2d 271, 274 (Pa. Commw. Ct. 1996) (holding that a cellular company was not to be considered as a public utility).

201. This assumes that the state has not granted exclusive jurisdiction over telecommunications

understanding that the prohibition clause only applies to regulatory actions that ban all cellular facilities from an entire jurisdiction. This interpretation leaves little ambiguity in application of the clause. However, one possible area of uncertainty is whether a temporary moratorium on cellular towers violates the clause. This issue was addressed in *Sprint Spectrum v. City of Medina* where the court found that a temporary moratorium did not violate the prohibition clause.[202] Other courts may find that even a temporary ban on cellular towers violates the clause, if interpreted to prohibit jurisdiction-wide bans.[203] The second possible judicial approach rests on a broader interpretation of the prohibition clause.[204] Courts might find that the clause applies to governmental actions other than total bans on cellular facilities. This approach will result in more causes of action and compel courts to address the issue of alternative sites.

A challenge under the broad approach to the prohibition clause would likely claim that a denial of permission to construct or modify a personal wireless communications facility has the effect of a complete prohibition of service because, without the tower, service cannot be provided. As with public utility cases, some courts may wish to dispose of such cases quickly by not considering the possibility of alternatives. To do so, a court could apply the following narrow reasoning to the law and facts: Where there is presently no service provided to an area, and construction of a facility on the requested site could fill the service gap, denial of said construction would prevent the provision of service.[205] Under such a regime, local governments would be faced with an overwhelming burden to support their denial of a permit.

If a court is open to considering alternatives to a proposed site, it invites the local government to claim that a denial does not have the effect of prohibiting service. This claim could be approached by a court in two general ways. First, it could use any variation of the reasonableness standard

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facilities siting to a state agency, thus preempting local zoning authority over such facilities. *See* Neighbors v. Connecticut Siting Council, No. CV 960557602S, 1996 WL 409320, at *1 (Conn. Super. Ct. June 18, 1996).

202. Sprint Spectrum v. City of Medina, 924 F. Supp. 1036, 1040 (W.D. Wash. 1996). The temporary moratorium lasted six months. *See id.*

203. This has, in fact, recently occurred. *See* Sprint Spectrum v. Jefferson County, 968 F. Supp. 1469, 1468 (M.D. Ala. 1997) (holding that moratoria on processing applications and issuing permits for cell towers violated the prohibition clause). Recently, a federal district court suggested that a ban on a portion of a jurisdiction may violate the prohibition clause. *See* Illinois RSA No. 3 v. County of Peoria, 963 F. Supp. 732, 744 (C.D. Ill. 1997).

204. *See, e.g., supra* Parts IV.A. & IV.B.

205. This precise approach was recently taken by the United States District Court for the District of New Mexico. *See* Western PCS II v. Extraterritorial Zoning Auth., 957 F. Supp. 1230, 1238 (D.N.M. 1997) (holding that denial of PCS company's request to place antenna on a water tank has the effect of denying the provision of PCS technology to the entire region).

demonstrated by the public utility cases discussed in Part IV.D. Second, a court could place a burden on the local government to show an alternative site. If one was found, the court could reason that since an alternative exists, the provision of service has not been effectively prohibited.[206] This approach would favor affirming a locality's denial of a siting any time it can present an alternative means for the telecommunications provider to provide service. Courts that choose this approach would stray from the tone set by state court holdings that a public utility site need not be the best site.

None of the courts in public utility cases examined above deferred to the local government's judgment.[207] Courts could have decided to require placing facility sites where the locality came up with a better alternative. Little weight, however, was ever given to the locality's alternatives. Instead, courts have consistently passed on the opportunity to demand that facilities be placed at the alternative locations a local government deems best.[208] If a court applies an approach to the prohibition clause that finds no violation whenever the local government can come up with an alternative site, the court will be applying a de facto process of elimination until the government is appeased with its best alternative. However, the fact that courts have passed on the opportunity to go through such a process in past public utility cases is reason to believe courts will not do so in TCA cases. It seems more likely that they will maintain the traditional stance of relative deference to the service providers rather than taking an approach that is ultimately deferential to local governments. While courts are bound to apply the prohibition clause to specific sets of facts, they may well engage in a reasonableness test to reach results similar to those in public utility cases. Therefore, local governments may be hard pressed to convince a court to allow their denial in favor of alternative sites.

If courts choose to stray from typical public utility case approaches in applying the prohibition clause, local governments are still not guaranteed success. Even if courts are willing to find that there is no effective prohibition where an alternative site is possible, there simply may be no alternative sites for a locality to suggest. This is true because as cell sizes shrink so does the possible area within the cell where an antenna can be placed.[209] This situation could arise where the entire area identified as feasible for antenna placement falls within zones that are unsuitable for towers, or where there is difficulty in acquiring land or permission to construct a tower in alternative sites. The

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206. However, the difficulties in making the technical determination, as discussed in Part IV.B., still exist.

207. *See supra* notes 182-98 and accompanying text.

208. *See supra* notes 182-98 and accompanying text.

209. *See supra* Part III.B.1.

bulk of permit denials may involve requests to build towers in residential areas because they are the strictest zoning category and are probably the most incompatible with antennas. If the applicable radius around the optimum location falls entirely within the residential area, there may be no other feasible location for the locality to suggest. This situation is not farfetched considering the decreasing size of cells. Thus, even with this generous interpretation of the prohibition clause, local governments may be powerless to exercise their authority over siting personal wireless communications facilities.

CONCLUSION

Uncertainty is all we can expect about how courts will apply the prohibition clause of section 704 of the TCA. Application will depend on both statutory interpretation and judicial approaches to potential alternatives. If courts take the view that the clause only applies to total bans on cellular towers, their task will be straight-forward and localities will retain much of their siting power. If courts apply the clause to narrower regulatory actions, a more complicated judicial review and greater restraint of local powers may follow. If parallel public utility cases are a reliable guide, courts will continue to give deference to service providers, and local government's best judgment will not prevail. The risk of this approach is that over the next decade, the placement of approximately one hundred thousand wireless communications facilities will be guided more by industry engineers than by local planners. Some traditional local zoning tools, however, appear to remain unfettered by the TCA.

Traditional conditions on development such as height, setbacks, screening, and lot size, to the degree that they are reasonable, may be the local government's only reliable tool to regulate personal wireless service facilities.[210] While these tools may be effective in easing safety and some aesthetic concerns, they will not mask the reality of towers looming overhead at heights of twenty-five to two hundred feet. Some newer strategies such as co-location[211] and pre-determination[212] may provide effective ways for local governments to guide the placement of cellular towers. However, cooperation

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210. This is true despite the fact that height restrictions will likely have to be flexible. *See* Gregory & Martin, *supra* note 4, at 3.

211. Co-location means that a number of different providers are encouraged or required to locate their facilities together in the same place or on the same towers. *See* MILLER, CANFIELD, PADDOCK & STONE, P.L.C., *supra* note 15, at 16-17.

212. Pre-determination of sites entails identifying and mapping appropriate facility sites in the community and working cooperatively with the cellular industry to agree to the siting plan. *See id.*

of service providers cannot be expected. Strategies such as these may also be subject to scrutiny under the prohibition clause.

Courts should be cautious about treating telecommunications companies as deferentially as public utilities. Public utilities are treated with deference because they provide essential services and operate under a mandate to provide their services. While telecommunications companies also operate under a mandate to provide service, the necessity of their service differs from those of public utilities. Telecommunications services, though growing in demand, do not necessarily serve the public welfare nor the general public as water, electric, or natural gas services do. Unlike the regulated monopoly atmosphere in which traditional public utilities operate, the TCA has incited a deregulated contest among telecommunications companies to consume as much of the market, as quickly as they can. And while the intended benefit to consumers is lower prices, the unintended consequences for communities may be a landscape haphazardly peppered with towers placed there by the ravenous hands of industry.

Gregory Tan