Incentive Zoning and Environmental Quality in Boston's Fenway Neighborhood

By

Joshua DeFlorio

BA, English and American Literature
Brandeis University
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Author_____
Department of Urban Studies and Planning
18 May 2007

Certified by _____
Professor Michael Flaxman
Department of Urban Studies and Planning
Thesis Supervisor

Accepted by_____
Professor Langley Keyes
Chair, MCP Committee
Department of Urban Studies and Planning

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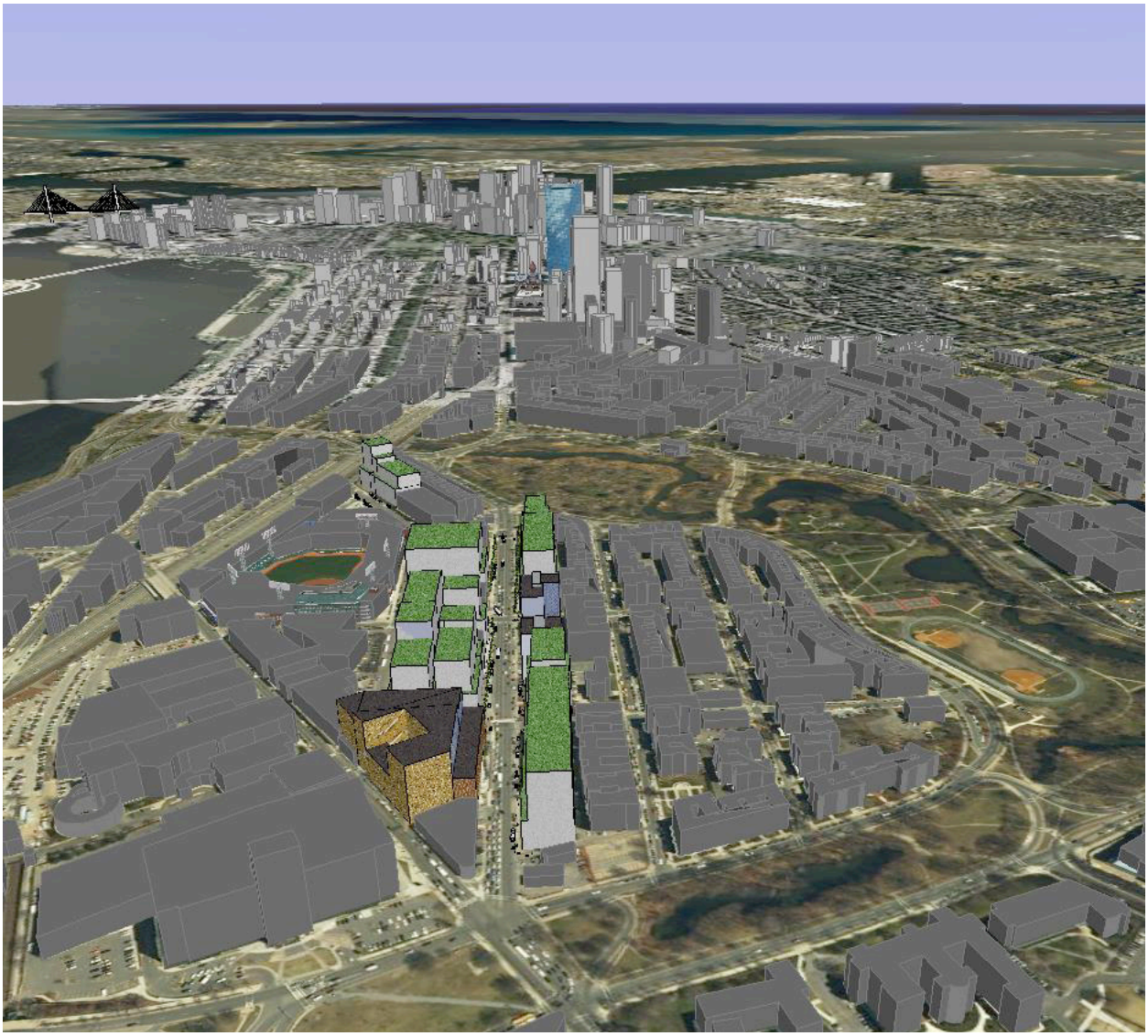

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ABSTRACT

A density bonus, also called incentive zoning, is a conditional liberalization of zoning regulations, allowing a real estate development to exceed as-of-right density limits in exchange for the in-kind provision or purchase of a public amenity, often affordable housing or public open space. I explore employing LEED certification, an increasingly well-known proxy for environmental quality, as the density bonus amenity. In theory, the idea is to link profitable real estate development with environmental sustainability. In practice, my primary interest is in the tradeoffs between the perceived burdens of greater density and the potential benefits of enhanced environmental quality.

I begin by examining the economic, public policy, and legal underpinnings of the density bonus idea, followed by a consideration of bonus calibration methods in current use, and determine that none adequately accounts for the public's valuation of density bonus amenities. In response, I explore the applicability of public valuation methods employed in the fields of environmental and real estate economics, before turning to scholarship on public participation for guidance. In the second section, with the fundamentals of incentive zoning better defined, I add LEED to the mix. Employing LEED as a bonus amenity/public benefit has the potential to yield, I argue, a closer alignment of the benefits and burdens of development by reducing the local, regional, and global environmental impacts of buildings. This promise, however, is realizable only with an appropriate deliberative process.

To place my proposal in context, as well as introduce some of the many real world difficulties it would undoubtedly encounter, I examine a hypothetical LEED Density Bonus tailored to Boston's Fenway neighborhood and Boston's existing zoning and development review procedures. My specific target is the under-utilized, auto-oriented upper Boylston Street corridor, which has long been viewed as a planning challenge by the city and a burden by the adjacent Fenway neighborhood. I conclude by visually simulating the build-out of three different LEED bonus scenarios on Boylston Street.

Thesis Supervisor: Michael Flaxman
Title: Assistant Professor, Department of Urban Studies and Planning

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Thanks are also due to my Fenway neighbors, and especially to the Board and staff of the Fenway Community Development Corporation. It has been a privilege to work with you all. Marc Laderman, past President of FCDC and former Fenway Planning Task Force representative—and a good friend—reviewed my Fenway chapter, and contributed to it with his own neighborhood-based scholarship (all errors are, of course, my own). I thank him and promise we will put down an offer any day now. Special thanks goes to the 2004 World Champion Boston Red Sox for making the Fenway the happiest place on earth one night in late October—when Boylston Street became a playground instead of a thoroughfare.

To my family (here and gone), including Sarah and Wally, Ben, Melody, Donny, Lucky, and especially my parents, I am, of course, eternally grateful. But you knew that already. So, to avoid making this into some kind of Academy Award acceptance speech, just know that you all have my thanks and love.

"The mediator between the mind and hands must be the heart."

-Metropolis (1927)

Introduction

In the United States, local governments often struggle to mediate between the capture of private investment dollars and the provision of public benefits. The resulting tension is especially apparent in the arena of land use and development. Often, developers allege that strict zoning is detrimental to project economics, stifling investment, while citizens charge government with pandering to developers instead of attending to public needs. For this problem there exists no solution, *per se*; the role of government in both the regulation of development and the provision of public benefits is controversial and will continue to be (Mandelker 2001). Without entering that thorny debate, my normative stance—and the underlying assumption of this thesis—is that American institutions of government must judiciously employ their legally and legislatively enabled tools in order to generate public benefits from private sector development without trodding unduly on property rights or choking off private investment.

Disputes over the role of government in urban growth and real estate development have, for the most part, been disconnected from concurrent debates over the effects of business, industry, and individual behavior on urban environmental quality, regional pollution, and global sustainability. Many argue that our collective health, our environmental resources, and even our global natural systems are in jeopardy. Others evince concern that environmental laws will inhibit local or national economic growth and competitiveness, stunting investment and job creation.

This thesis, however, connects the issues of development control and—in a limited, but nonetheless significant sense—environmental quality by focusing on a particular tool of government that, I argue, offers both demonstrated and latent potential for providing public benefits while encouraging investment: the development density bonus, also called incentive zoning. The density bonus is a conditional liberalization of zoning regulations, allowing a real estate development to exceed as-of-right density limits, often expressed as a maximum Floor-Area-Ratio (FAR),[1] in exchange for the in-kind provision or purchase of a public amenity, often affordable housing or public open space. More colloquially, the density bonus allows for a bigger building or more dwelling units per acre, with the required public benefit either included on-site or off-site. I explore employing LEED certification, an increasingly well-known proxy for environmental quality, as the density bonus amenity. In theory, the idea is to inextricably link profitable real estate development with environmental sustainability. In practice, my primary interest is in the tradeoffs between the perceived burdens of greater density and the potential benefits of enhanced environmental quality.

Although the density bonus is now a relatively common tool, particularly in urban zoning systems, it has received little attention from scholars or practitioners in the past two decades. While at least one of those scholars, lawyer-planner Jerold Kayden, views the density bonus primarily as a "market-driven incentive" (1992, *566*), incentive zoning is also animated and enabled by public policy, legal precedent, administration, and master planning—in addition to economics. Therefore, before delving into the additional complexities

1. Floor-Area-Ratio is derived by dividing the gross (or, occasionally, net) square feet of a building by the total square footage of the parcel in which it sits. A 100,000 square foot building on a 10,000 square foot parcel, for instance, yields an FAR of 10. FAR is typically paired with a series of dimensional controls—such as height, front, side or rear setbacks, and upper floor stepbacks—and sometimes a design review process in order to better control the final massing and aesthetics of a building.

entailed by specifying LEED as the bonus amenity, I will examine these key facets discretely, at first, in order to clearly distinguish the fundamental workings of each. I continue by detailing the various bonus calibration methods in current use, and determine that none adequately accounts for the public's valuation of the density bonus amenity (as opposed, simply, to the monetary value of a given amenity). In response, I explore the applicability of public valuation methods employed in the fields of environmental and real estate economics, before turning to scholarship on public process and consensus building for guidance.

With the nature—and drawbacks—of incentive zoning better defined, I add LEED to the mix, a bonus amenity unfamiliar to local governments.[2] The environmental benefits of green building, particularly under the LEED banner, have been extolled by the public and private sectors alike, and yet most local sustainable building provisions remain completely voluntary and un-incentivized, even among progressive cities like Seattle and Portland, Oregon, both of which have adopted advanced LEED standards for city sponsored public projects. Employing LEED as a bonus amenity/public benefit has the potential to yield, I argue, a closer alignment of the benefits and burdens of development by reducing the local, regional, and global environmental impacts of buildings. This promise, however, is realizable only with appropriate deliberative process.

To place my proposal in context, as well as introduce some of the many real world difficulties it would undoubtedly encounter, I examine a hypothetical LEED Density Bonus tailored to Boston's Fenway neighborhood and Boston's existing zoning and development review procedures. My specific target is the under-utilized, auto-oriented upper Boylston Street corridor, which has long been viewed as a planning challenge by the city and a burden by the adjacent Fenway neighborhood. I conclude by visually simulating the build-out of three different LEED bonus scenarios on Boylston Street and by setting out recommendations for the further analysis of impacts.

It is my intention to employ sufficiently simple and transparent research, methods, and assumptions in order to allow for useful extrapolation to other urban districts seeking to mediate between the seemingly incompatible interests of development and the environment. Ultimately, I hope that my findings—and even my inevitable uncertainties—serve to stimulate the interest and action of local governments in formulating LEED incentive zoning ordinances tailored to their own social, regulatory, and environmental contexts.

2. Arlington County, Virginia and Acton, Massachusetts are the notable exceptions. (As of May 2007, Bar Harbor, ME, Portsmouth, NH, and Nashville, TN had also adopted LEED bonuses).

Chapter 1: Bonus Fundamentals

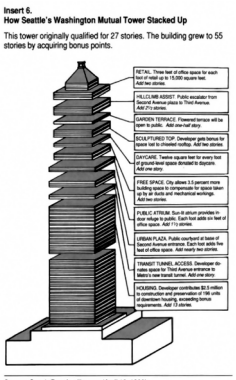
1.1 A Brief History of Incentive Zoning

The density bonus debuted with New York City's 1961 Zoning Resolution,[1] that ordinance's first comprehensive rewrite since 1916.[2] It was one of several innovative, second-generation development control tools spawned by the New York City Planning Department at that time.[3] The initial goal of the bonus was to provide for public open space, mostly in the form of hardscape plazas, in an effort to compensate for the termination of the multiple, "Ziggurat"-style stepback requirements dictated by the 1916 ordinance. Although a 20% FAR bonus was formally instituted (Barrett 1973), in practice, the bonus was negotiated *ad hoc* for each project (Lassar 1989), which resulted in inconsistent urban design, disconnected open space, and often poor administration and maintenance (Kayden 1977). In 1982, specific criteria were established (I.e., as-of-right bonuses were instituted) and developers were required to post a performance bond (and an "open space" plaque) in order to ensure effective enforcement (Lassar 1989). New amenities were added to the bonus schedule, including the provision of subway stations (Columbus Circle, for instance) the preservation of certain historic theaters, and retail space. Major bonus projects were made subject to the Uniform Land Use Review Process (ULURP), allowing the Planning Department to retain final discretion as to the acceptability of project impacts.

Plaque designates bonused public space in New York City.

New York City Open Space Plaque (Lassar 1989)

In the 1970s and 1980s, many American cities, large and small, followed New York's lead. San Francisco established its bonus ordinance in 1971 with a broad schedule of incentives, and, after complaints of so-called "Manhattanization" (incredibly tall, densely packed buildings) arose, dismantled the program in 1984 (Getzels et al. 1987).[4] Seattle, too, encountered unintended impacts in instituting its density bonus regulations; in the mid-1960s, the first-generation system—without caps on height or density—begot a 76-story tower popularly dubbed the Darth Vader building, in reference to its imposing black glass façade (Lassar 1989, *21*). Seattle's second-generation incentive zoning ordinance, adopted in 1985, added caps and placed limits on how many of the 28 possible amenity bonuses could be exercised cumulatively, or "stacked." Nonetheless, the program's test case project, the Washington Mutual Building, managed to literally double in size (from 27 stories as-of-right to 55 stories under incentive zoning), by



Source: *Seattle Post-Intelligencer* (April 18, 1988).
Based on original art by Duane Hoffman.

Seattle's stackable bonuses (Lassar 1989).

1. Barrett (1973) indicates that Chicago considered instituting a density bonus provision in the late 1950s, but the effort was (like this effort) experimental in nature. In 1972, John Costonis reported on a bonus system called "The Chicago Plan," designed to preserve urban landmarks (cited in Barrett 1973). By 1988, however, planning officials in Chicago were consulting with New York City and San Francisco in an effort to develop a comprehensive density bonus system (Lassar 1989).
2. This was the United States' first comprehensive zoning ordinance. Boston's own comprehensive zoning regulations were adopted in 1924 (Barr 1997).
3. The concepts of "Floor Area Ratio" (FAR) and "special district zoning," for example, were developed for the 1961 Resolution.
4. The famed Transamerica building, for instance, is the product of a density bonus, and at over 700-feet tall, is more than double the underlying height limit of 360 feet (Barrett 1973).

aggressively providing several bonus amenities, including 13 stories for 196 units of housing, two stories to compensate for unoccupiable mechanical space, one story for a 22-child daycare,[5] and two stories for a sculptured roof (Lassar 1989).

Boston has never made density bonuses, *per se*, a particularly prominent feature of zoning, either downtown or in neighborhood districts, but has nonetheless pursued the idea in various permutations over the years. In 1973, consultant David Barrett delivered a report to the Boston Redevelopment Authority[6] (BRA), entitled *Incentive Zoning for Boston*, in which he explores the concept in light of the city's prevailing zoning regulations and commercial real estate market. Barrett bases much of his analysis on the experiences of New York and San Francisco, and on balance is optimistic about applying the concept in Boston, stating that incentive zoning would likely "evolve from an innovative, experimental technique to become a component of the zoning controls of most major American cities" (*32*). He was correct in that presumption, but not for Boston, which reserved the technique for buildings abutting open space[7] and providing off-street parking in the downtown. More recently, incentive zoning has been employed on a broader scale for the purpose of housing creation, including affordable housing, which I discuss in more detail in the following chapters.

Barrett outlined five "Prerequisites for Success" for the institution of incentive zoning in Boston: 1) Legality, 2) Development pressure, 3) A plan with appropriate objectives and means, 4) Workable, equitable procedures, and 5) Effective administration. While many of Barrett's specific points have been rendered moot or outmoded by the intervening 35 years of planning practice (he fails to mention, for example, public interest or public process), I find the general framework to be quite useful and employ the individual categories loosely throughout this thesis. The "development pressure" and "effective administration" requirements remain generally applicable, but a whole wealth of zoning law, for instance, has since validated the concept of incentive zoning, the idea of "equitable procedures" has now taken on a new, more citizen-friendly set of connotations, and, with this thesis, I pair a relatively novel "objective" with what is now a reasonably conventional "means"—hence, the LEED Density Bonus. Almost 50 years after the density bonus first linked real estate economics with the provision of public needs, a serious consideration of real estate development's relationship to our collective need for local, regional, and global environmental quality is well past due.

1.2 The Policy Mechanism

Following Deborah Stone's intuitive tools of government framework (from *Policy Paradox* 1997), traditional zoning can be classified as a fairly rigid system of "rules," or equivalently, as a "command-and-control" mechanism (Kayden 1992). A rule is one of the fundamental building blocks of any policy. Not only does a rule set behavioral boundaries, it conveys the message broadly, precluding the need to explain the boundaries (or worse *negotiate* the boundaries) to each individual to whom they apply. A zoning ordinance is in force

5. By my back-of-the envelope calculation, this bonus bequeathed almost 1000 gsf per child. Lassar reports that most children enrolled in the daycare belonged to office workers on the upper floors, which, as a useful amenity for building occupants, would likely have contributed to the project's profitability even without the extra floor.
6. The City's planning and economic development agency.
7. See, for example, the 1960s era residential buildings across from Boston Common.

over all land within a municipality or county, its statutes recorded in a publicly accessible document. There is no need for each individual to interface directly with a government official to ask, "what are *my* rules?"

By eliminating most individual negotiations (or conditioning them, at least), zoning helps ensure equal treatment: "one reason not to give officials power to decide citizens' fates is that individual discretion will inevitably lead to like cases being treated differently" (Stone 1997, *286*). If a zoning law, or any other government rule, is considered unjust it may be overturned by the courts,[8] a subject I will treat in a subsequent section. Moreover, in establishing equality, the zoning ordinance greatly increases predictability as well, a factor of significant importance to the development community. Particularly for complicated projects, a few gray areas will remain, mostly in reference to intended violations of zoning ("will they grant my variance?"), but in most development projects, much more is predetermined than left to chance.

To be effective, a rule must have a system for evaluating compliance and punishing violations. In order for a developer to obtain a building permit, zoning officials or building inspectors must evaluate the project specifications to ensure compliance. As for violations, woe to the party that ignores the rules or fails to obtain approvals before building.[9] By Stone's criteria, zoning may be more successful than most rules: "Although the threat of sanction is always present," she posits, "rules are intended to induce compliance without the necessity of invoking coercive sanctions for every action they govern" (1997, *283*). As opposed to other "police-power" rules, zoning would appear to have a low violation rate and requires punishment relatively infrequently, perhaps because if cheating occurs it is probably deliberate, the evidence of cheating is permanent and visible, there is a relatively low volume of applications (allowing greater scrutiny for each case), and neighbors function as *de facto* compliance officers, using the tools of law and government to prevent unacceptable nuisances and inequalities. Rules prohibiting murder, speeding, or tax evasion, for example, have few of these benefits.

Like most rules, the inherent tension in zoning rules is between precision and flexibility.[10] Generally, as Stone reasonably submits, "precise rules cannot be sensitive to some kinds of individual and contextual differences, so that, inevitably, different cases will be treated alike" (*287*). This means equal treatment for unequal cases, which is not, of course, the type of equality protected by the Constitution or desired by developers. The standard variance[11] offers limited flexibility when real property presents obstacles to development (and thereby prevents more than a few takings claims), but the variance is not a remedy that is intended to apply to economic hardship, unaccommodated uses or forms, or unanticipated changes in cultural preferences, building technologies, or environmental circumstances. "[P]recise rules," says Stone, "are good for only short periods of time and usually lag behind changes in circumstances and goals," and ultimately, "precise rules stifle creative responses to new situations" (1997, *288*). Incentive zoning, specifically the zoning bonus,

8. Or, if the rule is simply widely despised, but not illegal, its framers are always subject to replacement through the elective process.
9. Even in the days before comprehensive zoning, a violation of one the few restrictions on development could be punished with crushing sanctions. Consider the (ironic) case of the precursor to Boston's 790 ft. John Hancock Tower, which came in two stories too high. It was simply required to remove the stories in violation (Whitehill and Kennedy 2000). More recently, when Independence Wharf (also in Boston) began construction without permits, the developer was required to create a public observation deck as punishment/mitigation.
10. "rules are in constant tension between precision and vagueness, between centralization and discretion" (Stone 1997, *294*).
11. "rules always contain escape hatches" (Stone 1997, *296*).

was introduced (in New York City) specifically to provide remedy for a zoning ordinance that, by itself, lacked the flexibility to accomplish complex urban planning objectives.[12]

Incentive zoning, my mechanism of choice for ensuring flexibility (among other goals) is formulated as an inducement (in that the intention is to induce, rather than force, an outcome). Inducements, Stone suggests, are anchored on a platform of rules, and cannot function independently. For a density bonus to succeed, the underlying, "as-of-right" zoning, *must* remain rigid and inflexible, within reason. If zoning officials were known to grant *any* variance, with or without cause, then the power of inducements would be compromised and the program would be rendered wholly ineffective.[13] The zoning bonus, in other words, is a non-starter without a base of fair, solid rules in the form of traditional zoning.

Inducements, whether positive or negative, serve as an attempt to align the goals of individuals with those of the broader community. They function by attempting to "alter the consequences of individual actions so that what is good for the community is also good for the individual" (Stone 1997, *264*). A density bonus, very simply, offers the developer a benefit—most often additional density—in exchange for the provision of a public amenity or benefit. The particulars of this exchange are often complicated and the proportionality of benefits and impacts is in many cases murky—but the *quid pro quo* concept is simple. Even traditional zoning "rules" have built-in, implicit inducements, albeit of a less amicable nature: meet standards x, y, and z and successfully secure a permit, or else return to the drawing board.

Finally, positive inducements are particularly conducive to political relationship building,[14] which stems again from the alignment of interests: incentive zoning leads to a "complex, symbiotic relationship" between landowners and government, "in which growth is conditioned upon development 'in the public interest'" (Lassar 1989, *6*, quoting Donald Elliott). Suppose, for example, in following the guidelines of a voluntary inclusionary zoning ordinance,[15] a given developer provides additional affordable residential units in exchange for the city's permission to build more total units. The developer, if he takes the deal, expects to generate additional profit, the mayor takes credit for spurring the creation of much-needed affordable housing, and both parties enter into the transaction feeling well disposed toward the other. If providing affordable housing is not in the developer's better interest, no extra housing is built and no extra FAR is conferred, so while no one is likely to feel triumphant, no harm is incurred either. Therefore, "there is little opposition from developers because they can choose whether or not to use the bonus system," and are in fact likely to greet the system as "a welcome change from the customary regulatory system, which usually restricts development" (Getzels et al. 1987, *1*). Incentive zoning, if formulated fairly and executed faithfully (points I will return to throughout this thesis), is potentially a prime opportunity to create trust and encourage greater communication between the development community and city hall. City hall and the personalities within, of

12. This is not to say that those objectives were accomplished without qualification (Kayden 1977).
13. A developer is highly unlikely to trade for the specified amenity if he can sidestep the ordinance at the appeals board.
14. "Rewards and punishments, or promises and threats, can foster different kinds of political relationships" (Stone 1997, *270*).
15. Inclusionary zoning provides for affordable housing, either by mandate (in Boston, accomplished through Mayor Menino's 2000 Executive Order) or by inducement (an affordable housing bonus). For residential projects on Boylston Street, an effectively mandatory provision grants a bonus of 1.5 FAR for complying with the Mayor's order.

course, wield authority granted by the citizenry, and thus have an obligation to discern, and then act in, the public interest, a topic treated in depth in the following chapter.

1.3 Legal Basis

Zoning, and therefore incentive zoning, is a right grounded in the police power, a power delegated to local governments, as "creatures of the state," by state legislatures. As such, the powers of local governments are strictly limited to those proffered by the state, and no expansion of authority can occur without state legislative approval—in fact, although rarely in practice, the state can retract any land use power if it sees fit.[16] The transfer of authority from state to local governments is accomplished through an "enabling act,"[17,18] a statute that, in most states, is written vaguely with the intention of broad interpretation (Mandelker 2001).

The police power is an Anglo-American concept defined as the "capacity of a state to regulate behaviors and enforce order within its territory" (Encyclopedia Britannica 2007). In the United States, its expressed purpose is typically formulated as "protection of the public health, the public morals, or public safety," which Justice Brandeis, in a famous early land-use decision, summed up as "to protect the public from detriment" (Mandelker 2001, *74-83*). Police power is widely viewed as an inherent right; it does not require explicit inclusion in a state's constitution—although, as suggested by Justice Stevens in the recent *Kelo v. New London* case,[19] aspects of it can be deliberately constrained though state constitutional amendments.

Before the institution of zoning laws, the police power was exercised in land-use contexts largely though nuisance law, a precedent reflected in the United States Supreme Court's first zoning case, *Village of Euclid v. Ambler Realty Co*. Previously, the Supreme Court of Ohio, in a fiery decision, had held that zoning was based on "a mistaken view of what is property and of what is police power," explaining that, "there can be no conception of property aside from its control and use, and upon its use depends its value," 297 F. 307, 313-16 (N.D. Ohio 1924). The Ohio court therefore held that zoning constituted a taking without compensation, and was therefore facially unconstitutional. The US Supreme Court, however, reversed, determining that the local legislative body, "presumably representing a majority of [Euclid's] inhabitants and voicing their will," had enacted a law that, in their judgment, bore a "reasonable relation to the health and safety of the community," 272 U.S. 365 (1926). Zoning, in other words, was in principle found to be a legitimate exercise of the police power, and a tradition of deference to local legislative bodies and their designated agency representatives in the determination of which land uses are (and are not) in the interest of the public welfare in a given context, was established.

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16. Vermont Act 250, a centralized review process for large-scale projects passed in 1970, is a good example of such a retraction.
17. Boston's enabling act (1956 Mass. Acts 665) is different from M.G.L. Chapter 40A, which is in effect for the Commonwealth's other 350 cities and towns.
18. While all states have enabling acts, most promulgated on the federal government's 1926 template ("Standard Zoning Enabling Act (SZEA)," about half of the states authorize zoning through "home rule" provisions in their constitutions (Mandelker 2001). In effect, home rule (also called devolution) grants local governments the authority to enact laws without specific enabling provisions from the state as long as local rules do not contradict state laws and are constitutionally sound.
19. "We emphasize that nothing in our opinion precludes any State from placing further restrictions on its exercise of the takings power," 545 U.S. 469 (2005).

In its Euclid holding, however, the Court added the important qualification that, "should the provision set forth in the [zoning] ordinance … come to be concretely applied[20] to a particular premises … some of them, or even many of them, may be found to be clearly arbitrary and unreasonable." Two years later, in *Nectow v. City of Cambridge*, 277 US 183 (1928), a decision also rendered by Justice Sutherland, the Court held that the zoning ordinance, as applied to the plaintiff's property, was not properly related to "the health, safety, convenience, and general welfare of the inhabitants of the part of the city affected." The ordinance was therefore found to deprive the landowner of his property without due process, a violation of the Fifth and Fourteenth Amendments. Despite the general respect accorded to local legislative bodies in the execution of land use related police power, the Court had sent a clear message that an arbitrary, unreasonable, and unfair ordinance was constitutionally unacceptable. The Court was silent on the zoning issue for the next 46 years, leaving state courts the "task of applying the constitutional test of reasonableness" or rationality (Mandelker 2001, *199*).

Zoning and other land use regulations have since been challenged, both facially and as-applied, under three general tracks of constitutional law: due process, equal protection, and, most importantly for this thesis, takings or inverse condemnation. Whereas government's uncompensated physical occupation of even a minute amount of a private landowner's property obviously constitutes a *per se* taking,[21] as does the denial of "all economically viable or productive use" of property,[22] of greater interest in the context of this thesis is the more nuanced regulatory taking. A variety of "tests" have been developed by the courts over the years in order to try to standardize regulatory takings determinations, although, as Justice Brennan stated in *Penn Central Transportation v. City of New York*, 438 US 104 (1978), many cases amount to "ad-hoc, factual" inquiries. Brennan's three-prong *Penn Central* test is the prevailing standard:[23] A taking may have occurred if the economic impact of the regulation is severe, the regulation "interfere[s] with distinct investment backed expectations," and/or the character of the action is deemed to deprive the claimant of significant property rights (the right to exclude others, for instance[24]).

Penn Central also reaffirmed, in a land-use context, the Court's view that the legislative body has the right to adjust "the burdens and benefits of economic life," and that it does so with "a presumption of constitutionality," with the burden of proof "on one complaining of a due process violation to establish that the legislature has acted in an arbitrary and irrational way."[25] As Brennan stated, "[l]egislation designed to promote the general welfare commonly burdens some more than others," and is unconstitutional only if the "severity of the impact" is especially unfair to a particular party—if, in other words, an individual is solely or grossly disproportionately made to bear the costs of providing a benefit to the general public. In *Johnson v. Edgartown*, 425 Mass. 117, 680 N.E.2d 37 (1997), the court expressed approval of this principle by stating

20. *Village of Euclid v. Ambler Realty Co.* was not an "as-applied" challenge because Ambler Realty had not exhausted its opportunities for administrative relief. Rather, the assertion was that zoning was fundamentally unconstitutional, amounting to a "cloud upon the land" as a whole, not just the site in question.
21. See *Loretto v. Teleprompter Manhattan CATV Corp*. 458 US 419, 433 (1982).
22. *Lucas v. South Carolina Coastal Council.* 505 US 1003 (1992).
23. Having been recently affirmed in *Lingle v. Chevron USA*. 544 US 528 (2005).
24. See *Dolan v. City of Tigard*. 512 US 374 (1994).
25. *Usery v. Turner Elkhorn Mining Co.*, 428 U.S. 1 (1976). J. Marshall writing for the majority.

that a by-law whose "reasonableness is fairly debatable will be sustained," or, in other words, that "the challenger must prove by a preponderance of evidence that the zoning regulation is arbitrary and unreasonable, or substantially unrelated to the public health, safety, morals, and general welfare."

Of course, zoning affects not only would-be developers, but also abutters and potentially other neighborhood residents. To challenge a rezoning or a zoning approval, the party bringing suit must have "standing." For a third-party to establish standing, "the plaintiff must show some 'special' damage flowing from the zoning approval that is different from the damage suffered by the general public" (Mandelker 2001, *214*). Assuming standing, the plaintiff must then prove that the zoning decision is unduly injurious to a neighborhood or detrimental to the public welfare. In an as-applied flexible zoning[26] case in Boston, *Manning v. Boston Redevelopment Authority* (BRA), 400, 444 Mass; 509 N.E.2d 1173 (1987), the SJC ruled that the BRA had the "responsibility to weigh adverse effects of development projects against their benefits, and then determine whether, on balance, the proposed project would be injurious to the neighborhood or detrimental to the public welfare" (*452-454*). This verdict offers a reaffirmation of Justice Marshall's statement in *Usery* that governmental authorities are entitled to exercise reasonable discretion in adjusting "benefits and burdens," even in land-use cases involving significant impacts. Particularly if a flexible zoning provision is buttressed by proper planning and public process (the referenced development was approved by a mayor-appointed Citizen Advisory Group or CAG), the local legislative body or planning authority is given the benefit of the doubt.

Incentive zoning, like traditional zoning, is also animated by the police power, and is therefore held to the same standard of promoting the health, welfare, safety, convenience (in Boston's Enabling Act), morals, *et cetera* of the public. Legal exposure from an incentive zoning ordinance is inherently limited[27] because "incentive zoning is an elective rather than mandatory provision"—if a developer opts not to seek the additional FAR conferred by a density bonus, he remains entitled to develop as-of-right (Getzels et al. 1987, *14*). As a *voluntary* provision offering conditional relief from baseline zoning, the density bonus is virtually immune to *per se* takings: the density bonus, or even the failure to achieve one, is not economically detrimental (as-of-right land is not devalued), nor does it frustrate investment-backed expectations because developing to as-of-right standards remains a viable option—which is all a developer could reasonably expect in the first place. The character test, even given the most nefarious formulations, is also essentially inconsequential; if an incentive zoning provision offers extra FAR in exchange for, by way of absurd example, "public access to every room of the building, at all hours," completely extinguishing the right to exclude, then the developer is free to scoff and continue the project using baseline zoning. With no independent ability to force the surrender of *any* property rights, the density bonus simply cannot be held to constitute a taking.

Nonetheless, there are two issues of genuine concern from a legal standpoint, one of which concerns the baseline condition. Absurdly restrictive underlying zoning, such that reasonable development rights are

26. In this case, a Planned Development Area, defined as an "overlay district that … accommodates development that is appropriate to its location but is not otherwise allowed by the underlying zoning" (Barr 1997, *59*).

27. The density bonus might even reduce overall liability by serving as yet another source of potential remedy, alongside the variance (Janet Stearns, attorney-at-law, 8 March 2007. Personal communication.).

extinguished, might bring takings challenges (although the crux would be as-of-right zoning, with incentive zoning providing possible evidence of an intent to deprive landowners of reasonable use) (Getzels et al. 1987, *15*). This was the contention in *Montgomery County v. Woodward and Lothrop, Inc.*, 376 A2d 483 (MD 1977). The claimants were 10 "aggrieved" property owners, whose land in a high-density Central Business District (CBD) had been significantly downzoned. Montgomery County then presented landowners with an "Optional Development Method," in effect a density bonus of two to two and one-half times base FAR in exchange for public amenities. Landowners claimed "confiscatory zoning," stating that, "so many limitations were imposed on that method of development that no use could ever be made of it," and that, as a result, they were "frustrated in the use of their property unless they apply for and submit to the exactions and limitations required for development under the optional method." The court rejected this argument, holding that the downzoning was "reasonably related" to the exercise of the police power and that, while significantly devaluing the properties in question, it did "not deprive the property owner of all reasonable use of his property."

The legal ramifications of conditional zoning, the granting of development rights or permits in exchange for exactions, linkage monies, or density bonuses, was further fleshed out in two landmark Supreme Court cases. In *Nollan v. California Coastal Commission*, 483 US 825 (1987), the court invalidated a statute requiring the transfer to the public of a beachfront easement in order to obtain permitting approval. It found that the condition imposed "utterly fail[ed] to further the end advanced as the justification for the prohibition." This effectively established the first prong of what would become a two-prong test, that there be an "essential nexus" between the permit condition and the public good it seeks to ensure. The second prong was added seven years later in *Dolan v. City of Tigard*, 512 US 374 (1994). This time, the conditional exaction was subjected not only to *Nollan*'s essential nexus test (which it failed), but received scrutiny under a newly-hatched "rough proportionality" prong. While eschewing "precise mathematical calculation[s]," the Court made it clear that a city imposing a development condition must make "some effort to quantify its findings" that the condition would indeed roughly offset the impacts of development. This two-part fairness test should be at the heart of attempts to "calibrate," or balance, the impacts and benefits entailed in a bonus provision.

The other issue of note is the potential for claims that the zoning authority is, through the density bonus mechanism, in effect selling development rights. Boston's linkage program, as modified by Article 26A of 1986, looked initially as though it did just that. Linkage is an opt-in provision, framed as a voluntary action, requiring that any development of 100,000 square feet or greater needing a variance, conditional use permit, text or map amendment—in short, any exception whatsoever—must pay into a city fund for affordable housing and job training in order to gain approval. The alternative, that which makes linkage technically voluntary, is to limit project size to 99,999 square feet or less, or conform fully (and in so doing potentially forfeit significant profits). Kayden (1987) examined the legality of this arrangement, and determined that it satisfied the two prong "reasonable relationship" test, which inquired whether 1) "development creates a need [or impact] that it should be asked to address," and 2) "the obligation imposed on the development is propor-

tional to the need created"[28] (*129*). Boston linkage, now over two-decades old, has thereby avoided significant legal challenges.[29, 30]

However New York City, a long-standing and prolific granter of all manner of density bonuses (sometimes dubbed "king of the density bonus"), lost an instructive, high-profile contract zoning case in the 1980s (*Municipal Art Society of New York v. City of New York*, 137 Misc. 2d 832; 522 NYS.2d 800 (NY 1987)). In a request for proposals (RFP) for the disposition of the publicly-owned Coliseum at Columbus Circle, the city required all respondents to seek a 20% density bonus (about 450,000 additional square feet) in exchange for $35-40 million in subway improvements. Based on the $40 million estimate, each additional square foot was therefore priced at $88 (or $111 assuming 80% efficiency), by any standard a major undervaluation.[31] The provision that caught the eye of the court and sealed the fate of the project was a contract clause stating that the city would refund $57 million of the purchase price if the density bonus was revoked. The court responded by invalidating the deal, stating that "a proper *quid pro quo* for the grant of the right to increase the bulk of a building may not be the payment of additional cash into the City's coffers for citywide use …. *Zoning benefits are not cash items*" (*14*, my emphasis). The City had, in other words, failed the "reasonable relationship" test. This is a primary reason why cash, although a much more precise instrument for balancing benefits and burdens, is largely avoided in density bonus statutes in favor of the blunter, but more easily defensible, provision of in-kind benefits.

Municipal Art Society protest poster (Lassar 1989).

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28. Kayden found linkage defensible particularly under the tradition of judicial deference to legislative bodies.

29. The first challenge was *Bonan v. General Hospital Corp*, 398 Mass. 315, 496 NE 2nd 640 (1986), in which the Suffolk County Superior Court struck down the linkage ordinance, stating that Boston had overstepped the bounds of its Zoning Enabling Act. The Massachusetts Supreme Judicial Court, however, subsequently vacated the decision.

30. Interestingly, the only recent challenge to linkage on record regards the distribution of funds collected under the program. In 1998, the "South Boston Betterment Trust" was established to funnel linkage monies from waterfront development to the neighboring, predominantly white South Boston neighborhood (Evans, Micah Ian. 2001. *The Convention Center as Catalyst for Investment and Development on the South Boston Waterfront*. Unpublished Master's Thesis, UMass Boston). By 2000, civil rights attorneys had reached a settlement with the city that effectively invalidated the agreement in order to avoid depriving more racially diverse neighborhoods of needed housing funds (Lawyer's Committee for Civil Rights under Law of the Boston Bar Association 2007). This means that the city as a whole is the smallest unit for assessing impacts under the linkage program, which is correct based on my reading of Kayden's analysis: citywide housing scarcity is created in part by workers who move to the city to reap the advantages of close proximity between their places of work and residences.

31. While the building in question was never built, the Time-Warner Center, built in its place in 2004, provides some standard of comparison. Its current value of $1.1 billion (Chan, Sewall and Rivera, Ray. Property Values in New York Show Vibrancy. *New York Times*, January 13, 2007) for approximately 2 million gross square feet, which works out to be about $550/gsf or $688/nsf. Assuming a completion in 1991 (if it had not been enjoined), this value would be equivalent to $500/nsf (this calculation uses CPI and, of course, does not account for fluctuations in the real estate market, which may be significant). This admittedly rough calculation reveals an under-pricing of about $389/nsf, or about $140 million (this means that the developer could compensate the city up to the amount of $140 million and still break even on the bonus). Given that New York tended to apply a bonus factor of up to 200% as an inducement to developers (Barrett 1973), and thus would have offered a bonus worth up to $114 million for $57 million in compensation, the math is close.

1.4 The Economics of Zoning Laws[32]

With the issue of fair value exchange now established as integral to the density bonus, it is necessary to consider the mechanism's economic underpinnings. This thesis draws heavily from an economic theory of zoning that treats publicly-held development rights (or entitlements) as potentially exchangeable assets, a perspective that, while established in the literature of zoning economics (Fischel 1985; Levine 2006), benefits from explanation. This framework, often referred to as the "property rights approach," considers zoning (and other land-use regulation) as the initial allocation of development rights/entitlements between private parties and the public collective.[33] As-of-right entitlements (the right to develop) are viewed as being "vested" with private landowners, and the remaining entitlements (effectively the right to *exclude* development) are held by the collective, as represented by local government.

It is useful to review how individual property owners within a particular municipal jurisdiction might benefit from the local government's retention of development rights, most often through strict zoning (Fischel 1985). The primary monetary value of zoning is embodied in its power to protect, and even enhance, the investments of property owners *who have already exercised their development rights* (I.e., built out their parcels) by excluding undesirable, value-reducing uses, forms, or impacts—nuisances or harms—from neighboring parcels. This entails a collective decision to limit the value (by constraining the height, density, and use) of individual properties by restricting entitlements in order to stabilize (and, over time, sometimes escalate) property values within the zoning jurisdiction (Fischel 1985[34]). Especially in a simple, relatively homogeneous suburban community, the zoning ordinance will likely distribute entitlements in such a manner that new, as-of-right development must closely resemble the form and use of existing development—excluding all other forms of development. The problem, of course, is that otherwise desirable[35] projects that happen to require legislatively restricted entitlements "may not happen because [of] significant impediments to the trading of development rights" (Levine 2006, *60*). In other words, in most communities, once development rights are allocated to the collective through zoning, have no expedient, legitimate[36] means by which to exchange them should the need arise.

The exchange value of development rights when under *private* control is intuitively understood in a market economy. Most basically, the fee-simple sale of private property typically confers the previous owner's development rights on the purchaser (these property rights, in this instance, are therefore said to "run with the land"). Landowners can convert these as-of-right entitlements through development, detach them for sale or donation (as with conservation easements or mineral rights), or let them lie unrealized.

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32. This section is based on William Fischel's book of the same title.
33. "Zoning," in Fischel's words, "is not really about planning: it is about legal entitlements" (1985, *36*). If planners are to agree with this proposition, it must be because planning for the distribution of legal entitlements is of crucial importance to the character of our cities and towns and to our quality of life in general.
34. "Zoning adds to the community's collective wealth" (1985, *140*).
35. "[D)evelopment whose social benefits exceed its local costs" (Levine 2006, *60*)
36. Whereas a zoning amendment is a legitimate change, it can be time consuming, open to legal challenges, potentially costly, and imprecise. A variance without a so-called real property deficiency, however, might be expedient, but is not strictly legitimate.

Private development entitlements are, in general, fully assigned and alienable—which is to say that they are fully fungible.[37] Indeed, almost every transaction involving private property involves money in some way, which serves as a precise instrument (divisible to the penny) to express the values buyer and seller assign to the object of that transaction—be it land, rights pertaining to land use or resource extraction, built square footage, etc.

For example, if I wish to build a garage on my neighbor's property, I must first purchase the land on which it will sit, which involves a transfer of title for a specified cash payment. The detachment and sale of a specified bundle of development rights from real property—for example through a covenant, conservation easement, ground-lease, or air rights purchase—is more abstract, but nonetheless generally understood. If my newly built garage cannot access the street from my property and I am forced to purchase an easement from my neighbor, I have negotiated a right of use, not of ownership. My easement, a legal entitlement, is then recorded as an encumbrance on my neighbor's deed (otherwise known as a servitude), a fact often reflected by a diminishment of overall property value.

However, whereas ownership in fee simple is traditionally said to extend to "the center of the earth" and, before the advent of air travel "to the skies" (Meiners et al. 2002, *198*), Euclidian zoning sets out finite height and density rules that, in the name of the public health, welfare, or safety, effectively limit development to a minute fraction of this broad realm—and a landowner cannot sell rights he does not possess. If my neighbor's land is fully "built out" under prevailing land use regulations he cannot sell me a ground lease to accommodate my garage on his property (or, at least it would have no value because it does not confer the rights I seek). Under the property rights approach, the remaining rights of ownership are not extinguished, but rather become collectivized within the applicable zoning jurisdiction—these entitlements, in other words, are effectively transferred to the public trust.

This is conceptually distinct from the better-known (in planning circles) Pigovian approach, in which zoning is instituted to control externalities, or public costs, and thereby correct for market failures. Whereas Pigou (1924) separates public and private costs, to property rights proponents that separation simply represents the initial allocation of entitlements. This is not to say that an externalities-based approach to land-use issues is invalid. Indeed, the typical Pigovian remedy—the institution of regulations by fair, objective, and fully-informed officials striving to create a perfect market—is the ideal in which traditional zoning is founded and carried out to this day. Nor do I claim that these theories are utterly incompatible. Like Fischel, however, I find that the property-rights approach is "more useful in focusing on the problems attendant to alternative policies" (1985, *117*)—and the density bonus, which deals fundamentally with market-driven entitlement distribution, is just such a policy.

As an example of the different mindsets undergirding these theories, consider an apartment building erected amidst a neighborhood of detached houses—a key element of Justice Sutherland's nuisance-oriented justification for local zoning in *Village of Euclid v. Ambler Realty Co*. The greater height and bulk of the

37. I.e., can be converted into cash.

multifamily structure—which combine to accommodate more dwelling units per acre and in turn generate more rent per acre—may cast an objectionable shadow on the surrounding homes. A Pigovian would label this an externality, a spillover that imposes costs on neighboring properties. To prevent this occurrence, the local legislative body might institute a regulation that prevents multi-story developments in close proximity to single-family homes. The problem—and the crux of the property rights approach—is that the prospective developer may value the benefit (marginal revenue) of increased bulk much more than neighbors value the burden (aggregate marginal cost) of the shadows. Due to imperfect information, irrationality, bias, or other faulty decision-making calculi, zoning authorities may well have *grossly* over- or under-corrected for perceived market failures—but given the rigidity of most land-use statutes, remedy is rarely available.

The property rights advocate, however, considers this zoning, however flawed, as a rule for determining initial entitlements, which, in theory, could be subsequently redistributed through a series of transactions between the affected parties. Following the Coase theorem (1960), the initial allocation of entitlements (zoning) is immaterial as long as rights are fully assigned and alienable and transaction costs are zero (which as Coase quickly notes, is never the case). The parties will assign a marginal value to each entitlement "unit" and then bargain until equilibrium is reached (until one party's marginal cost for a given entitlement is equivalent to the other party's marginal revenue for that same entitlement). While the assumptions enabling the Coase theorem are clearly unrealizable, it remains useful as an approach to considering land use regulation.

To return to the apartment example, the entitlement to additional building height[38] is a "resource … useful to both parties, but in mutually exclusive ways"—the ability to build or prohibit that extra height are two sides of the same entitlement "coin" (Fischel 1985, *91*). If zoning allocates entitlements (above those required for a single-family home) to the community, then the developer might purchase additional development rights, perhaps in the form of a "shadow easement,"[39] from each impacted neighbor.[40] If the apartment is allowed as-of-right, the neighbors might band together to pay the developer to reduce the building height or change the building's orientation or articulation, with a deed restriction recorded as a permanent encumbrance on the property. There are infinite gradations in between, depending on how entitlements are valued (and, for the collective public, by how many individuals).

Of course, this remedy I just described again involves transactions solely among individuals without the underlying stipulations of zoning to constrain choices or interfere with bargaining. I do not advocate for a pure property rights approach, in which government's primary duty is simply the enforcement of contracts and land-use is governed by a web of fungible covenants. I believe in the principle of zoning, but I also agree

38. It is useful, when translating entitlements into physical structures, to visualize each development right as a cubic square foot of construction—a building block (which encapsulates both height and FAR). An apartment with a 1000-square foot floorplate and 10-foot floor-to-ceiling heights would require the removal of 10,000 blocks to shave one story from the building in order to reduce shadows—and all 10,000 blocks would require removal (they are effectively packaged because half-story construction is impractical). It may be possible, however, to rearrange those blocks without eliminating any or many of them, to achieve the same shadow reduction.

39. This easement must "run with the land" to maintain the flexibility of the property rights approach.

40. This is in effect a vertical summing of individual costs to determine a single public cost—or, otherwise put, the social cost imposed by the externality.

with much of the criticism it attracts from landowners and would-be landowners.[41] This is where incentive zoning can help bridge the impasse. Incentive zoning, again, is a mechanism to enable entitlement exchange *wielded by the public*. It is not nearly as precise as the instruments available to private parties, but it is enabled by a municipality's statutory authority, and can therefore release otherwise restricted development rights if the action is in the public interest. Communities can guard against utterly unacceptable land-uses and exact just compensation to offset the impact of merely undesirable uses. In effect, this grafts an inducement to a rule, a property-rights approach to a Pigovian framework, and brings controlled, legitimate flexibility to an otherwise rigid system. In this capacity, incentive zoning serves dual roles as a major component of land-use control and a potentially significant tool for municipal finance.

1.5 Incentive Zoning and Entitlement Markets

Incentive zoning is a market-driven mechanism. Even the most elaborately conceived and thoroughly researched incentive zoning ordinance remains inert and ineffective until it is animated by the market: a density bonus is pointless without demand for the additional density it offers. Demand is both micro- and macroeconomic in nature, depending on global and national economic cycles, deeply ingrained cultural preferences, local and regional opportunities linked to metropolitan growth, and, at the smallest scale, neighborhood characteristics (adjacent development, park land, crime rates, retail amenities, etc.). Demand is further distinguished by asset type (residential, commercial, industrial, etc.), which is itself highly variegated; few would argue that a suburban single-family home and a downtown loft are perfect substitutes, despite the fact that both provide adequate shelter.

Regional demand is, in a manner of speaking, channeled by the patchwork of local options (tax structures, schools, amenities, environmental quality, etc.) emphasized by Tiebout (1956), with some communities' "packages" seeing healthy demand from businesses and would-be residents and others lacking substantial demand.[42] Zoning is, of course, an important element of that package (Hamilton 1975). Particularly in more exclusive suburban communities, zoning favors the existing property owner, while inhibiting the options of would-be residents or businesses (Fischel 1985[43]). I distinguish the type of value zoning seeks to cultivate for individuals as "realized," pertaining to previously exercised development rights, and thus accruing to current owners whose property is already built-out. Zoning is, in other a words, effectively a supply limitation, directly affecting how development demand for a given asset type is distributed.[44] In municipalities where demand is strong, the amount of realized value is roughly dictated by the zoning code (with state and federal

41. "The absence of specific devices to compensate neighbors for localized nuisances is a critical defect of zoning" as we know it today (Fischel 1985, *53*).

42. For example, Mattapan (among the poorest neighborhoods of Boston) and Newton, one of the wealthiest suburbs, are approximately equidistant from the Central Business District, and yet have very different demand characteristics. The package of good schools, good environmental quality, and little crime (among many other factors) generates significant demand for housing in Newton (median price, as of March 2007, was approximately $730,000).

43. "The zoning that matters to developers is the zoning of undeveloped lots" (*67*).

44. Zoning is, of course, not often explicitly considered in terms of its contribution to the collective value of entitlements, but rather deals with a community's ability to regulate the impacts of development. This angle will be explored in some depth in the following chapter.

land-use regulations also playing a role), which effectively establishes a maximum threshold of buildable square footage for a particular use. Particularly in low-density suburban and exurban communities, large lot single-family zoning and restrictions on multi-family dwellings keep the development threshold, and thus the realizable value per acre, quite low (Levine 2006).

In potentially limiting the property value of an individual parcel[45] by restricting certain types of development, however, another source of value is revealed, which returns to the idea of public development rights as exchangeable instruments. In this scenario, the economically rational property owner (like the previously referenced multi-family developer) would be willing to pay for additional development enabled by the lifting of zoning restrictions. This value, in the form of collectivized development rights/entitlements, is therefore "latent" until converted. In many jurisdictions, latent value is effectively banked, in the form of unused development rights, until such time as the city or town wishes either to convert them by trading them for an in-kind good or (rarely and with the goal of funding public improvements) selling them for cash. Many cities, in particular, choose instead to forfeit them by upzoning without compensation or granting unfounded variances,[46] often to garner more property tax revenue. Strict zoning administration is crucial to maintaining the value of latent rights.

In addition to realized and latent value, a third "value" category exists—an overabundance of which is the scourge of any municipal budget office. Development that has not occurred, but is permitted as-of-right, constitutes "unrealized" value; the presiding municipality collects a sub-optimal tax on the vacant land or existing lower-density (below as-of-right) development, and, beyond the collection of permitting and filing fees, cannot collect on new development without ownership of the development rights. While some land in almost every community falls in this category, jurisdictions that have especially liberal zoning or lax zoning administration (reserving few development rights for the collective) and/or weak development demand are particularly prone to this condition and may encounter difficulties in financing public benefits through taxes or density bonuses (I.e., there is a weak tax base and no demand for additional development entitlements). This may lead to a downward spiral effect, where land-use controls are further loosened in an often-misguided attempt to chase property tax revenue.

It is not my intention, however, to denigrate cash-strapped cities that effectively give away public development rights for increased property taxes. After all, real estate taxes, like the amenities leveraged from density bonuses, are levied in the name of the public welfare and are used to pay for a package of public benefits and municipal services desired by the taxpayers (Tiebout 1956). This practice is especially defensible in Massachusetts, where Proposition 2 ½ (which limits the increase of a parcel's tax burden to a maximum

45. "Zoning confers both benefits and costs that are capitalized as increases or decreases in property values" (Fischel 1990, *229*). So, whereas the value of a low-density parcel amid high-density parcels will likely be hurt by restrictive zoning (witness Grand Central Station in Manhattan, which lost an estimated $3 million/year ground lease), if low-density zoning leads to a unified neighborhood with few evident impacts from development (I.e., the large-lot suburb), then this peace and quiet will be capitalized into the value of the parcel, making up some (but not necessarily all) of the value forfeited through use restrictions.

46. Kayden labels this a "variance floodgate … opened regularly by political pressure and worse" (1992, *568*). Fischel notes that, "some studies have shown that zoning boards may grant variances for almost any cause" (1985, *35*).

of 2.5% per year, no matter how the assessed value changes) often means that taxes on previously "realized" development rights are not sufficient to adequately finance municipal services.

Understandable as it is, at least two related problems with this approach (giving away development entitlements) emerge. First, a portion of these new revenues will likely be needed to offset (beyond the scope of most exactions) the impacts of this additional development: additional traffic, sewage, water usage, stormwater, etc. created by more intensive use. Second, if indeed greater demand exists than that permitted by as-of-right zoning, it becomes possible to require developers to mitigate these specific impacts with the marginal profits from each additional unit/square foot permitted. Therefore, it is important for cities to preserve the value of development rights by dispersing them deliberately.

The value of development rights held by a municipality is generally determined by a supply and demand function: the supply of as-of-right development entitlements for a given asset type and the demand for that asset type above established as-of-right limits. A municipality that wishes to cultivate the value of latent development rights must have some supply limitations in place—if no regulations existed, then development rights would be common and uncontrollable and the public would have nothing to trade for public benefits (although, as previously noted, property tax revenue might be higher). While land is a unique commodity, with fundamentally inelastic supply, the case of publicly-owned mineral rights offers a useful parallel; a town located over the proverbial gold mine possesses latent value of an amount in direct relation to its ability to control access to the resource and the price of gold on the market (when land is concerned, however, the "gold" under each town is of different composition—and some varieties shine much more brightly than others).

To a certain extent, municipalities can even "bank" these latent development rights for future use; governments with liberal zoning (e.g. high as-of-right FARs) or weak development pressure will bank only a small store of latent value, while those with restrictive zoning and a strong demand for development will preside over a comparatively large cache. Although supply restrictions will, year-by-year, "send" development elsewhere because capital is mobile and land immobile (Levine 2006[47]), a desirable location and asset type will indeed "capture" development demand if restrictions are lifted, particularly if the overall market is riding high. For example, if, in a desirable single-family neighborhood with large-lot zoning, a parcel is suddenly made available for higher-intensity development—as is often the case with 40B[48] projects in Massachusetts—regional demand for higher density exurban units will flow to that site. In more urban locales, this will often read as a "pop-out," a multi-story building in a lower-density area.[49]

Clearly, a density bonus will work best in places with fairly low-density baseline zoning, relative

47. Or, as Levine claims, regional demand might be channeled into sub-optimal choices forced by restrictive regulations, "a disconnection between what people want and what they get" (*163*).

48. 40B is Massachusetts' ground breaking comprehensive permit provision (1969), which allows developers proposing housing projects with at least 25% affordable units to bypass most local permitting procedures (environmental permitting, for example, remains applicable) if less than 10 percent of that town's housing stock is certified as affordable. In practice, 40B has allowed for the development of denser, multi-family housing in suburban communities where single-family homes predominate.

49. This effect is particularly prominent in a semi-urban neighborhood like Brookline, Massachusetts, where Victorian single-family homes, 1920's-era low-rise (3-4 story) apartment buildings, and 1960's-era mid-rise apartments (8-12 stories) are frequently seen on the same block. A brief study of the town zoning map shows that this effect was accomplished through dozens of small zoning subdistricts.

to demand. In fact, the greatest effect would occur in zones with absolutely no as-of-right development entitlements—in other words, where every entitlement must be purchased. This scenario is patently unfair, politically inviable, and legally questionable, but it does lead to an essential inquiry, namely, how is fair baseline zoning established in a density bonus provision? Fischel (1985) proposes a "normal zoning" standard, whereby initial zoning entitlements are allocated in order to roughly match land-use standards and development patterns already in evidence in the community. This would place rights to "normal" development in the hands of the landowner-developer, and vest the "rights to keep out subnormal development" with the community (Levine 2006, *64*). In theory, this sounds ideal, but with the widespread deployment of the special or conditional permit, some municipalities now hold the reins for all development but single-family homes (often on one or two or five-acre lots)—and while this standard may reflect existing development, it is a stretch to consider this practice fair. The courts have little to say on this issue, other than that a total decimation of value is a taking; large-lot zoning,[50] and even precipitous downzoning,[51] has been upheld in many states, including Massachusetts, as long as the action bears a rational relationship to the exercise of the police power. In effect, this means that the "normal" zoning standard must be established in the public, rather than judicial, arena and then embodied in a master planning and zoning document (a topic to which I return in the following chapter).

While establishing the structure and terms of any entitlement trading mechanism presents significant complexities, as with any right or good that can be liquidated through transaction, including land (and gold), there is assuredly a market, albeit a limited one, for development rights. The merchants of this marketplace are public entities with direct regulatory control over land—most, but not all, of whom are municipalities or counties. Local government, representing the will of current residents, determines the initial supply of entitlements in their marketplace through zoning, and may choose to "vend" additional rights through incentive zoning. Obviously, not all municipalities engage in entitlement vending, with some instead holding these rights in perpetuity (mostly suburban/exurban communities) and others dispensing them without compensation through upzoning or variances (mostly cities).

The middlemen in this market are developers, who purchase development rights based on the economics of construction and per-unit land cost, tempered by the realities of basic supply of and demand for a particular asset type in a given service area. In most transactions, of course, these development entitlements are provided as-of-right with the purchase of land, but, although it is not explicit, it is demand for these entitlements that gives value to the land.[52] The end users are buyers or tenants who, following Tiebout's classic theory, vote with their wallets for a complex package of amenities, taxes, and services (1956). It is the consumer who ultimately dictates the demand for development rights in a particular community or region. Thus, the latent value of a community's development rights comes down to the supply released by current

50. In Massachusetts, see *Johnson v. Town of Edgartown*.

51. See *Montgomery County v. Woodward and Lothrop, Inc,* 376 A2d 483 (MD 1977).

52. As the Ohio Supreme Court stated in its *Euclid* holding, "there can be no conception of property aside from its control and use, and upon its use depends its value."

residents and the demand from prospective residents.

From a municipal finance perspective, this market, which I propose to operationalize through the density bonus, can act as a tool to enable government to more deliberately balance its "stock" of realized and latent development value while avoiding excess unrealized value. Again, development rights that are not needed or not adequately valued are held in the public trust for future conversion, and rights for which demand is sufficient are converted—in regulated quantities—to provide for specific public benefits. While baseline ("normal") zoning should continue to permit reasonable development, in order for transactions to occur as-of-right densities must be set lower than the market demands. This way, allowable density is responsive to demand, providing more square footage where it is needed and less where demand is lackluster, thereby maximizing realized value and minimizing unrealized value.

1.6 Calibrating the Bonus

The four issues of critical importance in the density bonus equation are development demand, the cost to developers of providing the public benefit, the public's valuation of that benefit, and public tolerance for the impacts of development. To simplify, I will consider the net value to the developer and to the community—if an entitlement trade creates a net positive value for both then a deal should go forward. The theoretical range of acceptable outcomes therefore coincides with the overlap between private and public valuations, with the final outcome determined through a bargaining process. In this scenario, both the development community and the public, broadly defined, will realize a surplus.[53]

A consistent means of calibrating these values is of critical importance. In theory, with no regulatory restrictions a developer will produce until the revenue of an additional unit (I.e., marginal revenue), which is determined by the supply and demand function, is matched by the marginal cost of that unit. When marginal cost and marginal revenue are equal, total profit is maximized and further production results only in the erosion of profit. In a market constrained by zoning, in effect an artificially imposed cap on supply, the developer will "maximize FAR" (I.e., develop up to the cap), but is forced to forfeit the portion of profits lying between the disparate quantities zoning and the market will permit. A density bonus allows as-of-right development—up to the "normal" threshold dictated in the underlying zoning—without compensation, so the pre-bonus profit level is unaffected. When a public amenity is required, usually based on a ratio linked to non-encumbered development above as-of-right allowances, this additional cost is added to marginal cost. A bonus calibrated to the exact level of market demand would allow the developer to seek profits up to the market-dictated maximum, but, in raising the developer's marginal cost in order to pay for public benefits, will arrive at an output and profit of some degrees less than the pure market scenario would permit.

For the developer, the total cost assigned to a particular public benefit is, I submit, a fairly straightfor-

53. I.e., a "price," in the form of a ratio of benefit-to-burden or amenity-to-impact, is established for the density bonus, in relation to which the public's willingness to pay is more and the development community's willingness to sell is less, leaving both consumer and producer surpluses. Bargaining is traditionally just a matter of allocating that surplus, although I will consider the idea of using bargaining to expand the aggregate surplus in a following chapter.

ward matter of multiplying the rate at which it is supplied, relative to the granting of development rights, and the actual net cost to provide that good.[54] If, for example, in a particular residential development each on-site affordable unit requires a $100,000 subsidy and is required at a rate of one to every ten market-rate units, then each unit adds $10,000 to the marginal cost of market-rate production. The higher the rate of required provision, the higher the marginal cost and the lower the quantity produced—a one-to-one ratio in the previous example would raise the marginal cost of a market unit by the full $100,000 subsidy. The deadweight loss resulting from a feasible density bonus, it is important to note, will always be of a smaller amount than that which would stem from the base zoning condition—and, in any case, the goal of the density bonus is not pure economic efficiency (which, due to permitting fees and building codes, is a myth anyway).

The public's tolerance for development and its valuation of public benefits will be treated subsequently, but the issue has a significant effect on the calibration mechanism, and so will be treated abstractly here. Determining the net public value of bonus amenities is deceptively simple in microeconomic theory (again, the significant practical challenges are addressed later). First, one must determine the amount of the public costs imposed by the additional development. If the amount each individual would pay to mitigate the additional impacts (above as-of-right) could be discerned and then added (vertically summed), the resulting figure would represent public costs. The operation would then be repeated to derive the value of public benefits (sum of all individual benefits). In order to provide a clear illustration of how private market valuations and public non-market valuations theoretically might be compared (I.e., facilitate an "apples to apples" comparison), I have monetized public valuations in subsequent examples. This should not be construed as an unqualified endorsement of contingent valuation, an issue I treat critically in the following chapter.

Following the concept of marginal utility, an individual's valuation of each successive unit of both benefit and burden will change, although at different rates. Whereas Fischel (1985) claims that marginal utility/disutility will decrease with each additional unit, I add a common-sense caveat: there is a tipping point for both benefits and burdens, which means that they require a certain scale to become truly beneficial or burdensome.[55] After that point, I agree that marginal utility/disutility diminishes.

To illustrate this point, assume that I live in a medium-density urban neighborhood (the Fenway, perhaps). A developer proposes a high-rise apartment building across from my five-story, *as-of-right* condominium building. The density bonus he plans to utilize requires the provision of one unit of parkland within ¼ mile of the site in exchange for one story of additional development (a one-to-one bonus ratio). Now, consider that I do not generally value local parkland very highly, but that I do own a large dog. The provision of the first unit of adjacent parkland might be worth, for example, $100 to me, but the second, which brings me up to a proper dog run instead of a pocket park, I value at $250. The third unit, however, is only worth, say, $50 to me, the forth $35, and fifth $10—I have no need for two dog runs, after all. Turning to the issue of burdens, the first additional floor (number 6) might have a very small impact on my unit, so I value that

54. While a developer might be expected to act rationally, in economic terms this is not always the case (Grenadier 1996, 1995, Wheaton 1999).
55. Rabin (2000). Marginal utility and risk aversion.

burden at -$35 (maybe it blocks part of a view I like), the next floor blocks a little more, valued at -$50, and the eighth floor begins to cast a late-afternoon shadow on my unit, which I would pay $100 to remove. The following floor casts my living room in total shadow from four o'clock on—which I value at -$300. The fifth additional floor creates little additional impact, for I am already in shadow when I return from work, and so "costs" me only $50 more.[56] Obviously, in the real world, a host of other utilities and disutilities would factor into this calculus—traffic might worsen significantly, but I might find that the new population of the new building enhances my social interactions in the neighborhood significantly.[57]

My net valuations in this scenario are shown in Figure 1, below.

Figure 1. Individual Utility/Disutility of a Hypothetical Bonus					
Units	1	2	3	4	5
Marg. Benefit	$100.00	$250.00	$50.00	$35.00	$10.00
Marg. Burden	$(35.00)	$(50.00)	$(100.00)	$(300.00)	$(50.00)
Net Marg. Value	$65.00	$200.00	$(50.00)	$(265.00)	$(40.00)
Total Net Value	$65.00	$265.00	$215.00	$(50.00)	$(90.00)

If I were the only stakeholder involved (I.e., the city used my personal valuations in calibrating the bonus), my negotiating range would be from one to three units (the positive "total net value" region), with four or more units/stories constituting an unacceptable tradeoff. Thus, my ideal trade would be at 2 units, although trades for one or three would be acceptable, and the bonus would be capped at three stories. Figure 1, while hypothetical, shows that it is the difference in the rates of change between the utility of benefits and the disutility of burdens that will determine in which range trades can take place.

To further complicate matters, it is important to note that there is no guarantee of alignment between "publics." The additional, above as-of-right impacts might be localized and the benefits might accrue to the entire community,[58] so a burden on the few, however significant, could be more than offset by a small community-wide benefit. Moreover, additional property tax revenue from the new development should be considered in the public valuation; strengthening the overall tax base reduces the tax burden and/or raises the level of service for each individual in a given municipality and is one of the few directly quantifiable public benefits of development. (Due to the difficulty of determining net property tax benefits, especially for residential buildings with school-age children, I do not include them in the highly

56. The same considerations are in effect for renters as well, although it will be the landlord who interprets these valuations and capitalizes them (positively or negatively) into the rental value of the unit. The renter will then seek a unit that maximizes his own price/utility criteria. If my friend works the four to midnight shift, for example, he might care very little about the lack of afternoon sunlight and therefore be willing to pay more for the impacted unit than I would. The next chapter will consider hedonic regression modeling as a possible means to more accurately discern net valuations.

57. This touches on an issue of importance: the anticipated demographics of the new building in question. If I am a middle- or low-income person and the proposed high-rise will cater exclusively to the wealthy, then, depending on which social theory one consults, I might either be further burdened or benefited by this new population.

58. This almost total segregation of benefits and burdens is one reason why transferable development rights (TDRs) are, in my opinion, to be regarded cautiously.

simplified theoretical examples in this section).

Misalignments of interests need not pit an entire city against a single block, however, but may instead manifest as a micro-level phenomenon. If, in the previous park-for-shadow example, my valuations of burdens are based on my residence on the first floor, my fifth-floor neighbor, even in the unlikely instance that her valuations would precisely mirror mine, might experience no shadow impacts and only minor view impediments. She might realize net positive value for all five additional stories—and then some. Ultimately, the degree of overlap between the three publics (tax jurisdiction, burdened individuals, and benefited individuals) varies depending on the size of the municipality and the characteristics of both the benefit and the development impacts. This disconnection between impacts and benefits, and thus the very real potential for the majority to trample the rights of the minority, particularly where massive property tax windfalls are at stake, will be taken up in the following section.

With this public valuing operation (however unrealistic) completed, the net valuations of entitlements are revealed for both the developer and the affected community. It is then possible to see if Coasean bargaining is worthwhile for each party. To facilitate this comparison, Figure 2 offers a hypothetical marginal cost/marginal revenue chart for the developer, with the escalating marginal cost of building higher separated from the escalating marginal cost of acquiring larger tracts of parkland. Marginal revenue, in this instance, grows as views expand, but, because demand is finite, begins to subside, reflecting higher rents for better views tempered by the need to offer inducements to fill these units.

Figure 2. Developer Marginal Revenue/Marginal Cost of a Hypothetical Bonus

Units	1	2	3	4	5
Marginal Revenue	$1,000,000	$1,100,000	$1,250,000	$1,250,000	$1,000,000
Marginal Cost	$(800,000)	$(850,000)	$(900,000)	$(1,000,000)	$(1,150,000)
Marg. Park Cost	$(25,000)	$(25,000)	$(35,000)	($50,000)	$(75,000)
Net Marg. Revenue	$175,000	$225,000	$315,000	$200,000	$(225,000)

The developer's negotiating range is between one and three additional stories, with three the ideal. Because the net revenue for four stories, while still $200,000 greater than the as-of-right scenario, is lower than for three stories, the rational developer will not consider this a viable option. If the average benefits/burdens valuation of all affected individuals, whether there are 10 or 10,000, reflect those expressed in Figure 1, then a trade is possible. If negotiators are rational, the trade will lead to the exchange of development entitlements for two or three stories above base zoning in return for two or three units of parkland.

If, however, three times as many individuals are burdened than are benefited (or if each individual's valuation of burdens is three times greater than expressed in Figure 1), then a different exchange ratio must be established or a minimum threshold must be coupled with a bonus cap. In this instance, although at a level of two units a net positive trade could occur, a trade of one unit offers only disutility for the public. A thresh-

old/cap would only allow two units[59] to be built with a $95 net positive valuation per member of the public and a $225,000 net valuation for the developer. If a two-to-one bonus ratio is established (necessitating two units of parkland for every additional story), then, according to Figure 3, only one story would be constructed because the priorities of the public and the developer are aligned (the Nash Equilibrium has been achieved).

Figure 3. 2:1 Bonus Ratio, With Burdens 3x Figure 1					
Stories	1	2	3	4	5
Ben. (2 park units)	$350.00	$85.00	n/a	n/a	n/a
Original Burden	$(35.00)	$(50.00)	$(100.00)	$(300.00)	$(50.00)
Burden x3	$(105.00)	$(150.00)	n/a	n/a	n/a
Net Value	$245,000	$(65.00)	$315,000	$200,000	$(225,000)
Total Net Value	**$245.00**	**$180.00**	**n/a**	**n/a**	**n/a**
Developer Revenue	**$150,000**	**$140,000**	**n/a**	**n/a**	**n/a**

In practice, five distinct calibration systems exist. All convert amenities and incentives into dollars in an attempt to, as Getzels et al. (1987) put it, avoid "the fairness problems of evaluating public policy 'apples' against developer profitability 'oranges'" (*16*). Assigning realistic dollar values to either developer profitability or public amenities, as I hope I have already conveyed, is no simple operation—and, as I argue in the following chapter, not necessarily appropriate. For the moment suspending my incredulity and operating under the assumptions implicit in the current calibration systems, deriving an appropriate bonus ratio using these systems is indeed elusive without dollar values. "Too small a bonus," say Getzels et al., "will result in developers ignoring the incentive provision, while too large an incentive may disproportionately reward the developer for providing an amenity of negligible benefit," which may well punish the public in the process.

The "equivalent land-cost model" compares "the costs of providing a public amenity to the costs a developer would incur by purchasing additional land (per FAR foot) to achieve the same overall project density allowed with the bonus" (Getzels et al. 1987, *16*). Mathematically, this method is expressed as Equivalent Land Cost = (Base FAR/Bonus FAR) x Amenity Cost. If the bonus amenity is valued at $10/square foot, land runs $100/square foot, the base zoning is 10 FAR, and the bonus FAR is 2 then: 10 FAR/2 FAR x $10 = a charge of $50/additional square foot to obtain additional floor area that would cost $100/square foot on a neighboring site. The break-even bonus in this instance is 40%, which would yield an amenity charge equivalent to the cost of new land.

A functionally similar calibration method, called the "equivalent development rights (EDR) model," was used by New York City specifically for low-income housing bonuses. The EDR value is derived from recent sales price data for neighboring lots, with the sales price simply divided by developable square footage (lot size x FAR). So, a parcel that sells for $10 million and permits 100,000 square feet of development as-of-

59. In other situations the threshold and cap will not necessarily coincide.

right, yields a cost of $100 per FAR foot. If low-income housing must be subsidized at a rate of $150/square foot, then 1.5 additional square feet, at a minimum, must be granted for every square foot of low-income housing ($150/$100 = 1.5). Because neither of the "equivalent cost" models employs standard bonus ratios, bonuses are awarded on a site-by-site basis, requiring calculations from scratch and creating uncertainty for the development community. Moreover, each requires significant discretion in determining the boundaries of "equivalent land" districts in order to derive costs (Getzels et al. 1987, *16*).

The "Rate of Return on Investment Model" establishes the bonus value by dividing the net operating income (NOI) of base square footage, bonus square footage, and any revenue generated by the public benefit by the net costs of construction, land acquisition, and amenity provision. For instance, a total NOI of $1 million divided by a total cost of $10 million equals a 10 percent ROI. The ROI is then compared against a "prevailing" ROI, which, of course, is essentially established by the development community. The bonus ratio is then toggled until the equation is made to deliver the target rate. This model has been employed in cities offering a broad menu of bonus options, most notably Hartford, CT and Denver. It has the advantage of "mov[ing] with the market" (Seyfried 1991), but the distinct disadvantage of lacking a means of weighting bonus options to reflect community preferences (Getzels et al. 1987).

San Francisco's "Marginal Cost-to-Profit Model" is perhaps the economically purest means of bonus calibration.[60] As such, it closely reflects the previously discussed theoretical model, in which the developer will avail himself of additional square footage until he has maximized profits (when marginal cost and marginal revenues are equal). First, projected net rents are determined and a capitalization rate is applied (both of which require reliance on the development community or savvy development consultants). If net rents are $35/square foot and the cap rate is 8%, the capitalized value is $437.50/square foot. Then building costs are considered. If construction costs are $300/gross square foot, with an 80% efficiency factor and a 5% vacancy factor (yielding a 76% composite space utilization), then costs per rentable square foot are about $395 ($300/.76)—a profit of $42.50/nsf. Then the value of the bonus amenity is computed by multiplying its per unit cost by the number of units expected—for expediency it will be a $1 million neighborhood park for this example. $1 million divided by $42.50 equals about 23,500 net square feet (or 29,400 gross) in development rights to be conferred. In Kayden's "Cost-Plus" model, based on the "Marginal Cost-Profit Model," he suggests adding an incentive by multiplying this result by a "Plus Factor," the reasoning presumably being that a risk-averse developer cannot be expected to devote all additional profit to amenity provision (Getzels et al. 1987). A Plus Factor of two, for instance, would yield a bonus of nearly 60,000 gsf, half of which finances the public amenity while the other half is pocketed by the developer. The "Plus Factor" has in fact been an implicit part of incentive zoning ordinances since the advent of the policy, with early adopter San Francisco, for example, providing bonuses worth 150-200% of amenity cost (Barrett 1973).

All of these calibration models have advantages and drawbacks, although the marginal cost-to-profit model seems both more intuitive and better oriented to establishing an as-of-right bonus. Not one, however,

60. San Francisco abandoned its bonus program in 1984 after downzoning the business district and placing a cap on FAR.

explicitly considers the public's valuation of the bonus amenity—a critical flaw. The emphasis, rather, is exclusively on making development economics work, and the amenity valuation in these models is therefore a pure dollar cost to the developer. There is no doubt that the process of deriving a measure of valuation is significantly messier, and more emotionally fraught, for the public than for the development community (and thus requires more initial effort on behalf of the planning authority than the five standard calibration methods presented above). The very personal politics of land use, development, and property rights, however, *must* be explicitly considered in order to successfully and sustainably operationalize any incentive zoning ordinance and, no matter how persuasive the economics might be, must be the central concern in instituting any system intended to facilitate the trade of public development rights.

Chapter 2: Process and Public Valuation

2.1 Public Valuation

In the previous chapter, I briefly reviewed the bonus calibration methodologies currently found in the literature (which is quite scant) and created highly simplified, hypothetical public and private value inputs in order to illustrate that, theoretically, a value surplus is obtainable if public and private valuations overlap. Few would dispute, however, that the process of determining public value inputs is far more complicated, uncertain, and logistically challenging than deriving the valuations of developers, for whom development economics should prevail.[1] The difficulties inherent in public valuation should not, however, preclude a conscientious attempt by government to derive some measure or indicator of public value and to include it in calibration methodologies.

Public valuation presents several challenges, and among the foremost is expecting individuals to consider non-market goods—like shadows, parkland, or neighborhood character—in the context of a transaction. In an effort to shed more light on individual valuation of non-market goods, I argue that members of the affected publics consider five broad, intertwined issue categories for both development and public amenities:[2] use, form, amount, distribution/location (for which there are at least three potential publics), and administration. While I believe that these are the general components of an individual's valuation, I do not argue that people consider them rationally, in part because all of these categories can be unpacked several levels further and they can be related to one another in vastly different ways. Still, a brief, simplified overview of these issues brings perspective to the valuation problem.

Generally, none of these categories is meaningful when considered singly. For instance, the use, and by implication, user characteristics, of new development are very important—but, with notable exceptions,[3] only under certain conditions. Homeless shelters, pre-release facilities, adult bookstores, transfer stations, and other bothersome, offensive, or noisome facilities often elicit strong negative valuations, whereas any use that enhances convenience or choice, such as retail or restaurants, for example, are often regarded as positives. When enriched by considerations of form, however, these instinctive valuations are almost certainly modified—if the pre-release facility is housed in a beautifully-renovated historic building[4] or the adult bookstore is unobtrusive with tasteful signage,[5] then the negative valuation might be partially offset by positive form characteristics. Similarly, a good restaurant in a derelict building might offset one's enthusiasm for the use.

Amount, a relative measure, adds another layer of nuance to the equation. If the pre-release inmates

1. While the developer's valuation is almost indisputably easier than that of the public, it may nonetheless reflect the irrationalities related to over- and under-building, use and programming, and risk perception.
2. Although development is often framed as the public impact or burden and the good leveraged by the density bonus is often synonymous with the public benefit, this is not necessarily the case on an individual basis. I may appreciate additional density and the enhanced services that accompany greater land use intensity (such as increased transit frequency or a new coffee shop), but I may dislike the introduction of, for example, affordable housing units into my neighborhood.
3. Uses that might be considered unacceptable under any circumstances include all patently illegal uses (drug dens, brothels, etc.), which might also be considered immoral uses, as well as so-called "Not on Planet Earth" (NOPE) uses such as nuclear testing facilities or internment/extermination camps. While each individual defines his or her particular NOPE uses, I argue that there are few uses that distance will not effectively mitigate.
4. As is the case in the West Fenway.
5. Which is NOT the case in the West Fenway.

account for 10% of a neighborhood's population or the adult bookstore engenders a cluster of seedy shops, value might plummet. A small neighborhood restaurant might be charming, but a large regional restaurant might create traffic impacts. However, several small restaurants might dramatically increase choice without attracting significantly more automobile traffic. And the administration of any use-form-amount combination is of critical importance in determining its impacts; a well-run halfway house might even be preferable to a poorly run restaurant (with irregular trash pickup, double parking, intoxicated patrons, etc.).

The same framework affects the value of public benefits. Consider the neighborhood park example from the previous chapter: The nominal use might be passive open space, recreational, or both; the users might be sunbathers, dog walkers, Frisbee throwers, or drug dealers; the form might be a simple lawn, or landscaped with benches, water features, or basketball courts; the amount might be "vest pocket," neighborhood park, or city park; and administration might include or neglect regular policing and maintenance. With a wide range of possibilities for each category, the final user experience can vary significantly—a park is never just a park, but rather the sum of its characteristics.[6]

The layering of these four categories yields a largely qualitative measure commonly referred to as "character," a fluid, subjective, yet overarching descriptor crucial to the desirability of a place. Each place has a particular "character," a vague and loaded term with which individuals nonetheless identify very strongly. Oftentimes complaints of character degradation translate directly into a decrease in property values or in perceived quality of life measures, but not every objection is, or need be, so rationally motivated; however character is measured, its significant disruption is sure to make each and every bonus application an ordeal,[7] while its augmentation may well smooth the path.

The issue of character will almost inevitably mellow into indifference with the addition of distance;[8] the homeless shelter might be fine across the city, the concrete tower might be acceptable in the central business district, the mega-mall might shift from blight to amenity if it is located a few exits down the freeway, and the poorly run restaurant might be charming if I am not required to walk by a mound of poorly-bagged garbage the following morning. Therein lies the crux of the three public problem: Most citizens will acknowledge that pre-release facilities, transfer stations, or mega-malls are necessary or even desirable—but not in close proximity to where they live, or recreate, or where their children attend school. At some proximal point, an amenity will fade into irrelevance (how far is one truly willing to travel to visit a neighborhood park, of which there are dozens in any given city?) and a nuisance might even become a benefit.

For some forms of density bonus, this distribution/location issue looms particularly large. The potential for disconnection between the benefits and impacts of development, and the questions of fundamental fairness and environmental justice it may raise, constitutes an important challenge in establishing a density bonus. Land, as previously mentioned, is a unique asset because, unlike capital, it is immobile and impossible

6. Kayden (1977), in his study of bonus plazas in New York City, shows that, even under the same bonus program, the quality (and therefore public value) of these nominally public open-spaces is remarkably inconsistent.

7. This potential problem can, in large part, be preempted by getting the ordinance formulation right in the first place—which is the goal of this chapter.

8. Untrue, of course, for some "Not On Planet Earth" uses such as toxic waste dumps or concentration camps.

to reproduce. It is similarly difficult or impossible to relocate improvements to land which, following my earlier economics-based theory of value, are actually realized development rights. Public benefits linked to the disposition of development rights are, however, sometimes mobile, potentially augmenting or eroding support for the density bonus. In other words, there are local and non-local/ on-site and off-site public benefits, and, depending again on the specific good and amount, the location of that good can yield controversy or merely indifference—can indeed offset the negative impacts of development, augment them, or be of minimal consequence.

Affordable housing is a good example, with units priced for purchase or rental by those earning a certain maximum percentage of area median income (AMI).[9] Housing can be required on-site, off-site, or in combination, following governmental preference. On-site housing neatly links the benefits and impacts of development, but an off-site housing provision may be needed to subsidize low-income housing citywide, particularly in neighborhoods without sufficient development pressure to operationalize a density-bonus.[10] Some stakeholders may applaud a new residential development because it will support a greater menu of neighborhood amenities—while at the same time decrying the on-site location of lower-income individuals. Others, however, may deem a luxury residential development acceptable only if the provision of affordable housing is local.[11]

Some benefits, like the permanent protection of rural open space or farmland, are rarely objectionable in and of themselves, but, because they require segregating perceived impacts from benefits (I.e., they hinge solely on an off-site good), can raise questions of fairness. This is the case with transferable development rights (TDR), in which the development rights of a parcel of rural[12] land are traded to a corresponding, urbanized site (Fulton et al. 2004). The rural site is rendered ineligible for most development and the landowner is duly compensated, while the urban site is able to add the purchased development rights to those already attached to the site. In this scenario, neighbors of the urban site will bear the additional impacts of traffic and pollution, among others, but will probably not benefit directly from the viewsheds or general environmental quality preserved for their rural counterparts. In other words, when proximity is the issue, one party's burden may be another's benefit.[13]

The distribution/location issue feeds directly into a point of great importance for both the political and economic feasibility of a given density bonus—the territory it covers. Rarely will a density bonus be

9. Affordable units are often required to be indistinguishable from market units from the exterior.
10. In Massachusetts, General Law 40B grants a developer proposing affordable housing a conditional approval to override local zoning if the receiving community's supply of affordable housing is less than ten percent of the overall housing stock. 40B is therefore a *de facto* density bonus. Resulting projects are denser than underlying zoning permits, although in this instance affordable housing is considered a public benefit for the Commonwealth—not necessarily the receiving municipality.
11. The courts have stopped short of declaring housing a fundamental right. Otherwise, this debate would take on significantly different dimensions.
12. While New York City runs a famous (due in part to the *Penn Central* Supreme Court case) urban-to-urban TDR program, a vast majority of the over 140 TDR programs currently operating in the United States feature only rural-to-urban transfers (Pruetz 2003).
13. This is not to claim that farmland preservation, often the goal of TDR, is not a worthy planning goal, but rather to recognize that the disconnection of direct benefits and burdens inherent in most TDR schemes has implications for fairness. Kayden (1992) equates TDR with tradable pollution permits, noting that, while both offer net benefits in aggregate, the local effects of each require further scrutiny.

appropriate across an entire jurisdiction: In mature residential areas, in environmentally sensitive or rural areas, and even in a traditional downtown district, the density bonus might enable development considered unsuitable or out of place.[14] Thus, returning to the public planning process to which I alluded previously, in addition to negotiating the uses, forms, amounts, and administrative conditions of public benefits desired, the borders within which the bonus is applicable must be mapped. The resulting "overlay zone," where special conditions apply to a place with unique characteristics, accommodates growth where growth is wanted—and leaves other zoning districts (and the various characters they reflect) untouched.

2.2 Setting the Boundaries

In any zoning proposal, mapping the boundaries is a critical step. This is particularly true in an incentive zoning proposal, where there is the potential for benefits and burdens to be distributed among separate publics. A density bonus overlay area must certainly reflect an understanding of the technical criteria relevant to accommodating additional density, including transit accessibility, infrastructure capacity, environmentally sensitive lands, *et cetera*. In the proposal I offer subsequently, I choose an overlay based on intimate knowledge of the study area, its demographics, and existing zoning subdistricts targeted for greater height and density—a method that is, admittedly, not widely replicable. Rarely will such "natural" overlay borders be available to the planner—political boundaries, areas supporting critical habitat or displaying environmental sensitivity, and development patterns and roads are, in practice, rarely so cut and dry.

The literature on political districting and gerrymandering, the pejorative term for the creation of contorted electoral districts in order to advantage a particular political party or demographic group, offers a few general insights into the art and science of drawing boundaries. The "mander" in gerrymandering is an abbreviation for salamander, denoting a rigged electoral district's potential to spread out in a serpentine form in order to unite or separate a political or racial group, depending on the circumstances. Therefore, the classic sign of gerrymandering is a contorted form: "A district's shape might be a telltale sign of malicious intentions" (Rush 1994, *682*). A bizarrely-formed zoning overlay or subdistrict might not reflect malicious intent, but may well indicate that planners are trying too hard to extend a concept beyond its logical geography. The US Supreme Court's "traditional standards for drawing districts" offers some basic, common sense guidance on this point. Districts should be "reasonably compact, contiguous, and respectful of existing political subdivisions" (Rush 1994, *683*).

Redistricting, like overlay creation, is both a cartographic and a public policy (or political) exercise—both involve formal or informal demographic mapping and the weighting of cartographic results in order to yield boundaries. Cartographic representations can incorporate dozens of different types of data (as many categories as the US Census collects), and, with the advent of GIS, literally thousands of alternatives can be proposed and evaluated. According to political scientists Eagles et al. (2000), GIS has had the effect of

14. Seattle's "Darth Vader" building, referenced in the opening chapter, is a prototypical example of the potential for unintended impacts in a loosely formulated incentive zoning system.

"empowering a wider array of interested parties outside the "official" districting process. Now these interested parties [can] relatively easily evaluate the impact of "official" plans … [and] experiment with their own alternatives" (*135*). Similarly, an overlay can be drawn and redrawn indefinitely based on demographic, economic, environmental, or technical data.

Of even greater importance in the context of this chapter, however, is the issue of representation in the context of boundary-setting: who is counted or represented in public valuation methodologies, to which public or publics do they belong, and ultimately how, and by whom, are overlay boundaries drawn and affected parties identified? These questions are important to keep in mind in the context of the following public valuation proposals.

2.3 Hedonic Pricing Models

Theoretically, if aggregate housing value could be established for a neighborhood, none of the measured units were adapted or improved, no physical or policy changes occurred other than the establishment of incentive zoning, and macroeconomic indicators were constant (in other words, everything *ceteris paribus*) then pre-rezoning and post-rezoning full build-out valuations could be compared to determine public valuation. The "if" conditions in this proposition are, of course, utterly untenable and the *post facto* timing is useful only for monitoring, not initial policy-making. The notion of indirect valuation, the central feature of the far-fetched proposal above, is, however, also at the core of predictive techniques, notably hedonic home-value regressions.

A hedonic regression of this type considers the dependence of "expenditures (rents or values) on housing characteristics" in order to determine the "implicit prices of these characteristics" (Malpezzi 2002, *2*). Regression is therefore the estimation of a "series of conditional means" for characteristics in a sample (*7*). The model "postulates a market containing a heterogeneous housing stock … and heterogeneous customers" who value "bundles" of characteristics differently (*12*). "Extremely costly adjustment processes," meaning simply that reconfiguring the characteristics that comprise a home is expensive, means that housing values are nonlinear (*13*).[15]

While this explanation omits much of the nuance involved in accepted regression techniques, the implication for the density bonus is clear: if metro-wide[16] values for housing characteristics are obtained, then the value implications for a variety of density-bonus build-outs could be predicted. This is to say that, theoretically, by breaking the entire market into its characteristics and associated values, a place analogous to the density bonus overlay area could be constructed. Then, the impact on home values of the proposed variation of those characteristics could be tested for various build-outs, yielding a simulated scenario of the type suggested in the opening lines of this section.

This promises to be a very data intensive exercise: in addition to standard data about building

15. Malpezzi recommends a "semi-log" function to reflect non-linearity.
16. This is what is commonly referred to as "the market" or "submarket"—which implicitly assumes that, due to differences in cultural preferences, climate, regional economics, or other factors, regression analysis is a poor predictor of value across markets.

characteristics (rooms, floors, structure type, systems, age, basements, fireplaces, garages, etc.), spatial data (distance from CBD, employment nodes, schools, shopping), socioeconomic data, and overall "neighborhood variables" (neighborhood quality index, school quality, crime), variables related to the five categories previously listed—use, form, amount, distribution/location, and administration—would require measurement for both the proposed development and amenity. Naming the broad categories that might affect an individual's valuation of a non-market good is one thing, of course, but accurately measuring or evaluating those values, particularly across populations, is quite another. While some of these characteristics might be captured in a standard home-value regression (particularly spatial/locational characteristics such as distance to a public park), and "use" and "amount" or some approximation thereof, could be measured using GIS in some cities, "form" and "administration" would likely require new variables.

Despite the difficulties in data collection and proper specification, some scholars claim that regression analysis might indeed offer promise for determining amenity values.[17] Cheshire and Sheppard (1995) consider hedonic modeling to be "a technique which, under appropriate conditions, can provide estimates of the marginal value of neighbourhood characteristics: value that can be capitalized into … the value of land" (*248*). In their analysis of two particularly data-rich towns in the United Kingdom, they employ a series of seven increasingly specified models, the last of which includes open-space amenities by percentage per square kilometer. They determine that "the aggregate value of some amenity or group of amenities can be obtained by estimating two hedonic functions, one with and one without the amenities of interest" (*261*). That is, they isolate the locational value of land (which they determine generally follows the monocentric model) from the location-specific amenities that are capitalized into the value of vacant land. While this analysis omits consideration of less quantifiable aspects of valuation, notably form, use, and administration, it seems to demonstrate conceptually that costs and benefits of exogenous characteristics are, in some sense, measurable.[18]

Good hedonic specification (choice of variables, functional form, and submarket definition) requires, as Malpezzi states, "art as well as science" (2002, *24*). It is not my intention to claim distinction as either an artist or scientist in this respect, but rather to point out that a framework for indirect public amenity valuations exists already—even if it is currently either incapable of handling the complexity of density-bonus tradeoffs or too data intensive to operationalize. As the technique evolves (it is, after all, no older than the density bonus itself), urban information collection improves, and GIS technology progresses, a city planning research department might eventually wish to supplement other valuation techniques with hedonic models, primarily as a monitoring device.[19] Regression analysis, particularly at this scale, is complex—and the ability to read the

17. Which is why, primarily, it is considered in this thesis.

18. If information is perfect and specifications are accurate and infinite, it theoretically might be possible to perfectly measure (and break out) the values of each amenity or dis-amenity created by a given density bonus scenario. Regression analysis is weak theoretically, however (Malpezzi 2002, *16*), and I could find no writings that confirm this view directly.

19. While monitoring the effects of an incentive zoning ordinance seems, in practice, far fetched, in theory is fits well with the property rights approach to zoning. If, for example, the impacts of a given development are difficult to predict—and thus a price for entitlements difficult to set—a hedonic model could help facilitate a contingent agreement. If, for example, the values of neighborhood homes decline over a pre-specified period, a hedonic pricing model, using a pre-agreed upon methodology, could determine how much of the value diminution is due to the impacts of the development in question (as opposed to a dip in the overall real estate market) and trigger a compensatory payment to neighbors.

results is not necessarily correlated with knowledge of the strengths and drawbacks of a given model design. There is, in other words, the potential for hedonic pricing models to fall into the "black box" trap, in which the process of converting information inputs to outputs is unclear, undermining the perceived legitimacy the results. If hedonic pricing, or any expert-driven technique (such as contingent valuation, see below), is used, a process of joint assumption generation might help in bringing legitimacy to the construction and interpretation of technical studies.

2.4 Contingent Valuation

In the previous chapter (for demonstrative purposes), I conjured hypothetical, *monetized* public valuations to compare with the developer's market valuations, and in so doing implicitly referenced the controversial technique known as contingent valuation, or CV. CV involves surveying a sample of individuals in order to determine their "willingness to pay" for or "willingness to accept" payment for the entitlements to a non-market good, and as such is a direct valuation.[20] A series of hypothetical scenarios, usually elaborated by a face-to-face interviewer, are presented to participants. The questions are typically framed in one of three ways: open-ended, often asking for an individual's maximum willingness to pay or minimum willingness to accept payment; iterative bidding, in which the interviewer systematically increases the offer price (either to avoid destruction or to purchase the rights to destroy); and the referendum format, in which taxes are said to rise by a specific amount if a certain policy is implemented—would the interviewee vote for or against the measure? (Portney 1994). Ideally, the respondent is quizzed to establish that some level of common understanding has been established, and the results are extrapolated, using inferential statistics, in order to yield a value across the entire population (the "public value"). The end product is a valuation reflecting the non-market aspects of a good; the non-use costs of the Exxon Valdez oil spill, for instance, were estimated at $3 billion by a group of CV practitioners (Carson et al. 1992).[21]

While the goods CV purports to measure range dramatically, including such subjects as willingness to pay to avoid heart attacks, CV is endorsed by both the United States Department of Commerce and Department of the Interior for certain environmental resource valuations (Portney 1994), and as such my treatment of CV borrows heavily from the literature of environmental economics. Environmental goods that, theoretically, could be subjected to CV include air and water quality, soil conservation, recreational amenities, and major national or international environmental disasters. My basic question is, if CV is sanctioned as an appropriate means by which to monetize the non-market costs of an abstract good like air quality or a major oil spill, for example, could and *should* it be used in local land-use contexts to derive values for the impacts of development and the benefits of amenities?

The idea is intriguing—if a magical device existed that would accurately monetize the aggregate

20. An advisory panel to the National Oceanic and Atmospheric Administration, headed by Nobel laureates Kenneth Arrow and Robert Solow, recommends only "willingness to pay to prevent" when dealing with environmental disasters (Portney 1994).
21. This study considered only existence values, but did so on a national scale. The total settlement (presumably including use values, option values, and market values), was decided out of court for $1.15 billion over 11 years. As of 1994, all CV cases had been settled out of court (Portney 1994).

public valuation, as in my consideration of calibration methods, experts could concoct hundreds of density-bonus scenarios and implement only those that yielded significant value surpluses for the public. CV is most certainly not such an omniscient device, but, according to Portney, it "would appear to be the only method capable of shedding light on [I.e., monetizing] potentially important [non-market] values" (1994, *14*). CV might even perform better in the local land use context, where the area is familiar, the consequences of proposals are clearer, and the catchment area is better defined. Moreover, unlike large-scale environmental valuations, a vast majority of respondents do or would derive either *use* or *option* value,[22] whether positive or negative, from both the impacts and proposed benefits of a given development. These types of preferences, particularly in a familiar neighborhood where values can be pegged to absolute figures (the value of a home) or related to one another (is a park worth the shadow?), are notably easier to quantify than existence values (Vatn 2004): "How much would you pay to avoid/how much could you be paid to accept an extra hour of shadow in your apartment each day?" is a far simpler question than "How much would you pay to avoid the destruction of the Mount Kilimanjaro snow cap?" or "How much would you accept to allow the destruction of an obscure species of tropical insect?" Establishing a common understanding and determining the extent of the affected population present extreme difficulties in environmental valuations that, while still challenging, do not seem so insurmountable in a local, urban context.

To many economists, however, CV presents critical problems in attaining credible, unbiased, and precise responses and therefore yields values that are "not consistent with economic theory" (Diamond and Hausman 1994). While some practitioners simply caution that CV is not "a mechanical process," requiring the exercise of expert judgment and plausibility checks (Smith et al. 1986), Diamond and Hausman conclude that its use in government decision making is "basically misguided" (*46*). Among their many criticisms of CV, they highlight an "anomaly" termed the "embedding effect," in which an attitude is expressed but not properly quantified—and thus is not a true value. Diamond and Hausman use the cleanup of a polluted lake as an example, claiming that the value attached to one lake is similar to that attached to a group of five lakes. When posed the cleanup question, the respondent, they surmise, might experience a "warm glow"—a pat on one's own back for symbolic, moral decision-making—for saving the first lake. However, when made aware of the existence of additional lakes suffering from the same degree of environmental degradation, the individual's expressed value of *each* lake tends to drop precipitously, with negligible difference in the value of one lake or five together. The "glow," it appears, is responsive only to the direction of the decision, not the degree.

This problem is generally not found in valuations of consumer goods. While the marginal utility of each additional consumer good might decline, few situations exist where one unit and five units are valued equally, whether the good is gasoline, foodstuffs, or square feet of real estate. Consumer goods fulfill, or come close to fulfilling, several criteria necessary for rational economic choice: individuals seek to maximize utility, operate individualistically, have ample information, encounter few transaction costs, and goods are homog-

22. As opposed to non-use or "existence" value. In other words, although I will never see a particular endangered species or threatened environmental "landmark"—never derive any use from them—I would pay *x* simply to know that they continue to exist in the world.

enous and entitlements are fully assigned (Fischel 1985; Vatn 2004).

Non-market goods, however, present individuals with "the problem of trying to form judgments about the gains from a purchase in settings where the link between the commodity and utility is hard to evaluate" (Diamond and Hausman 1994, *56*). In alignment with this hypothesis, Diamond and Hausman refer to the results of a CV practice called "verbal protocol analysis," in which the respondent is asked to think through his or her valuation rationale out loud. The transcripts they evaluate reveal an "inherent difficulty" in selecting a value, with many of the decision-making criteria proving to be "irrelevant to evaluating their own preferences" (*48*).

Diamond and Hausman relate this difficulty to the observed fluidity of preferences for non-market goods: "It seems to us that responses to contingent valuation questionnaires for a single environmental issue are likely to be based on little information, since there is limited time for presentation and digestion of information" during a CV survey (1994, *60*). Continuing, they propose that, "if respondents had more information and further time for reflection, including learning of the opinions of others," that valuations would be more accurate. While information and adequate time for its proper digestion is, I submit, a more easily realized prerequisite in a community context, this criticism would still seem to apply to a density bonus tradeoff as well. As Vatn (2004) claims, an individual must "know all states of the world" to determine precise values—otherwise "preferences cannot be considered complete" (*3*). What single individual can possibly approach this ideal of knowing the world, even in one's own small corner of it?

Diamond and Hausman (in reference to environmental damages) suggest that, given the aforementioned difficulties and the host of other biases not considered here, "it might be more informative to have an expert evaluation of the consequences … rather than to consult the public directly" (1994, *56*). While I generally agree with their criticisms of CV—one needs only to begin questioning one's self in order to establish the fundamental difficulties of valuing unfamiliar goods[23]—the idea of removing all decision-making power from the hands of the public seems regressive in the environmental arena, and especially undemocratic in a land-use context. Expert input is certainly crucial to the equation, but while experts might have a better technical grasp of risks, consequences, and alternatives, they are not equipped to determine the public's valuations of these factors without the assistance of the public itself.

Vatn (2004), an economist who borrows tools from the field of social psychology, offers an especially insightful consideration of the unfamiliarity issue in direct valuations. He characterizes a CV survey as a "particular type of communication," in which the interviewer presents *information* and the respondent expresses *preferences* (*5*). The biases associated with this communication (flaws in the conveyance of information and the formulation of preferences) are, in Vatn's view, responsible for producing the internal consistencies or "error terms" that frustrated Diamond and Hausman. The fundamental problem with CV, he states, is a lack of "understanding of how individuals relate to each other and how *social* processes help the individual to

23. Even typical consumer goods present this problem if the purchaser is unfamiliar with how they are typically valued—this is where Consumer Reports and other consumer guides come in. Even a mundane purchase becomes a guess without familiarity and common referents, a point the proverbial politician's question "how much is a gallon of milk?" seeks to exploit.

act reasonably…[even] rationally" (*14, my emphasis*). Both knowledge and preferences, he claims, are socially produced, and as such are results of collaborative or cooperative learning processes. The individual's role in evaluating information and determining preferences is to exercise judgment within a socially-constructed range of "reasonable or permissible" choices. While CV is a means of communication, it is not in any way collaborative (which, if it were, would surely elicit charges of interviewer bias). As such, CV isolates individuals from their standard referents—other people's feedback, opinions, and experiences—and in so doing forces imprecise choices, particularly when the trade-offs involved are unfamiliar.

If we believe that few values are generated in isolation, that they are, for the most part, co-produced through social learning processes, then Vatn's proposal that values should be determined socially, not individually, will resonate. Rather than measuring individual preferences and vertically summing those values, he urges the "facilitation of communicative processes from which people could develop their [collective] understanding and define the values that should have priority." To this end, he suggests "various types of group studies as an alternative or maybe supplement to more individually based studies as [a] basis for defining appropriate social choices" (2004, *10*). In this spirit, a public, participatory planning process, or at least a political one, may be required to negotiate priorities or, otherwise stated, relative valuations.

2.5 Planners and the Public Interest

Before embarking on a discussion of participatory planning, it is important to address head on (and dispense with) the idea of city planners as "experts who know and measure the public interest" (Innes 1996: summarizing Altshuler 1965). If indeed planners knew the public's interest, through the rational, technical tools embraced by the so-called Modern planning movement, then there would be no need to involve the citizenry in any collaborative decision-making process, and Diamond and Hausman's suggestion of expert evaluations would prevail. While the heyday of Modern planning is certainly behind us, many of its enabling myths persist—indeed, as I previously noted, sufficient knowledge of the public interest seems to be the underlying assumption of today's predominant density bonus calibration methods.

A brief summary of the history and significant criticisms of Modern planning, followed by a short critique of especially seminal and progressive counterproposals, is in order. According to Friedmann (1987), in its purest form Modernism was motivated by the faith that rationality could yield superior human settlements and societies. Rational planners generated technical solutions to the problems prioritized by the ruling classes or "power elite," and in doing so were expected to account for the multiplicity of human, natural, and institutional influences on the city. Essentially, this practice amounted to city engineering, a bureaucratic ordering and control of urban space and society using the Enlightment era tools of science and reason. Planners, as such, achieved prominence in the United States during the New Deal, when national planners were elevating a relatively elite conception of the public interest in order to restrain private greed. Their efforts were largely insulated from the accountability of democratic governance. By the 1950s, urban renewal featured planners' attempts to act as "guardians of the public interest," using physical and social engineering to

promote a conception of "social progress."

Rational planning began to draw significant criticism amid the failure of urban renewal and the social upheavals of the 1960s, when social mobilization sprang up to confront the "dark underside" of the prevalent order, in which planning was deeply integrated (Friedmann 1987). According to Scott (1998), rational (or High Modern) planning failed on two accounts: it was rarely, in thought or practice, well connected to democracy or committed to civil rights, and urban problems proved to be far too complicated to bear rational ordering and scientific understanding. Key among these problems, of course, was the definition and measurement of one prevailing "public interest" for the diverse masses of people affected.

Altshuler (1969) and Lindblom (1959), agree that traditional planning, is, at best, fundamentally flawed. Rational planning, by definition, requires its acolytes to better understand the public interest than the public itself, a supremely arrogant presumption. Each offers a proposal for proceeding in the absence of the Modern planning construct. Altshuler focuses on the appropriateness of the goals that undergird policy formulation. Rather than "rationally" formulating goals, he exhorts the planner to spur public discussion and create politically compelling "goal premises" for elected officials. The planner, he posits, must look to the political process to legitimate public policy objectives, suggesting a preference for incremental political bargaining over rational planning.

Lindblom, like Altshuler, posits that democracies change policies through incremental political adjustment. However, while Altshuler advocates that the political process provide clarification of public goals, Lindblom recommends combining the means and ends, arguing that the packaging of policies will best overcome marginal value differences.[24] Lindblom's model of "successive limited comparisons" urges the planner to analyze existing policies in analogous contexts, and then propose incrementally modified versions of these policies. A diversity of backgrounds within the planning authority, each established as a "watchdog" for a given interest, would supposedly ensure equity in the decision-making process.

Davidoff (1965) offers a proposal that casts planners in the role of advocates, obligated to gain credence for the values of parties marginalized by centralized planning. The planner contributes clarity, capacity, and voice to "interest groups," helping them generate their own "persuasive" plans. The planner "represents and pleads" this plan to decision makers, promoting a vision not necessarily his or her own. The result is plural plans, one from each interest group. In this way, Davidoff claims that decision-making becomes a public examination of values.

There is much in Davidoff's idea that enhances the role of planning in society—particularly the urban societies of the 1960s, still reeling from disastrous urban renewal campaigns. His model urges a level of transparency and accountability unknown by most planning agencies. It enables marginalized citizens to propose solutions themselves, rather than just react to plans. Moreover, Davidoff's vision is morally rooted. He seeks to address issues of distributive justice through a process that accommodates "all that is of concern"

24. The packaging of policies is a fundamental tenet of consensus building, although the process itself differs significantly from Lindblom's proposal.

to the public. His model, compared to its predecessors, is more just and more relevant to ordinary citizens. It is problematic, however, in its intention to obligate planners to function disengaged from their own values and potentially in opposition to the plans of their superiors. In Forester's words, "planners can be hired guns or public educators," with Davidoff's proposal clearly tending toward the former (1999, *5*). Finally, Davidoff provides little guidance concerning which interest groups warrant help and how a planner is to be "matched" to a given group, rather than forced upon it.

Both Lindblom and Altshuler effectively establish the need for alternatives to rational planning, but, in contrast with later contributions by Arnstein (1969) and particularly Forester (1999) and Susskind and Cruickshank (1987), neither proposal explicitly brings the public directly to bear on the decision-making process. Davidoff, on the other hand, urges the empowerment of citizen groups through representation by professional planners, but in doing so requires that community voice be channeled by a party not necessarily of that group's own choosing—and who may indeed harbor a contrary agenda—which I find extremely problematic. In short, while rational planning was (and is[25]) insufficient and even backward, particularly concerning the public valuation issue, none of these subsequent proposals offers a clear way forward. The only means of determining public valuation and the range of acceptable tradeoffs is, I submit, for the public itself to produce it.

2.6 Participatory Planning and the Public Interest

The emphasis of this section is the largely qualitative process of participatory decision-making. The institution—and occasionally even the administration (Paris 1977)—of zoning and other land-use controls is marked by one or more opportunities for the public to participate in decision-making. Substantive public participation, while still struggling to gain widespread credibility among planning practitioners (Brody et al. 2003), is credited by many academics as being an indispensable planning tool for crafting better policies with greater legitimacy. Burby (2003) states that "broad public involvement creates the potential for planners to expand their understanding of problems and to develop a stronger set of policies for dealing with them" (*35*), and Brody et al. (2003) claim that participation increases public trust in planning authorities, augments the credibility of plans, and strengthens citizen commitment to policy implementation. Most importantly for my current inquiry, at its best participatory planning helps planners to "learn not only about the facts at hand but inquire about value too, asking what ought to be honored, protected, sustained or developed" (Forester 1999, *1*). Dozens of participatory techniques abound (Sanoff 2000), often used in combination (Brody et al. 2003[26]), but not all techniques are substantive enough to generate the socially-produced, public priorities and valuations important to Forester and endorsed by Vatn (2004).

The problem of determining which participatory techniques, in what combination, are required in

25. "[P]lanners may often ignore the need for widespread participation or comply minimally with state and federal participation requirements" (Burby 2003, 36). Also see Brody et al. (2003).
26. Brody et al. reviewed several state planning participation mandates. They determine that, of the 10 techniques surveyed, the average state employed 3.7 (*260*).

order to approach the ideal of an accurate public valuation is broadly informed by the seminal work of Sherry Arnstein. Arnstein's famous "Ladder of Citizen Participation" (1969) has provided the basis for a great deal of subsequent writing on public participation in governmental decision-making processes and offers a useful starting point for this discussion as well. Writing in the context of HUD's Model Cities program, Arnstein's ideal for public participation was to enable "the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future" (*1*). Although my primary interest is in proper representation for all relevant interests,[27] Arnstein's framework remains a helpful standard for classification and evaluation.

The "ladder" is an illustrative concept representing three qualitative classifications of participation broken into eight "rungs," with "significant gradations" possible. The least substantive level of participation is entitled "Nonparticipation," the intent of which is to co-opt, educate, or "cure" participants—not to enable substantive participation. The associated rungs (in order hereafter from least to most opportunity for participation) are "Manipulation," characterized by "rubberstamp advisory committees" like Citizen Advisory Committees (CACs),[28] and "Therapy," intended to "cure" participants of their "'pathology,' rather than changing the racism and victimization that create their 'pathologies'" (*5*). Without commenting on the contemporary prevalence of this approach by city government, "nonparticipation" is clearly of no use in determining public priorities/valuations because it does not involve the communication of values, preferences, or even basic information to decision-makers.

Following "Nonparticipation" is "Tokenism," the three rungs of which are "Informing," "Consultation," and "Placating." Informing, as Arnstein notes, might indeed be the first-step in a proper participatory process, but "frequently the emphasis is placed on a *one-way* flow of information—from officials to citizens—with *no channel for feedback* and no power for negotiation" (*5*, emphasis added). This rung, I argue, belongs in "Nonparticipation" and is effectively useless in determining public priorities. Consultation, interestingly, is also characterized by a "one-way flow of information," but in the opposite direction. Arnstein most frequently cites the "attitude survey" as an example of the methods residing on this "sham" rung (alongside neighborhood meetings and public hearings). The attitude survey is a first cousin of the contingent valuation survey and is subject to many of its inherent weaknesses, particularly the communication biases highlighted by Vatn (2004). The final rung of Tokenism is Placation, which places "a few hand-picked 'worthy' poor on a stacked community board where they "can easily be outvoted and outfoxed" (*7*). The intent is again obviously to marginalize public preferences, but, significantly, the door to meaningful interaction has nonetheless been opened a crack.

Skipping a rung up the ladder (to the final two rungs, classified under Citizen Power) are Delegated Power and Citizen Control, which Arnstein obviously privileges. Both rungs, however, are, at least in part, flawed like their predecessors in that they promote one-way information flows. A "particularly interesting"

27. Although, like Arnstein, I am concerned that the rights of the so-called "have-nots," particularly economic or racial minority groups, not be trampled by the will of the majority, a topic I address subsequently.
28. CACs, in my experience, are not necessarily simply ceremonial, but neither do they meet the ideal of "Partnership," discussed subsequently. Perhaps "Placation" is a more apt categorization.

model of Delegated Power considered by Arnstein is "separate and parallel groups of citizens and power holders" to conduct what she paradoxically refers to as "joint planning" (*11*). Citizen Control, the top rung, offers even bleaker prospects for productive communication, with the ideal a "neighborhood corporation with no intermediaries between it and the source of funds" (the equivalent in the density bonus scenario would presumably be the ability to write the ordinance and have the Zoning Commission "rubberstamp" it). Arnstein is writing in another era, one of legendary urban disquietude and strife (see Gans 1985, Lukas 1985, Levine and Harmon 1993), so certain allowances must be made, but her implicit endorsement of "one-way" or non-collaborative decision-making at the top of the ladder seems as misguided, if not as sinister, as the "one-way" decision-making of the power-elite at the bottom.

The referendum, unmentioned by Arnstein who appears to favor more localized control, is nonetheless perhaps the ultimate in direct citizen control, the phantom top rung of the ladder. What could be more democratic and empowering, after all, than delegating public decision-making power to the greater electorate? The use of this technique is well established in the land-use and development control context; mandatory zoning referenda have been instituted in some municipalities to transfer authority directly to the citizenry. Paris (1977) takes issue with the types of decisions likely to stem from putting zoning to a vote, arguing that the potential for arbitrary, unfair, and unpredictable decisions is high.[29] The reason for his concern is the "uninformed electorate," a pejorative with which I disagree, which is given veto power over proposals "without understanding their specific features and probable impacts," an assessment with which I concur (*831*). If the electorate is indeed uninformed about a particular issue, it is because of a fundamental flaw in the referendum format—the lack of mechanisms for questioning, debate, and deliberation (Fiorino 1990, Paris 1977), and the lack of contingent or non-dichotomous choices (Fiorino 1990, Susskind and Cruikshank 1987). This unfortunate combination can lead to decisions that indicate the general "direction but not the intensity of beliefs," precluding opportunities for wiser, more broadly beneficial decisions (Fiorino 1990, *232*).

If all people had all information, then perhaps collaborative learning would be irrelevant to good decision-making. But, with omniscience unrealizable, eschewing learning opportunities leads to inefficient, irrational, and potentially harmful decisions (Brody et al. 2003; Paris 1977). Citizens, I argue, need both the benefit of debate and deliberation and the services that planners, lawyers, politicians, and even bankers provide in order to make decisions with adequate information and consideration of alternatives. Although the "publics" involved in a comprehensive rezoning should have some power over *how* their interactions with each other and planning professionals are structured, they should not be empowered to forgo these interactions altogether, which seems to be the ideal espoused by Arnstein.

The rung of Arnstein's ladder that I previously omitted, Partnership,[30] is, judging by her descriptions, the only rung that offers the potential for meaningful communication and collaborative learning—as opposed

29. In Massachusetts, at least, the motivations for decision-making by the body politic are unchallengeable in court. See *Durand v. IDC Bellingham, L.L.C.*, 440 Mass. 45 (2003).

30. As Arnstein says, the rungs are simplifications and there are "significant gradations." Aspects of Placation and Delegated Power (respectively before and after Partnership) are agreeable to the idea of two-way information flows that I advocate for in this section, but neither concept offers the balance of inputs or the spirit of collaborative learning that Partnership does.

to one-way information flows favoring the judgment of either the "power elite" (Manipulation–Placation) or the "have-nots" (Delegated Power and Citizen Control). At this rung, power is "redistributed through negotiation between citizens and powerholders. They agree to share planning and decision-making responsibilities through such structures as joint policy boards, planning committees, and mechanisms for resolving impasses" (*9*). Citizen-leaders are selected for their ability to represent their constituency (by which they are held accountable), and they are endowed with adequate financial and technical resources to reach independent, yet informed conclusions. In short, under the Partnership model, citizens gain "some genuine bargaining influence," but are not sole, or even dominant, decision-makers: decisions must be generated collaboratively through structured negotiation.

Partnership, as delineated by Arnstein, has a great deal in common with the decision-making technique broadly known as "consensus building." Innes (1996) defines consensus building as a "method of group deliberation that brings together for face-to-face discussion a significant range of individuals chosen because they represent those with differing stakes in a problem" (*461*). Susskind and Cruikshank (1987) further characterize the process as *ad hoc*, informal and voluntary, stressing that consensus building is supplemental, rather than an alternative, to "conventional" decision-making—"officials with statutory power must retain their authority in order to ensure accountability" (*11*). Consensus, under Susskind and Cruikshank's definition of practice, is not necessarily a unanimous accord, but rather an "overwhelming" agreement, endorsed by a vast majority (or "supermajority") of stakeholders so that no individual holds veto power (2006).

Most importantly for my current train of thought, consensus building requires substantive communication. True to the fundamental ideals of communication, in a consensus building process information not only flows two ways, but evolves toward more palatable solutions and common understanding. According to Innes (1996), consensus building has "emerged parallel to the idea of 'communicative rationality'," an idea drawn from Habermas's work on "communicative action" and Dryzek's "discursive democracy" (*462*). In this line of scholarship, decisions are rendered rational not through positivistic criteria, but because they are reached through consensual deliberation among all concerned stakeholders, and are thus based on "good reasons" rather than power imbalances. Burby (2003), implicitly concurs by submitting that "progress in dealing with important issues depends on social and policy learning" *(35*), while Brody et al. (2003) recommend the employment of "two-way dialogue" between planners and stakeholders to ensure that plans reflect "public views and preferences." Forester (1989) more explicitly connects this idea of communicatively-generated rationality to process, explaining that, to him, rationality is discovered through an "interactive and argumentative process of marshaling evidence and giving reasons … a process that welcomes, rather than punishes, value inquiry" (*6*).[31]

31. To more clearly highlight the basic, but crucial, value of face-to-face interaction, I find it useful to consider Arnstein's framework in a more familiar consumer context, say television shopping. Toward the bottom of the ladder, the government determines which television you will buy, charges it to you, and then leaves it on your doorstep. Perhaps, as part of the government's effort to diffuse opposition or placate consumers, you are inundated with advertisements endorsing the television in question, or maybe a previously staunch, respected television-choice advocate is hired (co-opted) in order to pitch the idea to protesters. The government might have numerous good reasons for choosing a particular TV—quality, price, compatibility with government-issued DVD players, or

To conclude, I agree with Innes that public valuation, which this chapter has from the beginning prioritized as an essential input for any density bonus calibration model, is best determined in a "qualitative, discursive way," rather than in an "objective way of aggregating multiple diverse goals" in the mode of contingent valuation (1996, *466*). I therefore recommend proceeding with a community consensus building process, adding only the minor qualification that quantitative valuation techniques and so-called one-way communications[32] could indeed play an important supplementary role in predominantly discursive processes. That, however, is a determination for the process participants to make.

2.7 Process Considerations

The preferred means by which I suggest calibrating incentive zoning (or indeed any zoning ordinance) is consensus building, a practice nestled in the theoretical framework of communicative rationality. Of course, in practice communication is often far from rational—difficult personalities can plague public processes—and incomplete or flawed processes can compound the struggles inherent in discursive communication. In other words, a well structured and administered process is critical in order to realize the promise and potential of consensus building.

Susskind and Cruikshank (1987, 2006) have devoted careers to practical strategies for consensus building, and have written expansive Best Practice manuals for practitioners seeking to foster better processes. Beyond simple "accuracy" in determining valuations, they attribute several practical benefits to good process: fairness, efficiency, wisdom, and stability. Fairness and wisdom ("containing the most relevant information" (*30*)), are generally encompassed in my previous discussion of the importance of genuine two-way communication. Efficiency does not have the noble ring of fairness or wisdom, but is nonetheless crucial in an era of limited public resources and short attention spans. Susskind and Cruikshank contend that a "climate in which side-by-side problem solving is possible," as opposed to Arnstein's parallel "joint planning" processes, is a crucial prerequisite to an efficient process (*26*). Finally, a consensus building process is more stable because it makes provisions for correcting mistaken assumptions and preserving relationships (1987).

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local origin (meaning manufacturing jobs)—but true knowledge of consumer preferences is not one of them. This scenario is clearly unacceptable and would certainly be decried as anti-democratic, but, in an especially ironic twist, during the heyday of McCarthyism this is essentially how public goods were purchased.

At the top of Arnstein's ladder you are free to purchase any television you can afford. This abundance of choice, I argue, is a mixed-blessing. While I am free to choose the set that seems to best fit my needs, in actuality I am probably not endowed with the information I need to make this choice. The basic function of a television is well known to us, but it is not a completely homogeneous good (having different perceived brand qualities, resolutions, sizes, etc.) nor is it typically the subject of repeat purchases. Experiential information on a given television is therefore usually quite poor: The TV I covet might be of poor quality, lack features I would otherwise opt for, be incompatible with recording devices, or be rendered rapidly obsolete by a next-generation technology of which I am unaware. In other words, as much as I appreciate the option of choice, I might be ill-equipped to benefit from it. Communication, however, yields the information I need in order to gain more overall satisfaction from my purchase. For any large consumer investment we typically consult neighbors, ask questions of salespeople, read Internet reviews or Consumer Reports, and often rely on one or more government agencies to ensure minimum standards for our purchase. Just as this discursive communication (supplemented by trusted one-way information flows) helps us choose better consumer goods, it can also help communities choose better plans.

32. "One way to think about appropriate techniques is to have techniques for one-way planner output of information, for one-way input of preferences, and for two-way dialogue" (Brody et al. 2003, *260*).

Consensus building entails five general steps: 1) Convening, 2) Situation Assessment (sometimes called Conflict Assessment), 3) Designing the Process, 4) Deliberating and Deciding, and 5) Implementation.[33] Convening is the foundation of the process; no matter how well constructed the rest of the process is, it cannot succeed if it is built on a flawed foundation. In order to convene, of course, a convener must emerge. In a rezoning process this is often the Mayor, through the Community Advisory Committee (CAC) mechanism. A City Councilor, Planning/Zoning Commission Chair, or even a community-based organization could, under the right circumstances, assume this role. Essentially, the convener is a party motivated to seek a fair, efficient, wise, and stable agreement on a given issue and who possesses the resources to underwrite the process.

In *Breaking Robert's Rules* (2006), Susskind and Cruikshank collapse Situation Assessment into Convening, and indeed they are closely related elements. An assessment helps determine who comes to the negotiating table, which issues they care about, and how those issues relate to the interests of the other participants. Assessment, as Susskind and Cruikshank note, is best carried out by a "neutral" party, sometimes a hired facilitator and other times a widely-trusted individual with no direct stake in the outcome. Assessment is an iterative process. Typically, the assessor will start with private and confidential interviews of, in the words of Susskind and Cruikshank, the "obvious stakeholders."[34] In a comprehensive rezoning process, likely candidates would include impacted landowners/developers and organized citizens groups. From these initial interviews will emerge the names of other potential stakeholders, and so on until a wide net has been cast in order to conscientiously recruit at least one legitimate representative for each interest group. The typical CAC, it is worth noting, is indeed composed of a range of representative stakeholders, but is rarely as comprehensive or inclusive as the consensus building approach would yield.[35]

Especially when bringing people to the table in order to discuss an incentive zoning proposal, it is important to again recall the three publics problem. Rarely does a neat alignment exist between those benefiting from the bonus amenity, those impacted by the additional burdens of development, and the general public—represented by the city's executive branch—which stands to benefit through increased property tax revenue.[36] Particularly when those bearing burdens belong to groups that typically go unrepresented in formal or informal power structures (potentially the poor, the very young, very old, or certain racial or ethnic minority groups), it is the shared responsibility of the convener, the "obvious" stakeholders, and the assessor to ensure that *every* stakeholder interest is fairly and effectively represented in the discussion.

Consensus building, it should be noted, is not appropriate for every circumstance; if a powerful party

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33. In *Breaking Robert's Rules* (2006), Susskind and Cruikshank use a somewhat different formulation that nonetheless offers the same substance: 1) Convening (which includes Assessment), 2) Assigning Roles and Responsibilities, 3) Facilitating Group Problem Solving, 4) Reaching Agreement, and 5) Holding Parties to their Commitments.
34. A "stakeholder" is simply any party with a "stake" in the decision.
35. In Boston, for example, the presiding City Councilors nominate CAC representatives, but the BRA's final method of selection remains mysterious (Laderman 2007).
36. To further complicate the issue, the construction unions, for example, are known to speak out in favor of nearly every major development project as a matter of self-preservation. Groups benefiting through job creation and economic development could conceivably constitute a fourth public.

is not inclined to negotiate or has more attractive alternatives, other measures may be in order. The assessment step is a means of preemptively considering the barriers to and opportunities for a fair, durable agreement. In an incentive zoning proposal, relatively few alternatives exist for parties without statutory authority (perhaps exceptions would include so-called company towns or instances where a single ownership entity possesses a great majority of the impacted properties). Ideally, in the context of a zoning process, the convener will be an elected or appointed authority with the power to formally implement the informal agreements produced by consensus building. If the convener is not empowered as a public decision-maker (a community group, for example), the presiding official should be consulted before the process commences. If the official decision-maker refuses to buy in to the process, the convener can either pursue alternate avenues or, as often occurs, preside at the head of a "protest" or "parallel" process.[37] Without passing judgment on such processes, I submit that the absence of official support, as well as the general aims of the exercise, should be made explicit to all stakeholders at the beginning. Otherwise, the potential for frustration and disillusionment is high.

Designing the Process involves the establishment of stakeholder roles and responsibilities and lays the groundwork for productive communication and decision-making. This step should take place at the first plenary session, and the results should be recorded and distributed for future reference. With the rules for engagement established, the stakeholders enter the substantive portion of the process, Deliberating and Deciding. Susskind and Cruikshank (2006) helpfully characterize the explicit aim of this step as "maximiz[ing] joint gains," or "expand[ing] the proverbial 'pie" in order that each party receives a "larger slice" (*178*). The "most efficient way to expand the pie," they claim, "is to look for mutually beneficial trades, or what are called packages, that give each group more of what is most important to them, in exchange for granting others what they need."

The mention of pie naturally recalls the concern of Getzels et al. (1987) for converting amenity "apples" and development "oranges" into cash equivalents in order to facilitate trades. While money may well enter into the discussion, discursive bargaining may preclude the need to perform an explicit "apples-to-apples" conversion. Rather, in the course of assembling packages, parties may well make intuitive, qualitative conversions. Of particular relevance to this idea, Susskind and Cruikshank (2006) suggest playing the "what-if?" game, where stakeholders "invent" hypothetical scenarios and then test them through dialogue in which stakeholders are challenged to improve upon one another's suggestions. Again, the issues at stake in a density bonus discussion are likely to concern use, form, amount, distribution/location, and administration—all of which should be drawn upon and traded across in order to invent more broadly acceptable packages.[38] When agreements are eventually struck, Susskind and Cruikshank recommend that they be recorded in a "single-text" procedure, meaning that all group decisions are unified in a single document, which is then distributed

37. I suspect the KAFNI report referred to in the following chapter was the result of just such a process, but, beyond several intimations of discord in the document itself, I cannot confirm this speculation.

38. For instance, Stakeholder A, a developer, lays his hypothetical proposal on the table. Stakeholder B, a neighborhood resident, has five broad categories, each with a different value, to choose from in order to improve the package. Stakeholder B might have strong ideas about the appropriate form and location of new development, for example, but care less about use, amount, and administration. If Stakeholder A cares more about use and amount, a series of "what-if" proposals might indeed net a mutually acceptable solution.

to stakeholders in order to promote greater clarity and understanding.

Zoning, and particularly incentive zoning, can be complicated, and the implications for the built and natural environments can be uncertain. A clear need exists for the establishment of methods to insure the credibility of technical information; Susskind and Cruikshank (2006) suggest a practice they call Joint Fact Finding (JFF). JFF requires the creation of "expert" subcommittees that take on assignments from the larger group related to technical methods, data, findings and interpretations in order to establish the factual basis—essentially mutually agreed-upon technical assumptions—for broader policy decisions. This approach enables the community to negotiate on a common basis with resource rich entities (in a zoning context, city governments and developers) and supplants the more typical, courtroom style war of the experts. Not only does JFF build shared understanding, it also enhances and improves collaboration among stakeholders and facilitates trust among them.[39]

In the final chapter of this thesis, I offer an incentive zoning proposal that entails so much complexity and uncertainty that, given my limited resources (I am not an environmental scientist, an architect, nor a traffic engineer), I am unable to evaluate in a manner that adequately reflects its multi-dimensionality. Were this a proposal meant for actual implementation in a specific district, it would behoove the CAC to delve into the potential impacts on air quality, stormwater, traffic, and other key livability measures using a Joint Fact Finding framework. Even the height and density simulations I offer would benefit from JFF. The perspectives, colors, or even background atmosphere could all be said to constitute visual biases—what, for example, would the streetscape look like snarled with traffic (I use automobiles for perspective, not to project Level of Service) or on a bleak winter afternoon? This is an issue to which I devote considerable thought in the following chapters as I create my own proposal and generate simulations with which to illustrate it.

The JFF subcommittee must, of course, reintroduce its findings to the broader consensus building process, which in turn must translate them into a policy-driven discussion of tradeoffs—which is what the density bonus calibration is all about. Ultimately, I submit, the proper density bonus calibration will be found not by crunching probable developer ROIs in the isolation of a planner's cubicle or through the one-way communication of the economist's survey, but through the process of informed, structured two-way communication: consensus building.

It is important to note that, in all likelihood, a public hearing, and in some jurisdictions, a referendum, will follow consensus building in order to fulfill public participation requirements. Neither should present an obstacle to implementing negotiated agreements *if* the process has been conducted properly from start to finish. If, on the other hand, the public hearing is especially contentious[40] or the voters flunk the plan, then clearly the process was fundamentally flawed. By themselves, these "one-way" public feedback

39. Again, Stakeholder A and B are in negotiation. Stakeholder A proposes a height limit of 150'. Stakeholder B is concerned about the impacts on daylight, shadows, and street level winds—but otherwise not categorically opposed to the proposed height. A JFF subcommittee on shadow and wind impacts could help facilitate an agreement by delivering trusted technical information, visual simulations, and even possible mitigation strategies.

40. Public hearing "professionals," citizens who attend every hearing and often deliver fiery orations, may never be placated. Real concern should arise when "reasonable" people express substantive opposition to the plan.

mechanisms might have little to contribute to substantive planning efforts, but in conjunction with consensus building they can be seen as important checks to ensure the validity of the process.

2.8 Implementation and Administration

The consensual agreements forged through community process are only effective if they are implemented (relatively) intact. In a zoning context, the role of the "single text" documentation of agreements recommended by Susskind and Cruikshank (2006) is, in effect, encapsulated in the resulting plan—which in turn is codified and implemented as the new or revised zoning ordinance.[41] Plans, according to Neuman (1998), "connect people to places by bringing people together to shape a common destiny for their places and themselves." The completed consensus-driven plan, therefore, stands as a crystallization of the hopes, expectations, and even concerns of all stakeholders participating in the community process.

Ideally, the community-generated plan serves many functions. An articulation of purpose, a discussion of qualitative criteria, and a general delineation of goals are, of course, important (and will be carried over to the zoning ordinance in abbreviated form as the "Statement of Purpose"). The quantitative bases for decision-making (as determined through JFF) enrich and clarify sometimes vague policy articulations, and are often given expression in the document through charts, graphs, matrices, and projections (Neuman 1998). The plan, however, is not properly complete—as an expression of the process which informed it—until specific steps for implementation are layered on, which may include phasing diagrams, concurrent infrastructure investments, maps, visualizations, and even procedures for renewal or re-evaluation. This level of specificity might be criticized as overkill or, alternatively, political suicide; "fear of drawing lines that are legally binding and fear of presenting maps in public arenas are skeletons in the planning closet" (Neuman 1998, *215*).

Those "lines," literal and metaphorical, will, however, eventually need to be drawn and recorded as rules, in the form of the resulting zoning ordinance.[42, 43] Zoning maps, eligibility standards, density bonus award guidelines, development review procedures, and other terms and conditions—sunsets, caps, or liquidating bonds, for example—are integral to the plan; there should be no opportunity for planners and lawyers to guess at the framer's intentions.[44] The plan can (and should) also be used whenever possible to specify procedures essential to effective administration and enforcement. This is not to say that development control officials and building inspectors should be denied all opportunity for discretion—doing so would remove administrators' flexibility to deal with unexpected variation and nuance. Rather, it simply makes sense to

41. I, of course, do not have the benefit of a community-generated plan that deals specifically with my proposal. In formulating my model ordinance, however, I rely heavily on relatively recent neighborhood planning efforts.
42. While I have only anecdotal evidence on the actual process by which the West Fenway Land Use Plan was generated, the resulting zoning ordinance (Article 66) closely reflects the spirit, as well as the specifics, of the plan.
43. A planning document does, in many ways, crystallize the goals, hopes, and desires of a specific set of people in a particular moment in time. Neighborhood demographics are bound to change. In the short run at least, I consider this less of a challenge. Just as standard zoning reflects the preferences of existing residents, so too does incentive zoning. As I previously posited, both impacts and amenities will be implicitly capitalized into rents and home prices, and those who derive the most net utility (utility of amenities minus disutility of impacts) from new development will be willing to pay the most to live near it. Over the long term, this phenomenon might to some extent "correct" for errors in initial public valuations.
44. I attempt to address these issues in the model LEED density bonus ordinance (see Chapter 4).

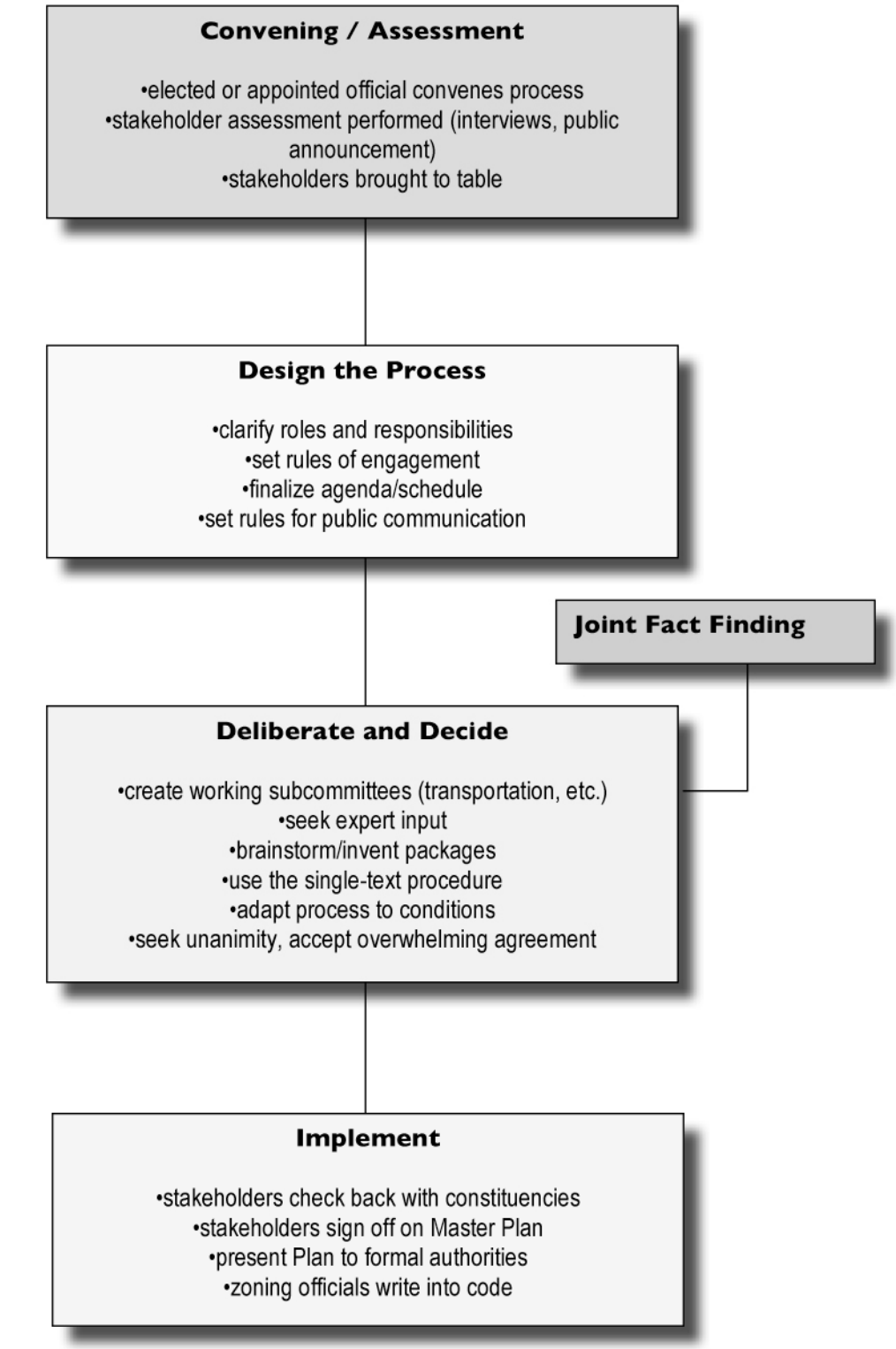
make basic provisions for effective implementation and to plan for, as Susskind says, "predictable surprises" (2006a).

To illustrate this subtle point in an incentive zoning context, if the bonus amenity is public open space, as in the original New York City ordinance, then poor maintenance and lack of accessibility—which Kayden (1977) discovered was indeed the case—could result in the effective retraction of that community benefit. Possibly as a result of Kayden's unfavorable analysis, the city's 1982 code revision began requiring a bronze plaque, to be displayed in a prominent place, which specified the number of trees and moveable chairs required in the plaza (for anyone who cared to count), the name of the owner and superintendent, and a pledge of handicapped accessibility. Moreover, before an occupancy permit would be issued, the code required that a performance bond be posted with the City Comptroller should serious compliance issues arise. I suggest a number of similarly themed measures in the LEED density bonus ordinance presented in the following section.

Finally, although incentive zoning looms large in this thesis—and sometimes, as a necessity, precludes discussion of other relevant considerations—it is, in reality, only a small facet of land use and development control policy. It is my view that, in order to allow residents and developers to properly evaluate the effects of incentive zoning, the provision of bonuses should not substitute for a comprehensive rezoning. This is to say that, ideally, a density bonus is not just awkwardly melded onto an antiquated, obsolete ordinance as an interim patch, but rather integrated into a new zoning ordinance that reflects current conditions (so-called "normal zoning").

Article 66, which specifies zoning for the Fenway, was adopted in 2004, so the underlying zoning can be considered "normal," and therefore incentive zoning would not be adopted to correct a land use deficiency, but rather an environmental deficiency. However, were this proposal meant for immediate implementation, the relative immutability of the underlying zoning (it would ask too much to reconvene the CAC in order to reconsider every facet of the 2002 plan) would prove a major barrier to success. The only truly appropriate means of implementing the following proposal would be through a start-to-finish comprehensive process, where baseline zoning, transportation, environmental quality—and a host of additional planning components—are all considered in an integrated manner.

Consensus Building Flow Chart: Local Zoning Process



Chapter 3: The Study Area, West Fenway

3.1 Introduction

As I mentioned in the "global" introduction of this thesis, my primary aim is to consider a relatively unexplored[1] means (the LEED density bonus) of incentivizing developers to voluntarily adopt measures that decrease the environmental impacts of their projects. The first task I set for myself was to better understand the density bonus itself, a deceptively demanding endeavor. That effort, the evidence of which preceded this section, treated the policy, legal, economic, process, and administrative aspects that animate the density bonus. Neglect of any of the foregoing considerations may well detract from the technique's precision, flexibility, overall efficacy, and legitimacy, and therefore the conscientious design of any density bonus requires the devotion of careful attention to all of them.

The second task, which I undertake below, considers how LEED (an unconventional amenity) might be integrated into a density bonus ordinance, and then applies, through computer simulation, a series of three possible density bonus build-out scenarios to a particular study area. The aim of this exercise is not to determine which scenario is right or wrong; only the receiving community, with the assistance of technical experts and input from developers, is qualified to make that judgment. Rather, the idea is to enrich the more abstract, sometimes theoretical, conclusions reached in the previous section by considering the density bonus in its "natural habitat"—in context. In so doing, this section will also serve to introduce a tool for use in the calibration-consensus building process: a visual (and potentially also quantitative) representation of development scenarios under various density bonus provisions.

Of course, if one is to "apply" the density bonus, a study area must be chosen. My interest is in urban areas that 1) have sufficient undeveloped or underutilized land, 2) are experiencing (or are likely to experience in the near future) pressure for new development beyond that which is allowed as-of-right, 3) have "normal" (Fischel 1985) underlying zoning that reflects the current needs of residents and realities of development, 4) have adequate infrastructure, including public transit, 5) are not considered "environmentally stressed," and 6) have abundant GIS data available (not a strict requirement, but a useful feature).

Conveniently, the neighborhood in which I have resided for nearly four years, the West Fenway of Boston, Massachusetts, fulfills all of the above requirements and will thus serve as my study area. For me uniquely, the area has two more distinct advantages over other areas worthy of consideration:[2] I can directly apply so-called informal, local knowledge to supplement and balance this formal, academic treatment, and, perhaps most importantly, any intervention I propose would affect me too.[3] While admittedly I tend to

1. In fact, I was not aware of the recent LEED density bonus adopted by the County of Arlington, VA until after beginning this project (it is difficult to conceive a totally novel idea, I suppose).
2. Originally, I had intended the study area to be Boston's Seaport District, a rapidly evolving area with vast tracks of open land still to be developed (I expect the future reader will marvel at this characterization of what will surely be a fully built-out neighborhood in 25 years or so). Because, however, there is very little population actually living in the area (although adjacent communities have shown considerable concern for activity within the district), it is more institutionally complicated (with Massport, a quasi-public state transportation authority owning over 300 acres and claiming exemption from Boston zoning), and it has relatively meager transportation infrastructure, I felt that the Fenway would be a better choice for this exercise..
3. The closer alignment of personal and professional interests could be one reason (among many) why many cities, Boston included, have residency requirements for municipal employees, although I have never heard this justification explicitly.

embrace dense development more readily than many others active in Fenway neighborhood affairs[4] and my viewpoints cannot be considered representative in any way, this alignment of my study area and my "living" area keeps me honest and helps me empathize with my "subjects." It is just as likely to be my apartment that loses sunlight or the bus on which I am a passenger that gets stuck in rush hour traffic as a result of my proposal.

3.2 Physical Delineation and Overlay Area

Fenway/Kenmore is the westernmost neighborhood district within Boston Proper, situated to the west of the Back Bay, north of Roxbury and Mission Hill, south of the Charles River, and east of Brookline and the Longwood Medical and Academic Area (LMAA). A more precise, but potentially contentious, definition would bound Fenway by Massachusetts Avenue to the east, Huntington Avenue to the south, a string of minor roads to the west commencing at the Museum of Fine Arts and wending to Boston University,[5] and Commonwealth Avenue to the north.

Hybrid map/aerial photograph of the West Fenway neighborhood (Google Earth).

The Boston Redevelopment Authority (2003) weaves together several census tracts to create Fenway/Kenmore, portions of which are in areas that the residents themselves (and city parking stickers) might identify as Mission Hill, Roxbury, the Back Bay, or even the South End. The resulting land area is 1.24 square miles (of Boston's 48.4). My informal delineation, above, is certainly less than one square mile.[6]

The West Fenway residential neighborhood is a small slip of land in the greater Fenway wedged between Park Drive (following the kidney bean-like contours of the Back Bay Fens) and Boylston Street. It is logically delineated by its pronounced separation from the other neighborhoods under the Fenway/Kenmore umbrella—from the East Fenway by the 106-acre Back Bay Fens park, from Kenmore by Fenway Park, from Brookline by the medical and academic institutions of the LMAA, and from Audubon Circle by Boylston Street and Landmark Center (a 1929, 1.3-million square foot former Sears outlet now used as

4. I serve on the Fenway Community Development Corporation Board of Directors and its Urban Village Planning committee (one duty of which is to review development proposals) and am well aware of the wide range of views concerning new development in the Fenway.
5. Louis Prang, The Fenway, Park Drive, and St. Mary's Street.
6. It coincides roughly with the 550-acre (about .88 square miles) study area delineated by the BRA in a 1989 report on Fenway/Kenmore.

office and retail space).

The proposed Fenway LEED Density Bonus Overlay Area (Overlay) corresponds with the North Boylston and South Boylston Neighborhood Business subdistricts (NS-2 and NS-1, respectively).[7] NS-1 is adjacent to the West Fenway core (best distinguished by its inclusion in the Neighborhood Design Overlay District) and NS-2 is across Boylston Street adjacent to the Fenway Triangle Neighborhood Development Area (I.e., Fenway Park). Combined, NS-1 and NS-2 (the Overlay from now on) are 750' at the widest point, and run together for just over one-half mile before NS-1 terminates and NS-2 branches off to follow Ipswich Street, terminating at the Massachusetts Turnpike.[8]

3.3 Open Space

While the name Fenway is currently famous for the baseball park that bears its name, the name is derived from the neighborhood's most distinctive geographical feature, the Back Bay Fens, which occupies about 15% of the district's acreage (BRA 1977). Originally, the Fens were indeed a tidal, saltwater fens—an area of "low, flat, marshy land," or, in other words, a bog (Webster's 1997).[9] Buildable land was scarce, with only the tip of Sewall's Point (now Kenmore Square) and Gravelly Point (now roughly followed by Hemenway Street) legitimately solid (Seasholes 2003). Two major freshwater streams, the Muddy River and Stony Brook (now culvertized) fed into the Charles River, merging at the site of the present day Museum of Fine Arts. By 1814, several tidal mills had been erected, and in 1821 the Mill Dam was built, extending all the way to the Beacon Hill Flats following the line of present day Beacon Street. By the early 1840s, the area was crisscrossed by canals, causeways, and major rail lines, including the Boston & Worcester (now commuter rail tracks) and the Boston & Providence (now the Orange Line, commuter rail, and Amtrak tracks).

The Back Bay Fens, facing east from the roof of 35 Park Drive (photo by author).

In 1877, with the fens becoming a serious sanitary problem due to the disposal of raw sewage, the city approved the creation of "Back Bay Park," a plan submitted by F.L. Olmsted.[10] In addition to addressing the ills of solid waste pollution, Olmsted's scheme was to serve as a flood control mechanism—a massive storage basin—with a series of presumably floodable recreational amenities, such as bridle paths and carriage ways, lining the scenic waterway. The general outline of the park, including the accompanying street grid, survives largely intact today. The 106-acre parcel was purchased for the sum of $450,000 in 1877 (Pollan et al. 1983),

7. I exclude two properties of which more than 50% of the area falls within the Greenbelt Protection Overlay District (GPOD).
8. Normally, the determination of the overlay borders should be a matter for the affected citizens, relying on logical breaks such as major highways, use changes, or natural features when available.
9. The area is probably referred to as a fens, rather than simply a marsh, because of a prominent, half-million acre wetland (now drained) near Boston, England called The Fens.
10. This was Olmsted's first formal association with the Boston Parks Department (Seasholes 2003).

dredging and bridge building began in 1880, the boundary roads (now Park Drive and The Fenway) were built by 1885, and by 1894 all work was complete (Seasholes 2003).

With the original plan freshly implemented, more changes were to come. In 1910 the Charles River was dammed, ending the brackishness of the Fens for good and allowing the growth of a greater variety of plant life.[11] Soon after, the city began depositing large quantities of soil, from ongoing subway excavations, into the former tidal estuary. This practice diminished its size and presumably undermined its flood controlling properties. Today's Muddy River is, as a result, a much less prominent feature of the Back Bay Fens than originally intended. By 1912, greater demand for recreational amenities induced the city to fill in a large section of the Fens south of Agassiz road, and between 1925 and the early 1930s, a ball field (now Roberto Clemente Field), a running track, bleachers, and a rose garden (Kelleher Rose Garden) were added (Miller 2001). At the commencement of World War II, the 46-acre Fenway Victory Garden, allowing urbanites to grow their own vegetables, was carved out of the Fens between Agassiz Road and Boylston Street. This tradition of urban gardening has continued to the present, giving rise to claim that this is the last of the original Victory Gardens (Fenway Garden Society 2007).

The Fenway Victory Gardens (photo by author).

With the minor additions of two basketball courts and a war memorial, the Back Bay Fens (as bounded by Boylston and Brookline Avenue) have not undergone substantial landscape changes since the 1940s. The original entry parcels, craftily designed to extend access to the park out to the major thoroughfares of Commonwealth Avenue, Huntington Avenue, and Brookline Avenue, have unfortunately been marginalized. The Bowker Overpass, connecting Boylston Street to Storrow Drive, has irreversibly altered the Commonwealth entrance, "obliterating the original Olmsted landscaping" (Pollan et al. 1983, *19*). The Brookline Avenue entrance was paved over for a parking lot in the late 1950s, which has since been removed as part of the Landmark Center project (although the Muddy River has not yet been re-daylighted). Finally, the Huntington entrance, now called Evan's Way, remains intact, but is obstructed from Huntington Avenue by the massive Massachusetts College of Art building.

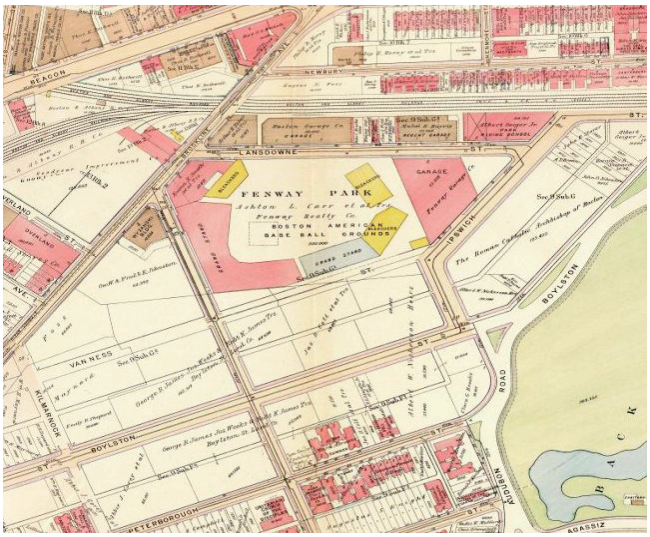
3.4 The Built Environment

The built history of the neighborhood is easily traced through an inspection of the periodically issued Bromley Ward maps for Boston and Roxbury (courtesy of the BRA's online Boston Atlas). In 1895, the Back Bay Fens and bordering parkways are shown, along with the interior street grids. While the East Fenway is nearly half built out, in the West Fenway building parcels have not yet been delineated (this would not hap-

11. The initial salt-resistant waterside plantings did not thrive, causing some to characterize the area as desolate (Seasholes 2003).

pen until 1900) and not a single non-hydrologically related building exists.[12] Ownership is mapped as large, swirls of land—there is hardly a straight line, with no correspondence whatsoever to the recto-linear street grid. By 1902, the interior streets had been named, alleys constructed, and land ownership has been tamed by the street grid (the largest owners are the Boston Water Power Company[13] and Harvard College). A solitary, single-family residence exists at the intersection of Queensberry Street and Audubon Road, the fortress-like Robert Treat Paine house, now condominiums. Later that year, a second townhouse, for MIT professor of architecture Theodore Clark, would be constructed at 107 Audubon Road. A row of six modest three-story row houses was constructed in 1903 at 22-32 Peterborough Street, but these would be the last single-family residences constructed in the West Fenway (until 2005), and are now considered "anomalies" in the neighborhood (Pollan et al. 1983).

The 1917 Bromley Ward map speaks of a dramatic transformation in the 15 intervening years. Fenway Park, pre-Green Monster, is five-years old, and the Archbishop of Boston, owner of a 125,000 square foot parcel across the street seems poised to make a major investment (but would instead sell to the Post Office, depriving the Red Sox of grace they sorely needed). A small, odd shaped lot is carved out of the Archbishop's land for Mrs. Robert Treat Paine, while the original Robert Treat Paine house has become the eclectic Chapel of the Vedanta Centre.[14] The Theodore Clark house has also been transformed for institutional use, now serving as the Audubon Hospital (Pollan et al. 1983). And, while speculators still hold entire blocks undeveloped, several rows of 4- or 5-story masonry walk-ups have been erected.[15] These structures now typify the neighborhood's residential building typology. Notable for its absence amidst this flurry of building, however, is the existence of a solitary structure along Boylston Street from one end of Audubon Road (Park Drive) to the other (the proposed Overlay).



1917 Bromley Ward Map (Boston Redevelopment Authority).

By 1938, the last Bromley Ward map for the area, only one vacant parcel remains east of Jersey Street in the core neighborhood.[16] West of Jersey is also well populated but dotted with vacant lots, the build-out of

12. A number of attractive gatehouses were built to control flows from the Stony Brook and to regulate the water intake from the Charles River. These exist today but are now ornamental.
13. In was the Boston Water Power Company that, in 1859, obtained permission by legislative enactment to fill in the Back Bay, a much more famous instance of landmaking in Boston (Seasholes 2003).
14. This group is dedicated to "all the world's religions." They are now based in Cohasset, Massachusetts (www.vedantacentre.org). By 1938 the building was inhabited by the Church of Jesus Christ.
15. "These speculator-built apartment houses varied in quality of construction, and, subsequently, in their maintenance" (Ganz 1988).
16. This parcel would remain undeveloped until 2004.

which would occur much more slowly (through the 1980s). The overlay area is now sparsely developed with single-level automobile garages and gas stations. Save for the subtraction of a few minor buildings and the addition of a supermarket, two fast food restaurants, and a motor inn during the 1960s and 1970s, neither the uses nor the streetscape would change much until the Fenway rezoning in the early 2000s (see Planning and Zoning, below).

3.5 Urban Renewal and the History that Almost Was

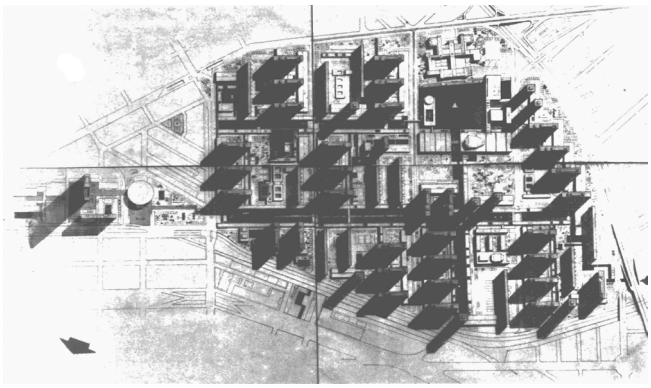
Urban renewal, infamous in Boston for razing the old West End and Scollay Square, was kinder to the Fenway (and left the West Fenway untouched)—but not for a lack of planning. Among the first documents to anticipate the consideration of urban renewal programs for the Fenway is the so-called *Fenway Redevelopment Plan,* produced by graduate students of the MIT School of Architecture in 1954-55. The Fens was then a mere 60 years old, and a majority of the West Fenway housing stock was only 30-40 years old.[17] The design problem was focused on providing "a valid pattern of urban form in American cities," and featured the hypothesis that "the success of residential building forms are most acceptable through harmonious interaction with natural elements" (*cover).* The accompanying neighborhood assessment returns only one salient finding, that "the magnificent riverscape" has been marred by expressways—although the egregious insult of the Bowker Overpass[18] was yet to come.

The studio was divided into four groups, each delivering a unique proposal. Group A offers a relatively incremental approach, keeping most of the existing building stock (which they describe as being in "excellent condition"), maintaining Fenway Park, and keeping the outline and general features of the Back Bay Fens. They surround Fenway Park with 5000 parking spaces, shielded from the existing neighborhood by a curvilinear superblock apartment building of at least 1000 feet in length. Boylston Street, meanwhile, has been removed in its entirety (replaced by new housing and green space) and a new freeway,[19] featuring a massive interchange across from Landmark Center, replaces the western portion of The Fenway. The East/West Fenway neighborhood population undergoes a slight increase, from 17,000 to 18,000. The vision offered is, in many ways, startling, but, as a particular credit to these students in an era of *tabula rasa* development, it retains many of the Fenway's defining features.

The other three schemes are all, to varying degrees, horrifying. All involve the destruction of Fenway Park, the Back Bay Fens, and every existing residential and commercial building, while two of three demolish Symphony Hall. Only the Museum of Fine Arts remains in all three. One version doubles the number of residents, while the other two nearly triple the neighborhood population, to 50,000. See, for example, Scheme C, which accomplishes this dramatic population increase by building a series of 32- and 22-story income-segregated towers over the Fens. In Scheme D, 16,000 parking spaces (only 1000 fewer

17. The building in which I currently live, a four story masonry structure typical of the neighborhood, was 31 years old, for instance.
18. The Charles River Conservancy, for example, claims that Bowker is viewed by "urban planners worldwide as an environmental abomination of the first order." www.charlesriverconservancy.org/press/press_releases/BU_stormy_waters.html. Accessed April 14, 2007.
19. Presumably anticipating the construction of the "Inner Belt" expressway, which never occurred.

than there were original residents) are accommodated underground, connected to the new freeway by a few endlessly[20] meandering interior streets. Overall, these three "towers in a park" schemes resemble the redeveloped West End to a frightening degree, presaging the callous attitude of urban renewal advocates toward existing physical context and demographics.



Scheme C (MIT School of Architecture 1955). Buildings anticipating the Prudential Center are at far left.

Although students developed these proposals, they certainly had analogues in practice. In 1958, a report entitled *Fenway-Parker Hill Area: Its Problems and Potential*, was authored by Isaacs, Sasaki, Nagel, Consultants.[21] Without precisely delineating their study boundaries, the authors characterize the Fenway-Parker Hill Area (which would seem to exclude, but nonetheless bears relevance to, the West Fenway) as "blighted in a large portion, overbuilt and overcrowded in others, badly laid out, and subject … to indiscriminate and opportunistic commercial projects." Based on their assessment that "the majority of existing structures lack[ed] sufficient structural and site development values to warrant their retention," they suggest widespread demolition and the development of "medium-rent, high-rise apartment buildings" (*2-4*).

Presumably in response to the sub-standard conditions highlighted in the 1958 report, in 1965 the Boston Redevelopment Authority created the Fenway Urban Renewal Area and proposed a broad slate of large-scale redevelopment, primarily in the East Fenway. While several of these interventions eventually came to pass, the Church Park apartment block and garage (across from the Christian Science plaza) was the only project of significance executed west of Massachusetts Avenue and north of Huntington Avenue. Outrage stemming from this project (and other urban renewal projects closer to the Prudential Center) spurred a lawsuit,[22] pitting "certain residents versus planned redevelopment," which finally resulted in the subsequent formation of the Fenway Project Area Committee (FenPAC) in the early 1970s (BRA 1977). By that time, however, the government-enabled destruction of so-called blighted urban neighborhoods had run its course. It would be another 25 years before the next major eminent domain proposal would affect the Fenway, this time involving the relocation of Fenway Park (see Planning and Zoning, below).

3.6 Residents and Demographics

With the newly minted Back Bay Fens as an attractive centerpiece, the population of the Fenway began to increase rapidly at the turn of the 20th century. Although the early construction of the Robert Treat

20. From some locations, a mile or more must be traveled in order to reach higher capacity city streets.
21. For whom it was authored is unclear. The transmittal was to Richard Overholt, Acting Chairman of the Sponsors' Committee on the Fenway-Parker Hill Study.
22. *Jones v. Lynn*, 354 F. Supp. 433 (1973). The appellees claimed that they had "been injured or will be injured as a result of the decrease of availability of decent low income housing in the Symphony area and by the change in the character of the neighborhood." The prayer for an injunction of urban renewal activities was initially denied, but later granted on appeal.

Paine house anticipated a predominance of spacious townhouses in the new West Fenway neighborhood (which did in fact occur along The Fenway, see Pollan et al. 1983), speculative developers quickly established the neighborhood tone by erecting blocks of fairly large "second-class"[23] apartment buildings just after World War I. Retrospectively at least, these initial owners evinced pride in their properties and interest in the neighborhood in general. Writing in 1977, the BRA sentimentally claimed that, "property was owned by neighborhood residents or absentee owners interested in a solid, long-term return on their investment … landlords chose tenants carefully and maintained their property; and an overall feeling of stability and confidence was shared by owners and residents alike."

While early neighborhood-specific statistics are scarce, a building-by-building census examination begins to sketch a neighborhood of young families (couples in particular) and young professionals. My own building (constructed in 1922), sheltered 38 residents in 17 units, with five children (in 2007 there are none). Professions include several automobile salesmen (some of whom, in a twist of irony, likely walked to work at Studebaker or Chevrolet), a doctor, a druggist, an engineer, and multiple hairdressers, stenographers, and department store clerks.

By 1950, the Fenway was home to 36,649 people (Ganz 1988), with about 7,500 residing in the West Fenway (MIT School of Architecture 1955). Sweetser (1961) provides a valuable demographic description of the West Fenway: 14.7% of West Fenway residents were under 17 or over 65, 14.2 percent were foreign born, and only .6% were non-white. The degree of overcrowding was 12.3%, on par with the city average (BRA 1971). The ratio of women of child-bearing age to children was only 10:1.87, but the non-family population, at 28.2%, was quite low relative to other inner city neighborhoods,[24] suggesting a prevalence of young, childless couples. Without children to attend to, 53.8% of women participated in the labor force. Despite this, household incomes were modest, with a median of only $1150 and only 8.2% earning above $6000 (by comparison, Beacon Hill's figures were $2165 and 19.6%, respectively). 10.4% of households, a middle-range figure, owned a television. The housing quality index was favorable at 17.8,[25] but not a single new unit had been constructed in the preceding decade (79.1% of units were 30 years old or older). Finally, reflecting the continuing ownership of apartment blocks by absentee landlords, the homeownership rate was a scant 2.5%, a precursor to the instability that would later plague the neighborhood.

Commensurate with Boston's general decrease in population, by 1970 the Fenway was home to less than 33,000 people (Ganz 1988). The population of young people (15-24), however, had risen dramatically—from only 30% as late as 1960 to 60% in 1970 (BRA 1977). This reflected the skyrocketing enrollments of the academic institutions ringing the Fenway, particularly Boston University and Northeastern University, both of which also began programs of significant campus expansion in order to accommodate growing student bodies (Laderman 2005). Reflecting burgeoning student populations, over 36% of residents lived in group

23. The designation "second-class construction" is listed on building permits from this early era.
24. The East Fenway, an infamous red-light district for many years, had a non-family population of nearly 50%.
25. This is in stark comparison with the soon to be demolished West End, which ranked between 80.0 and 92.1, depending on the section.

quarters, as opposed to 5% citywide (BRA 1977). Owner occupancy had dipped to only 2%, as opposed to 26% for Boston as a whole, and the five-year housing turnover rate (1965-70) stood at 79%. Arson and abandonment became serious challenges to the neighborhood, particularly the East Fenway, at about this time.

The West Fenway, in contrast, was characterized in 1970 as a "neighborhood of young working people … and of elderly residents (15%), many of whom have lived in the neighborhood all their adult lives" (BRA 1977, *4*). While the West Fens experienced fewer student pressures than adjacent neighborhoods—group quarters accommodated only 4% of the population—most residents were still "unrelated individuals." With most housing now a half-century old, significant problems "of citywide notoriety" had arisen; about one-quarter of all units were controlled by a single, absentee landlord and consequently, "deteriorating rapidly" despite the efforts of "tenants and developers to achieve proper rehabilitation" (BRA 1977, *5*). Much of the blame is attributed to "rampant real estate speculation" due to Urban Renewal plans and institutional expansion, ushering in a new breed of owner. Rent control, too, provided little incentive for upkeep, much less upgrades. The BRA also cites two adjacent land-uses as exerting "negative impacts on the livability of the area and on the potential for residential stability," one being Fenway Park, and the other "the uncertain fate of Boylston Street" (see Planning and Zoning, below).

Statistics from 1980 seem to show the peak of neighborhood decline. The overall population had declined to only 30,842 and the youth population (15-24) had risen 4.7% to 19,996 (Ganz 1988). 35% of the population lived in poverty, and the rate of homeownership had slipped to 1.9% (Goetze and Johnson 1992). By 1990, however, improvement is evident. In 1986, the Copley Group had acquired several buildings throughout the West Fens (in all probability corresponding with the infamous single absentee-landlord's 25% share), and has continued to own and professionally manage those units, keeping ownership low but effectively saving the original housing stock from destruction by disrepair. Population swelled to 32,737, its 1960 level. 15-24 year olds (not in dormitory housing) had declined to 59.8% or 19,578. Homeownership increased to 7.0%,[26] although vacancies also rose from 8.5% to 10%. Families also lost ground, from 21% to 17.7%. The percentage of minority residents rose from 20.2% to nearly 30% in the course of the decade (Goetze and Johnson 1992).

The results of the latest (2000) census are mixed. Population was 36,191—nearly the 1950 level, when the overall population of Boston was greater by over 200,000 people. The gross density per square mile remains high at 29,186 (as opposed to 12,172 for Boston). Almost 63% of residents are between 18 and 24 years of age,[27] and only 283 families with children live in the neighborhood. Homeownership rose to 9%, and vacancies fell to just 2.5%. Minority residency increased to 32%, including 14% Asian, 8.3% Hispanic, and 7.5% African American. Poverty, however, spiked to 37.3%,[28] compared to 19.5% citywide, and the unemployment rate was up to 11.4% (7.2% citywide). While it is clear that trends have stabilized and that

26. Laderman (2007) submits that many of these new condo owners themselves became absentee landlords, skewing the statistics.
27. Note that previous measures included 15-17 year olds in this figure. This group by itself is only .6% of the population.
28. In part, this reflects the rapid increase in Asian population (from 3181 in 1990 to 5074 in 2000) and the high rate of Asian poverty in the Fenway (52.3%). Hispanic poverty is 50%, White poverty 33%, and Black poverty 30%. Poverty among female householders of every age cohort but 25-44 ranges from 34-62%.

the Fenway's most dire days are past, low incomes, transience and instability, and an evident lack of desirability for families—all of which have been present since the West Fenway's inception—remain challenges to maintaining the neighborhood's general livability and prosperity.

3.7 Transportation

A full transportation study of the West Fenway was conducted in 2001, with particular emphasis on Boylston Street and Brookline Avenue. The transportation subgroup of the Fenway Planning Task Force (FPTF) offered community input over the course of 11 topically-driven meetings. The final report addressed four major themes—parking, pedestrians and bicycles, the transit system, and the roadway system—and then considered the implications for future development.

Parking has long been an issue of concern in the Fenway, both for its impact on quality of life indicators and development feasibility. The current street configuration of the core West Fenway neighborhood was mapped in 1877, with parkways constructed around 1885 and interior streets in 1897 (Pollan et al. 1983). Neighborhood streets were therefore designed with little consideration for the automobile, particularly parking. Nonetheless, parking was introduced on both sides of all interior streets, and, at some point between 1917 and 1928, Audubon Road was carved into separate lanes for travel and parking (Bromley 1917, 1928).[29]

As of 2001, the core neighborhood offered 752 on-street spaces, 529 of which were reserved for residents (yielding a residential parking ratio of .37 per unit). The district north of Boylston (surrounding Fenway Park) accommodates 544 spaces, most of which are metered (320). While on-street parking is fairly modest, off-street parking is substantial. The 1410 spaces in the West Fenway are provided primarily by the surfeit of surface lots on Boylston Street, the back lots of apartment buildings, and a pair of pre-War garages on Queensberry and Kilmarnock.[30] The area north of Boylston hosted 5286 spaces in 2001, primarily in surface lots along Boylston Street and Brookline Avenue, in the Landmark Center garage (1800 spaces), and in about one-half dozen smaller garages near Fenway Park. Currently, the minimum/maximum parking ratio for new residential development is .75 spaces per unit, a maximum of .75 per 1000 gsf for commercial development (no minimum), and no additional non-accessory parking is allowed.

42% of Fenway residents walk or bicycle to work, perhaps a function of the area's relatively youthful population, low incomes, and close proximity to downtown Boston. Moreover, while the West Fenway is ringed by transit stations, none penetrates into the core neighborhood, necessitating a 5-10 minute walk to reach one of nine T-stations,[31] two commuter rail stations, and an Amtrak station. Residents can traverse the Back Bay Fens to intercept the E train of the Green Line or the articulated #39 Bus, but trips to the higher volume T-stations at Kenmore Square or Hynes require crossing Boylston Street. Primary crossing locations

29. While the change would have been more fitting at the time Audubon Road was renamed Park Drive (Park/Drive), the renaming occurred between 1928 and 1938.
30. Encouragingly, Zip Car, a car sharing service, has taken a modest but growing number (on the order of two dozen) of these spaces since 2001.
31. The "T" is the Massachusetts Bay Transit Authority's subway service. The Green Line commenced service in 1897, and was extended into proximity with the Fenway in 1909 with growth of the West End Rail Company into Brookline.

are at 3- to 5-way intersections, which, while currently all signalized, "can be daunting to pedestrians to cross, especially the elderly," due to "high traffic volumes and vehicle speeds" (BTD and BRA 2001, *28*). No on-street bicycle lanes exist, but three pleasant off-street paths are accessible with varying levels of effort: the Riverway, following the Muddy River south to Jamaica Plain with portions through Brookline; the Southwest Corridor Park, which connects Bay Back Station in Copley Square to Jamaica Plain via the South End and Roxbury; and the Esplanade, connecting Waltham (a suburb nine miles distant from Boston) with downtown Boston.

Although characterizing the West Fenway as a "transit-oriented" community is problematic, it is indeed well served by transportation for those willing and able to walk. While 34% of residents commute via public transportation, the only transit stop situated in the core neighborhood is the #55 CNG[32] bus, which travels from Queensberry Street to the Park Street T-station via Copley Square (where it terminates after 7pm). The bus runs 17- to 22-minute headways during morning peaks, switching to half-hour headways after 9am. Even the AM peak ridership is low, with only 253 inbound passengers (91 outbound) during the two-hour peak. The #55 intersects with the #1 bus (to Harvard-Dudley) at Massachusetts Avenue (in about 5 minutes), a number of services to the South End, Dorchester, and South Boston at Copley (in about 10 minutes), and reaches Park Street, the most active station in the MBTA system, in 14-19 minutes.[33] A 5- to 10-minute walk reaches the #39 bus on Huntington Avenue (to Back Bay-Forest Hills) or the #57, #60, or #65 to points west, including Brighton and Newton. The Ruggles multi-modal station offers numerous bus routes to Roxbury, Dorchester, Mattapan, and Cambridge. Shuttle buses operate from major transit hubs on Red Sox game days, while a host of other private bus services primarily serve commuters to and from the Longwood Medical and Academic Area from transit stops and satellite parking lots.[34]

The area is well served by light rail transit, with, as previously mentioned, nine stations within a 10-minute (half-mile) walk of most points in the West Fenway. Access to major stations is slightly improved from the Boylston Street Overlay, relative to the core neighborhood, with certain parcels less than five minutes from T access. While peak service is generally prompt, with 1.4 minute headways at Kenmore and 4.5 minute headways at the Fenway D train station, the trains are uncomfortably close to capacity during rush hour;[35] the MBTA now adds a third car to the D line during PM peaks in an attempt to alleviate the situation. The Orange Line (at about a 10 minute walk) is well under capacity for both AM and PM peaks, while the various Commuter Rail trains (South Station-Framingham/Worcester at Yawkey Station and South Station-North Attleboro/Providence, -Franklin, and -Needham at Ruggles) are nearly overtaxed but not generally an integral feature of neighborhood commuting (up to 2% of workers, 5% of residents).

Only 19% of Fenway residents commute to work via automobile (3% of whom carpool), but 55%

32. Condensed natural gas.
33. This route was approximated by tram service to Fenway Park starting in 1914 (Sammarco 2002).
34. Although persons unaffiliated with these institutions can often purchase tickets on these private buses, the option is expensive and not well publicized.
35. Two-car peak capacity (peak direction) on the Green Line D train is 2626 (13 trains/hour x 202 capacity, 92 seated), while the AM and PM peak direction ridership is about 2000 between Fenway and Kenmore stations.

of Fenway workers, particularly employees of the LMAA, drive in. As a result, street capacities in the Fenway are undeniably strained during peak periods and especially so on Red Sox game days, when a mix of through traffic and destination traffic[36] clog Boylston Street's four lanes and multiple intersections. This situation is further exacerbated by the frequent travel of ambulances to the LMAA. The Sears Rotary, the five way intersection of Boylston Street, Brookline Avenue, Park Drive, The Fenway, and The Riverway, is cited by traffic consultants as "one of the most complex intersections in the City of Boston" (BTD and BRA 2001, *56*), an opinion in concert with its "level of service" status of "F."[37,38] Of the 161,000 cars that pass through this intersection daily, an estimated 36,000 come from Boylston Street traveling west. The consultant group suggested a number of traffic mitigations, including road widening (Boylston Street and Brookline Avenue), the extension and signalization of Kilmarnock Street (completed), a reworking of the intersection of Park Drive, The Fenway, and The Riverway, and the construction of a "counterflow" bus lane along a portion of The Fenway as part of the Urban Ring project (see below).

Given the preceding information, the FPTF and consultant group sought to forecast additional travel demand (trip generation), by mode, distribution, and assignment, for a scenario allowing denser development along Boylston Street and Brookline Avenue. They used a hypothetical 4.0 FAR, assuming full build out, to project an increase in square footage of 2.9 million square feet (1.45 million residential). Of particular relevance to this study, the group cautioned that "additional space above this maximum, through the exercise of proposed FAR bonuses and incentives … could not be predicted and was therefore excluded" (BTD and BRA 2001, *70*). Nor does the study area align precisely with my proposed Overlay (in other words, the proposal I set out below would require its own transportation study).

However, the study is nonetheless highly relevant to this project, and its key findings are encouraging. Given that "many of the uses on Boylston Street are highly vehicle-oriented," the study authors surmised that "the new uses with limited parking, e.g., residential, office, and small-scale retail space, are expected to be much more transit-oriented" (*73*). As noted above, half of all new development in the study area is assumed to be residential, a proportion that, if anything, rises within the Overlay zone (see Planning and Zoning, below) and "residential use generates about half the level of trips as the same amount of office space." Moreover, the gas stations and fast food restaurants that would be eliminated generate significantly more auto trips than either office or residential (ITE 1997[39]).

While the elimination of auto-oriented uses (existing automobile trips) will surely help balance the

36. Through traffic and destination traffic are split nearly evenly during AM and PM peaks (BTD and BRA 2001, *59*).
37. BTD and BRA 2001, *60*. Level of service F corresponds to over 80 seconds of delay for an urban area (*57*).
38. An MIT civil engineering thesis from 1936 entitled Relief of Traffic Congestion at the Intersection of Park Drive, Boylston Street, and Brookline Avenue, Boston, Massachusetts (Weaver and Gordon) indicates that this is a long-standing problem.
39. For a quick, and not necessarily perfectly aligned comparison: Fast Food Restaurants with Drive Thru Windows (whose primary business is hamburgers) have a PM Peak range of 8.15-117.15 cars per hour, per 1000 square feet, and 195.98-1132.92 per day (peak figures matter more for capacity considerations). Gas Stations with Convenience Stores generate between 5 and 27.33 trips per pump during the PM Peak hour per pump, and 73-306 per day. In contrast, a General Office building generates only .49-6.39 trips per 1000 square feet during the PM Peak, and 3.58-28.80 per day. Mid-Rise Apartments (3-10 floors) generate .15-.54 trips per dwelling unit during PM Peaks, with High-Rise Apartments (11+ floors) generating .3-.59. All figures are from the 1997 ITE Reference Manual.

increase of automobile trips attendant with a higher intensity of development, a great deal of the final traffic impact of development will depend on mode shares—which in turn depend on the proximity of good transit and on "socioeconomic characteristics." The difference between the automobile mode share for current workers and current residents (55% and 19%, respectively) is the difference between unacceptable and adequate levels of service. With a 50% drive rate, a net increase of around 900 cars would occur during peak hours in the peak direction, while a 30% rate yields only 183 new trips during the morning peak hour and 239 in the PM peak—"a share of 30% is required to allow intersections to function at acceptable levels of peak hour congestion" (BTD and BRA 2001, *77*).

Although the report notes that a "shift in commuter behavior" would need to occur to meet the 30% target, and then continues its analysis with that assumption, this proposition deserves greater scrutiny. Explicit in the analysis is that workers' travel behaviors must shift (in part through the disincentive of reduced parking per area of building space) and that the MBTA must upgrade its service capacity, particularly the Green Line and select bus routes. Unspoken, however, save for a brief note that the "socioeconomic characteristics" of travelers affect mode splits, is the potential affect of demographic shifts on automobile travel. Thus far, the two new residential projects on Boylston (Trilogy, completed in 2006) and 1330 Boylston (under construction) have billed themselves as "luxury" apartments (and Trilogy has the rents to prove it). Although each development includes some on-site affordable housing, it is clear that the demographic groups they seek to attract will not mirror the neighborhood's unfortunate poverty rate or the largely car-less 18-24 year old cohort.

Murakami et al. (1997) reasonably state that low-income households[40] own 30% fewer cars and walk twice as frequently as households above the low-income threshold. In an admittedly speculative fashion, I submit that, given the relative affluence of the future tenants of these new developments, the transit-friendly mode-splits of the traditional West Fenway neighborhood will not be reflected along Boylston Street. With a conservative 1450 new units, this behavioral change could result in further overburdening local roadways. This is not to say that efforts to eradicate neighborhood poverty should not be undertaken, but rather that efforts to ensure that new demographics roughly reflect older demographic patterns, e.g. through affordable housing, may be important in the endeavor to reduce traffic impacts.

Finally, a brief summary of the proposed Urban Ring is in order, although the project is on the distant horizon and uncertain at best (I will not make the same mistake as my predecessors of 1955, who offered plans based on the construction of the controversial and ultimately ill-fated Inner Belt). Currently, much of the MBTA's transit infrastructure radiates out from central Boston.[41] The Urban Ring proposes to create a large "ring" of new transit, much of it bus-rapid transit (BRT), through East Boston, Chelsea, Everett, Medford, Somerville, Cambridge, the Fenway, Roxbury, Dorchester, and South Boston connecting to the current radial network.

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40. In this particular study, "low income" is very low: $10,000 for an individual and $20,000 for a family of 3 or 4, which is still above the 2005 poverty rate of $18,810.

41. Some transit enthusiasts call the resulting system maps "spider" maps due to the resemblance to legs spreading out from a body.

As of Spring 2007, the project is in alternatives analysis, with four primary scenarios under consideration. Each proposed alternative affects the Fenway in a slightly different way, although all versions connect Ruggles (Orange Line) to the Green Line (D train). Alternative 1 makes the connection via a dedicated bus lane along The Fenway, merging into mixed traffic at the Sears Rotary (this version appears to reflect the Fenway Transportation Study recommendation). Alternative 2 keeps this alignment, but does not include a dedicated bus lane along The Fenway. Alternative 3 skirts The Fenway, instead moving via tunnel from Ruggles under Huntington Avenue, Longwood Avenue, and Brookline Avenue, where it surfaces. Alternative 4, also subterranean, misses the Fenway altogether, connecting at Longwood (D train) and Hawes Street (C train).[42] This paper cannot hope to comment thoughtfully on these alternatives—particularly given the size of the proposed system—save to point out the obvious: alternatives that feature a connection to the Fenway T-stop (1-3) offer the prospect of increased capacity and greater transit viability, while Alternative 4 could hamper efforts to bolster the critical role of transit in the West Fenway.

3.8 Environmental Quality

Article 97 of the Constitution of the Commonwealth of Massachusetts states that the "people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of … natural resources." It therefore seems proper to evaluate local environmental quality using the framework of fundamental rights granted by the Commonwealth. The entire West Fenway, it should be noted, is considered to be an Environmental Justice Community by the Executive Office of Environmental Affairs (2002), a designation for "high-minority/low-income neighborhoods in Massachusetts where the residents are most at risk of being unaware of or unable to participate in environmental decision-making" (*4*).

Suffolk County (encompassing Boston, Winthrop, Revere, and Chelsea[43]) ranks among the worst in the nation in air quality, falling in the top 10% of all counties in the nation for emissions of carbon monoxide,[44] nitrogen oxides,[45] 2.5 micrometer particulate matter (PM-2.5),[46] and volatile organic compounds, or VOCs. Emissions of PM-10 and sulfur dioxide[47] fall in the top 20% (Scorecard.org 2007). Unsurprisingly,

42. The source for all draft alternatives are the Draft Alternative Maps, found on the project's official site.
43. Chelsea in particular is a notoriously environmentally stressed community.
44. Carbon monoxide (CO) "displaces oxygen molecules carried to organs and other tissues," and is of particular concern for those with cardiovascular disease. High levels of carbon monoxide can cause light headedness, shortness of breath, chest pain, headaches, and even confusion." 52% of CO emissions in Massachusetts are from automobiles (Background Document and Technical Support for Proposed Revisions to the State Implementation Plan for Carbon Monoxide, EOEA 2000).
45. Nitrogen Oxide (NOx) reacts with VOCs, particularly in intense sunlight, to create ground level ozone, which can exacerbate respiratory problems, damage lung tissue, and reduce lung function. NOx is also a key component of acid rain, can form particles that are especially damaging to lung tissue, and can lead to eutrophication of water bodies. 55% of NOx emissions nationwide are produced by traffic, and 22% by electric utilities (US EPA "Health and Environmental Impacts of NOx." www.epa.gov).
46. Particulate matter is comprised of dust, soot, or smoke (particularly from diesel trucks). PM-2.5 is considered "fine" matter, and is particularly detrimental to human health, causing coughing, wheezing, decreased lung capacity, and other more serious, long-term respiratory ailments, including premature death. PM-10, "coarse" particles, are also considered a health and environmental problem, but are less detrimental in comparison to PM-2.5. Both fine and coarse matter can have impacts on water quality (www.epa.gov).
47. Sulfur dioxide (SO2) is a major contributor to respiratory illnesses, especially in children. The primary source is electrical utilities

scorecard.org also ranks Suffolk among the worst 10% of US counties for health risks due to hazardous air pollution, including carcinogenic pollutants.

Without local-level data for the West Fenway it is impossible to characterize neighborhood air quality, although many, but certainly not all, air quality issues are regional in nature and can be properly measured at the county level (EPA 2007). It may be fruitful, however, to consider potential major sources of local air pollution. Of the 25[48] regulated emitters of air pollution listed by the EPA Aerometric Information Retrieval database within the West Fenway Zip Code (02215),[49] one, the Medical Area Total Energy Plant (MATEP), at 474 Brookline Avenue in the LMAA, is listed as a major emitter by scorecard.org (2007). The facility is a 62-megawatt diesel-powered steam and electricity plant, serving Harvard Medical School, Beth Israel Deaconess, Brigham and Women's, and several other institutional clients (Dillon 1997).[50] According to the EPA, in 2005 the plant released 20 lbs. of ammonia,[51] .12 lbs. of dioxins,[52] and 163 lbs. of naphthalene[53] into the air (and shipped 450 pounds of ethylene glycol to East Chicago), which far exceeds point source emissions for all other Fenway emitters combined. It is important to note, however, that releases occur from 333-foot stacks (Dillon 1997), rendering purely local exposure difficult to calculate with certainty—it may well be that the Fenway is not in fact the community most environmentally burdened by this facility.

Non-point source air pollution also presents challenges to neighborhood environmental quality. The high levels of CO, NO, PM2.5, and VOCs all point to mobile sources. The CO problem in particular is aggravated by the long wait times and stop-start traffic patterns at major intersections:[54] According to the Massachusetts Executive Office of Environmental Affairs, "high levels of vehicle emissions and poor atmospheric dispersion can result in high ground level CO concentrations. This is especially noticeable in urban areas near heavily trafficked intersections" (EOEA 2000, *3*). While, again, the relative pollution levels I reported previously were measured at the county level, the effects of automobile-generated pollutants can be very localized, particularly in their contribution to ground-level ozone formation in the summer months. However, partial solutions, at least, are also available locally. Mode share increases for public transportation and walking (see Transportation, above), along with the reconfiguration or re-signalization of problematic intersections, would likely reap substantial benefits for local air quality.[55]

(67%), followed by other industrial processes (18%) (EPA, SO2 - How Sulfur Dioxide Affects the Way We Live & Breathe, 2000).

48. While the EPA AIRS database actually retrieved 26 facilities, one (Anthony's Pier 4 in the Seaport District) was clearly miscoded.

49. Accessed April 15, 2007.

50. Dillon also states that the facility underwent a 6-year permitting process after completion in 1980, and was built to save energy (compared to service from public utilities) by including a co-generation component.

51. According to the US Agency for Toxic Substance and Disease Registry (ATSDR), ammonia can cause a host of non-carcinogenic respiratory problems, especially for asthmatics. The Minimal Risk Level (MRL) threshold is .01 ppm for daily exposure. Ammonia is non-bioaccumulative, and is commonly used as a fertilizer (accessed online, April 15, 2007).

52. Dioxins are noted carcinogens and are bioaccumulative. Although most intake (95%) is through animal fats, inhalation is a recognized exposure path. There remain "numerous questions and uncertainties regarding scientific data on and analysis of dioxin risk" (US Dioxin Interagency Working Group, Questions and Answers about Dioxins, July 2006).

53. Naphthaline damages or destroys red blood cells and is a possible carcinogen (shown in animals, not in humans). The MSL for inhalation (it can also be ingested orally) is .0007 ppm (ATSDR).

54. CO is caused by inefficient burning of fossil fuels (which occurs in heavy, stop-and-go traffic), whereas NO is produced primarily by high-temperature burning (Mass DEP).

55. As would, as I claim in the following chapter, the reduction of emissions from individual buildings.

Water quality has never been a strong point for the Muddy River; again, the original creation of the Back Bay Fens was in response to a major sanitary problem (Seasholes 2003). The early lessons provided by that original, unfortunate situation failed to stick, however, as the state legislature "vetoed a plan for a separate system for foul and clean water flow" in 1904, despite the vigorous objections of the Sewer Division's chief engineer (Pollan et al. 1983). The failure to build a segregated sewer would haunt the Fenway: The 1996 100-year storm event is perhaps the most notable example, having posed a significant "hazard to public health and the immediate environment in Boston as raw sewage discharged from the city's sewer systems onto the local streets" (Conklin and Noonan 2002). FEMA estimated the resulting public and private damage as between $70 and $117 million.

Most challenges to the environmental quality of the Muddy River are thankfully not as dramatic, but no less important. With a 4,000 acre, highly-urbanized watershed, the existence of all manner of run-off related contaminants is not surprising (Parker 1999). The SFEIR (2005) for the Muddy River restoration project states that "most of the project area [from Jamaica Pond to the Fenway] currently fails to meet ambient water quality criteria for dissolved oxygen (DO) during low flow periods. Other water quality problems include high nutrient levels (phosphorus and nitrogen), and failure to meet ambient water quality criteria for metals and coliform bacteria" (*72*). Finally, from observation, by the time the Muddy River reaches the Back Bay Fens it contains an excessive amount of non-organic debris, which is especially evident when viewed from the Bowker Overpass. Fortunately, as the SFEIR shows, efforts are underway to remedy most of these long-standing problems, and new development on Boylston Street (on already impervious surfaces) is unlikely to exacerbate stormwater problems.

Debris in the Muddy River (photo by author).

Three primary sources of noise pollution affect the West Fenway. Red Sox games, night games in particular, attract large, occasionally boisterous crowds and can be heard from most points in the neighborhood. Beginning in 2006, however, the announcer's voice can no longer be distinguished from outside the Park due to the comprehensive reconfiguration of the stadium speaker system. More recently, Fenway Park has also hosted one rock concert each summer for the past three years, which have attracted a small number of complaints from neighbors. These concerts, however, are strictly monitored by police to ensure compliance with Boston's noise ordinance (72 decibels maximum) (Lilleston 2003[56]). Emergency transportation to the LMAA is responsible for the other two sources: helicopter flights, which are supposed to follow the Back Bay Fens but do not always do so, and ambulances along Boylston Street, which cause little disturbance in most sections of the core neighborhood but could constitute a nuisance for new tenants on Boylston Street. Jet noise from Logan

56. "Rolling Stones Live: Opening Night at Fenway Park. *USAToday*. August 21, 2005.

Airport is noticeable, but is far below the 65-decibel aircraft noise threshold.[57]

Finally, in the spirit of "scenic, historic, and esthetic qualities," as well as conservation, the proper maintenance and upkeep of the Back Bay Fens have long been issues of concern (Miller 2001).[58] With 106 acres devoted to gardens and parkland (as opposed to 40 acres for Boston Common), a long period of general decline in the surrounding neighborhoods, and inconsistent management by the Commonwealth's overburdened Department of Conservation and Recreation (DCR),[59] this is disappointing, but not surprising. As early as 1955, the Back Bay Fens is described as "casually maintained" (MIT School of Architecture), and by 1977 the Boston Redevelopment Authority (BRA) had flagged poor park maintenance as a quality of life issue, stating that the park had "deteriorated physically and … [been rendered] of minimal use to the immediate community and the City as a whole" (*17*). The City had budgeted $275,000 for landscaping and utilities work in 1975, but estimated that $2 million would be required in the future (BRA 1975).

Recently, the City of Boston, Town of Brookline, and DCR have begun collaborating on a $89-million multidisciplinary initiative to address problems relating to flood control, water quality deterioration, non-native invasive flora, particularly Phragmites,[60] and historic landscape restoration—colloquially called the Muddy River restoration project. If carried out to its full extent, the project promises the comprehensive reclamation of one of the Fenway's defining resources and the institution of Best Management Practices in an attempt to prevent future decline. In the words of Margaret Dyson, Director of Historic Parks for the Boston Parks Department, the Fenway is "such a dense community, anything that is done to improve the experience of the park is huge" (Preer 2006).[61] I agree. It was the creation of the Back Bay Fens that originally enabled, defined, and spurred the rapid growth of the West Fenway, and, appropriately, no other single resource is as important to the neighborhood's future than the health and integrity of this less-famous of the Fenway's historic parks.

3.9 Institutions

Although the subject bears little direct relation to the density bonus proposal at the core of this thesis, properly understanding the Fenway requires at least a cursory knowledge of its institutional landscape. One community leader likens the Fenway residential core to an "island" in a sea of institutions (Foster 2007), and indeed cultural facilities, universities, hospitals, and a major sports venue tightly ring the neighborhood. In 1989, the BRA found that 65% of the land in the greater Fenway neighborhood (of 550 acres) was in institutional use (*13*).

The great landmaking project of the late 19th century created large swaths of open land at a time

57. By which I mean the Day-night Average Sound Level (Ldn), which is a 24-hour average weighted during nighttime hours. If the Ldn exceeds 65 dB, an airport's activities are considered incompatible with residential uses.
58. See Trisha Miller's 2001 MCP thesis for a more complete treatment of this topic.
59. At some point after 1925 (when the land was still owned by the Boston Parks Commission) the Back Bay Fens was transferred to the Metropolitan District Commission, precursor to DCR.
60. "Phragmites australis is a clonal grass species with woody hollow culms which can grow up to six meters in height" (www.invasiveplants.net). Accessed April 15, 2007. The species is better known as the common wetland reed.
61. *Boston Globe*, City Weekly, March 5, 2006.

when many venerable institutions were considering expansion, and the extension of mass transit to the Fenway (especially the conversion from horse-drawn omnibuses to electric trams in the late 19th century), played a major role in enabling this exodus[62] (BRA 1975). While some chose more pastoral locations (e.g. Boston College, Chestnut Hill in 1909 (Donovan 1983)[63] and the Archdiocese of Boston, Brighton in 1926), the Fenway's proximity to central Boston proved irresistible to many more.

The cultural institutions were the first to arrive: the First Church of Christ, Scientist's "Mother Church" on Massachusetts Avenue was the first to sink roots (1894), followed by the Massachusetts Historical Society on Boylston Street (1897), and the Boston Medical Library (now Boston Conservatory) next door on The Fenway (1900). Symphony Hall, home of the Boston Symphony Orchestra and widely famed for its model acoustics, opened on Huntington Avenue in 1900. Horticulture Hall opened across Massachusetts Avenue in 1903 (Pollan et al. 1983), next to the now demolished Chickering Hall (1901). The handsome 2,300-seat Opera House joined the music scene on Huntington in 1908, but fell to the wrecking ball just short of its 50th birthday[64] (Sammarco 2002). Jordan Hall at the New England Conservatory, also on Huntington, made its debut in 1903, and the Repertory Theatre of Boston (now the Boston University Theatre), the first tax-exempt "civic" theater in the nation, opened in 1925. The Isabella Stewart Gardner Museum first brought art to The Fenway (1901), and was soon joined by the Museum of Fine Arts (1909), which relocated from a colorful Ruskinian gothic structure in Copley Square.[65]

The YMCA erected a large facility on Huntington Avenue in 1913, and remains at the facility to this day. More significant for neighborhood history, however, was the YMCA's creation (in 1896) of a small evening school, which would eventually become Northeastern University, with an enrollment of about 23,000 in 2006. Simmons College began the construction of a new facility on The Fenway in 1901, and would be joined by the Wentworth Institute of Technology (1904), Wheelock College (1914), the Massachusetts College of Pharmacy (1918), and Emmanuel College (1919) to form the Colleges of the Fenway.[66] The Boston Normal School arrived in 1906, followed by Boston Latin and the private Windsor School (1910). By 1938, Boston University had etched out a small presence along primarily residential Commonwealth Avenue, but in 2007 the University dominates the street from Brighton to Kenmore Square, with an enrollment of over 30,000 students. Last of the major schools to arrive was the Berklee College of music, founded in 1945, which has grown from a small upstart named for the founder's son (Lee Berk) to become the world's largest college of music, enrolling 3800.[67]

Among all of these major institutional developments, the one that may have most fundamentally

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62. The BRA (1975) also cites the notorious "Boston Fire" of 1872, which devastated adjoined buildings in the congested downtown, as another reason for the mass relocation to the Fenway, where crowding was not an issue. Given that the first move took place in 1894, I treat this supposed causality with skepticism.
63. Meredith and Grew, Donovan notes, recommended that the College purchase the present site as early as 1900.
64. The Marino Center at Northeastern University is now located on the site.
65. The original museum was demolished soon thereafter to make way for the Copley Plaza hotel.
66. The Massachusetts College of Art was founded in 1873, and is now located at the former site of the Boston Normal School.
67. Unless otherwise noted, all statistics and dates are from the institutions themselves, with Bromley maps used to track the progress of early expansion (up to 1938).

shaped the Fenway was the establishment, in 1906, of Harvard Medical School on 26 acres on Longwood Avenue. The five original neo-classical buildings ended up occupying only 11 acres, and therefore the 15-acre balance was consequently sold to the Peter Bent Brigham Hospital (1912) and Children's Hospital (1914)—effectively establishing the LMAA (Pollan et al. 1983). Currently, the LMAA is home to some of the nation's most prized hospitals and research institutions, including Brigham & Women's, Beth Israel Deaconess, Children's, the Dana-Farber Cancer Institute, and the Joslin Diabetes Center. Harvard's Schools of Dentistry and Public Health have now joined the Medical School, and the Forsyth Institute (dentistry) opened along The Fenway in 1910.

Back Bay Fens Huntington Avenue Entrance (Evan's Way), with MassArt in the background (photo by author).

The tradition of major sports venues in the Fenway precedes even the creation of the Back Bay Fens. The National League "Bostons,"[68] comprised of the manager and former players of the Cincinnati Red Stockings, began the tradition of professional sports in Boston in 1876 (Stout and Johnson 2000). By 1884, a ballfield with a miniscule grandstand had been established on the Roxbury side of the Boston and Providence tracks. Four versions of this stadium, eventually known as the South End Grounds, would come and go before the team, by then the Braves, moved to the spacious "Bee Hive" in Brighton (1915).[69] In 1901, the Huntington Avenue Grounds were established just across the tracks for Boston's fledgling "Americans." The team was renamed the Red Sox in 1907, and moved to Fenway Park, now the oldest, and only single-deck, stadium in Major League Baseball, to begin the 1912 season. While Boston's original ballparks were soon razed and the land on which they stood now belongs to Northeastern University, the Boston Arena, built along St. Botolph Street in 1910, remains intact under Northeastern's ownership. This facility is distinguished as the nation's first artificial ice rink, housing the Boston Bruins professional hockey team in their early years, and additionally hosted many championship boxing bouts (Jack Dempsey and Joe Louis were among the fighters featured).

With this perhaps unprecedented concentration of institutions have inevitably come clashes with residents. Laderman (2005), for example, painstakingly documents the process of Northeastern's institutional expansion in the East Fenway and the conflicts resulting. FenPAC, as previously mentioned, was formed in response to urban renewal in the Fenway (in 1973), but remained well after urban renewal had faltered in order to temper the enthusiasm for expansion evinced by many neighborhood institutions. Although FenPAC was dissolved in 1983 due to a lack of funding, the group's philosophy on institutional growth in many ways encapsulates the community's expectations today: "no institutional projects [would] be approved that would

68. Now the Atlanta Braves.
69. Portions of which are still intact as Nickerson Field at Boston University. The Braves, constantly in the shadow of the Red Sox, moved to Milwaukee in 1953 and the stadium was converted for football, and now soccer.

1) remove taxable property from the City tax rolls, 2) result in the net reduction of the area's housing stock, or 3) degrade the existing environment whether through overbuilding, pollution, traffic congestion, or insensitive design" (Laderman 2005, *2*, quoting FenPAC newsletter, Feb. 1976). The third category in particular may be presumed to apply equally to substantial private development as well.

Fenway Park (photo by author).

3.10 Civic Groups

Civic groups do not evolve in a vacuum, but rather in response to issues of community concern that government is either unwilling or unable to address to the satisfaction of the citizenry. The slow, steady decay of the Fenway neighborhood after 1960, the degradation of the Back Bay Fens, the deterioration of housing stock and lack of high-quality, affordable shelter, and institutional pressures have all spurred the creation of community-based organizations in the Fenway. While evidence hints at the formation of dozens of such groups in the Fenway over the years, many groups remained unincorporated, were poorly documented, were only sporadically active, or fizzled out early on.[70] The list of groups I present cannot, therefore, be considered comprehensive.

Of the substantial, enduring organizations, the Fenway Civic Association (FCA) is perhaps the most venerable. The group was founded in 1961 in response to declining conditions—including crime, blight, and trash—in the East Fenway. The FCA of today serves both the East and West Fenway, with an agenda aimed at stimulating neighborhood improvement through volunteer-based programs to "protect the environment, highlight our cultural riches, guide development, advise new businesses, improve public transportation, cultivate open space, [and] inform interested citizens" (Fenway Civic 2007). Members are active in major public processes, often contributing one or more members to local Citizen Advisory Committees (CACs).

The Fenway Community Development Corporation (FCDC), a not-for-profit affordable housing developer, was founded in 1973 in the context of rampant arson[71] and rapidly deteriorating neighborhood housing. The organization has since developed over 560 units of housing for low- and moderate-income people, including seniors, families, and people with AIDS, and has branched into workforce training, community planning, organizing, and advocacy (Fenway CDC 2007). Although professional staff members conduct day-to-day activities, policy is set by an all-volunteer board of directors,[72] and many program activities are conducted by citizen committees (including the Urban Village Committee, see below). In 2007, Fenway Solar, a small but effective renewable energy group with two West Fenway arrays to its credit, was

70. STOP and RAT are some of the more evocative names I encountered in my research.
71. 30 fires in 1974 alone. 33 people were eventually convicted of arson-related crimes (KAFNI 1992).
72. Of which I have been a member since 2004. In the interest of identifying potential biases, FCA and FCDC have a relationship that could be described as frequently cool and sometimes contentious.

incorporated in the FCDC committee structure. Like FCA, the FCDC board is often represented on local CACs. Both groups could be expected to seek participation in any major development projects or rezonings, and members from both groups were in fact represented on the Fenway Planning Task Force and continue to comment on new development proposals.

The Audubon Circle Neighborhood Association (ACNA) and Symphony United Neighbors (SUN), are also active in neighborhood affairs. Neither group, however, seems to claim a firm stake in shaping the development of the West Fenway, with most of their respective service activities taking place on the periphery of the study area. Finally, the Fenway News, a monthly, sometimes eccentric,[73] locally-produced newspaper, has provided valuable reporting on neighborhood affairs from the citizens' perspective since 1974. While the Fenway News does not, of course, participate in CACs, it is an important indicator and driver of community opinions and a not-to-be-underestimated means of disseminating information on neighborhood initiatives.[74]

Although not strictly a community-based organization, the Emerald Necklace Conservancy (ENC), founded in 1996, offers a crucial complement to CBOs concentrating on the more typical aspects of urban life. The Emerald Necklace is an Olmsted-designed system of linear parks stretching from Franklin Park to Jamaica Pond (primary source of the Muddy River) on to the Charles River. As such, the system, of which the Back Bay Fens is a crucial piece, is a unique environmental, aesthetic, and historic resource—and requires a unique organization to ensure proper stewardship. ENC's mission is to "protect, restore, maintain and promote the landscape, waterways and parkways of the Emerald Necklace … as special places for people to visit and enjoy" (Emerald Necklace Conservancy 2007). This organization could play an important role in connecting citizens to the technically complex (and glacially slow) Muddy River Restoration planning efforts, but, perhaps due to recent changes in leadership, it is not currently realizing this potential.[75]

3.11 Planning and Zoning

The Overlay Area (again, running roughly from Ipswich to Brookline Avenue on Boylston Street) has, from its inception, never been particularly well-suited to the pedestrian or the local shopper, nor has it been utilized to its permitted intensity. In 1917, the Bromley Ward Map shows an utterly abandoned strip, particularly in contrast to the rapidly developing residential neighborhood to the south (the West Fenway)—not a sole structure obstructs Fenway Park from the rear windows of Peterborough's abundant apartment buildings.

In 1924, Boston adopted comprehensive zoning for the first time (Barr 1997). The original zoning for Boylston (and indeed the entire "Fenway Triangle") was B-80, meaning "general business" (as opposed to "local business") with a generous height limitation of 80 feet.[76] By 1928, automobile ownership was firmly

73. To whit, the newspaper's slogan is "To Comfort the Afflicted and Afflict the Comfortable," which was temporarily retired in 2003 but brought back by popular demand.

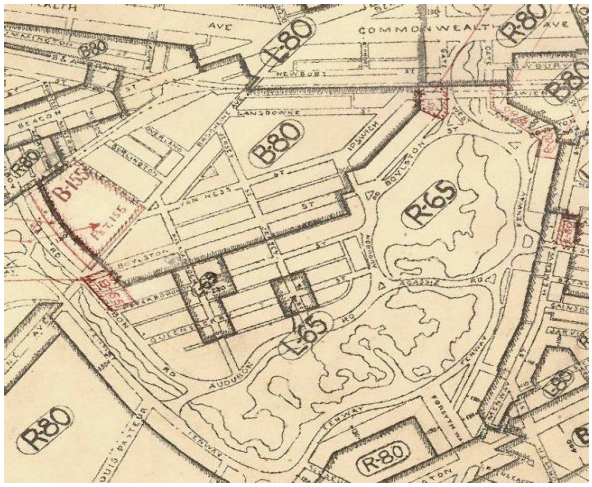
74. The Fenway Garden Society (FGS) and Symphony Road Gardeners are active, community-based groups, and do indeed have a stake in urban affairs. FGS, for example, facilitates a monthly meeting with police to discuss crime and enforcement efforts around the Victory Gardens.

75. The Charles River Conservancy, with an admittedly larger potential constituency, appears to be a more effective model, although I have not examined the organization in depth.

76. No FAR guidelines were yet in place because the concept had yet to be "invented." Later, when FAR was introduced, a B-80

established as a rite of middle class life and over 26 million automobiles (one for every five people) were registered in the United States, up from less than 10,000 in 1905 and 2.3 million in 1915 (Jackson 1985, *162*). Boylston Street's swath of cheap, open land—land zoned for business and situated along a major thoroughfare connecting central Boston to the burgeoning western suburbs—seemed destined to play a role in this revolution. Soon, a small, auto-oriented "agglomeration economy" had sprung up, comprised of an auto dealership (Studebaker, at 1295 Boylston), a Standard Oil gas station just across Jersey Street, Merchant's Tire across Boylston, a Firestone facility on Brookline Avenue, and garages everywhere. The most optimistic development, and that which would require the most parking (other than Fenway Park), was the massive, 1.3-million square foot Sears warehouse and store.[77] More gas stations had joined by 1938 (which remain to this day), but the pace of development had clearly slowed—the intervening decade had not been good to the American economy, after all. New zoning was recommended in the late 1950s and finally adopted in 1965 (Barr 1997), establishing a maximum FAR of 2.0, with, originally at least, no maximum height (BRA 1968). Under this updated zoning a motor inn (fittingly replacing a used-car lot) would arrive in the mid 1960s, soon to be joined by a supermarket and a pair of fast food franchises erected in the 1970s.

Perhaps more notable than what was eventually developed on Boylston is what was *not* developed. One might imagine, at least, that the first wave of auto-oriented businesses in the 1920s added vitality, if not beauty, to the corridor. The plethora of surface parking lots that remained undeveloped along Boylston Street, however, offered little of either. While the Bromley maps are silent on the matter of surface parking, an aerial photograph (bottom left) from 1955, speaks volumes about the type of place Boylston Street had become.[78] While the Depression seemed to stunt growth in the area initially, it was primarily due to the increasing profitability of parking for Red Sox games[79] and outmoded zoning regulations that parking came to characterize the strip of Boylston adjacent to the West Fenway.



Fenway zoning map, 1924 with amendments. Note the 155' allowance for the Sears Building (Boston Redevelopment Authority).

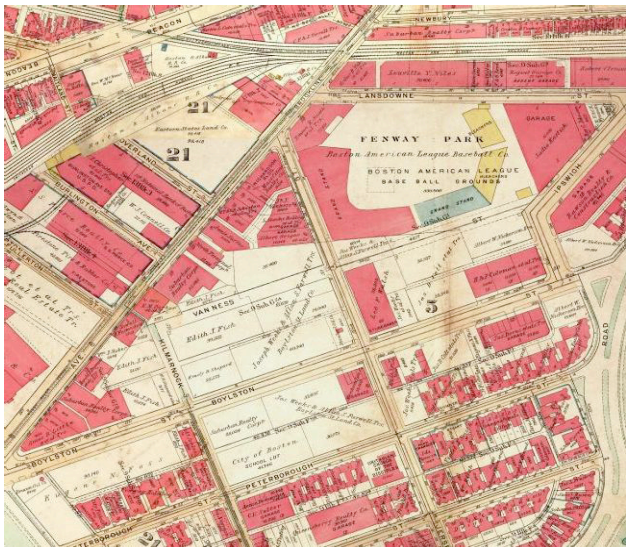
district with an FAR of 2, for example, would appear as B-2-80 (Barr 1997).

77. An amendment recorded between 1924 and 1927 granted the Sears lot a 155-foot height limit. This facility had nearly 600 parking spots on site, and hundreds more adjacent and satellite spots. The Brookline Avenue entrance to the Back Bay Fens was paved over in the 1950s for Sears parking.

78. It should be noted that no Red Sox game is in progress (this is in all likelihood a regular weekday, and most of these cars would therefore belong to commuters). Note the football field chalked out on Fenway Park's field. The Boston Patriots professional team began play at Fenway during the 1963 season, and the Boston Redskins had moved to Washington DC in 1937. The Boston Yanks NFL team moved to New York in 1948 to become the New York Yanks, then moved to Dallas as the Texans, and settled (for a time) in Baltimore as the Colts. The field, therefore, must have been prepared for a college game—both Boston University and Boston College once played there.

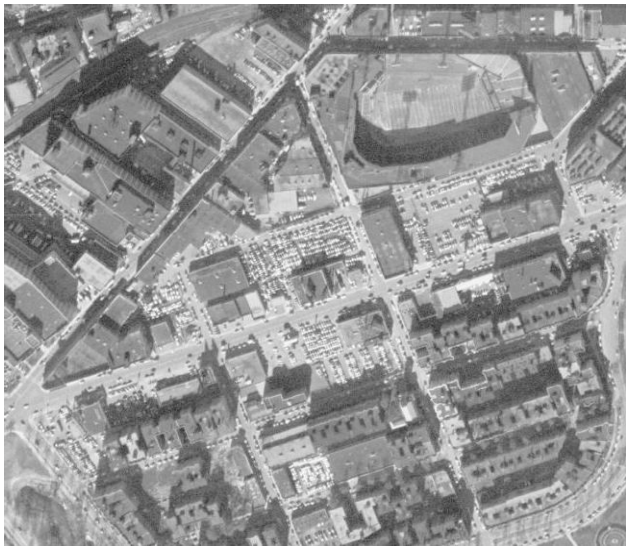
79. In 2004, Leahy's Mobil (the former Standard Oil gas station) began charging $100 for blocked parking during regular, night Red Sox games. After the Mayor commented publicly on the audacity of this price, the price quickly dropped. Many lots currently charge between $25 and $60/night game.

By 1975 the situation on Boylston Street had generated substantial concern at the Boston Redevelopment Authority, and had evidently become a source of considerable notoriety. The Authority's description of the situation is so telling—and the corresponding recommendation is so prescient—that I will quote the following passage almost in its entirety:



Bromley Ward Map, 1928 (Boston Redevelopment Authority).

> The three-block portion of Boylston Street from the Fens to Brookline Avenue is an underutilized, auto-oriented commercial strip. Much of the land is occupied by one-story structures that are often vacant and by parking lots used to capacity only during the baseball season. Private reconstruction has taken place in a haphazard fashion, not serving to improve the street's appearance or to stabilize the economy. At night, the strip is deserted and dark; it has become a dangerous area.
>
> Boylston Street's need for planned reuse is clear, but the precise nature of its rejuvenation has never been pursued to the point of an active, investor-backed proposal. One concept discussed by the BRA has involved the construction of new mixed-used structures (residential, with ground floor retail) of 12 to 15 stories …. Zoning changes for height and density would likely be necessary for any major, intensive redevelopment of Boylston Street. Thus the reuse becomes a matter of public policy. It is also a matter of concern to the adjacent West Fens neighborhood, whose population composition, economy, environment and general character stand to be affected by changes on Boylston Street. A rehabilitated upper Boylston Street, including new construction and new uses, would utilize more fully a section of prime real estate which has undergone little improvement (*20-21*).


Boylston Street aerial photograph, 1955 (Boston Redevelopment Authority).

Despite the insight and intelligence with which both the problem and the potential remedy were expressed, I could find no evidence of subsequent efforts in this direction by the BRA for the next fourteen years.[80, 81]

80. The 1975 report was a draft, stamped "working draft for community review," but the final report, issued in 1977, quoted the draft word for word (on the matter of upper Boylston Street).
81. A "current issues" map seems to isolate "Boylston St. Reuse" to the southern side of the street.

In 1989, under the notably community-oriented administration of Mayor Raymond Flynn, the BRA published a report entitled "The Fenway/Kenmore neighborhood: a framework for discussion." The document was explicitly designed to set the stage for a major rezoning of the district. The author, an anonymous "neighborhood planner," concentrated primarily on the same issues that had afflicted the neighborhood (as well as his or her predecessor) in 1977. Of particular note was the predominance of parking along Boylston, with our planner positing that "land devoted to [parking] remains underutilized and undeveloped" (*21*), "unsightly," and "inefficient" (*29*). This time, however, the point is driven home by a quantification, by area, of land uses in the Fenway Triangle: the 69-acre district was only 10% non-warehouse commercial, with 40.6% used for warehousing, and an astounding 26.6%, or 18.4 acres, devoted to parking—only six acres shy of the entire West Fenway neighborhood land area of 26.4 acres[82] (*20*).

With seven parcels for sale on Boylston, including the Sears building, the BRA saw a distinct "opportunity to encourage development compatible with the neighboring residential areas" and establish Boylston's "role as a boulevard" (*28*). The Authority established zoning, especially uses and heights, as a point of departure, with the next step to be the Mayor's "recognition of a Community Review Commission (CRC), consisting of residents, local business leaders, and property owners" (*36*). The BRA proposed to provide "leadership in land use analysis and policy recommendation," and suggested the rapid adoption of an Interim Planning Overlay District (IPOD) as a needed patch before the formal rezoning process could be undertaken. Above all, the BRA, citing the principles of the Flynn administration, insisted on a "open community planning process," acknowledging that "all knowledge of what is best for the city does not reside with the government … plans work best when they are fashioned by the community" (*35*).[83]

Evidently, the community agreed. That same year, the Kenmore/Audubon Circle/Fenway Neighborhood Initiative, or KAFNI, convened what would be a three-year community planning effort—without, it should be noted, direct City assistance. KAFNI's work culminated in a substantial document, entitled *The Urban Village Plan for the West Fenway: Recommendations for Strengthening Our Neighborhood,* which was introduced in 1992. The introduction picks up where the BRA's report leaves off by boldly stating, "We started this project with the assumption that residents possess unique knowledge of what does and doesn't work in their community: They are, therefore, a critical part of the planning process." KAFNI characterized the Fenway as being "at a crossroads": "Boylston Street looks like 'auto mile,' the Muddy River is polluted, many residents don't feel safe at night, a quarter of the land is given over to parking lots, pollution from automobiles is at unsafe levels, and the City has targeted underutilized land in the Fenway for the biomedical industry."[84] Despite these problems, KAFNI members expressed an optimism that these ills could be addressed with "a strategy to capitalize on our assets and opportunities and to ensure that upcoming development benefits and

82. The West Fenway was 64.2% residential, with 10.3% for surface parking. Vacant land is listed as 0%.

83. This statement aligns well with my conclusions in the previous section on process.

84. The veiled negativity over the City's alleged land use plans for Boylston, coupled with the lack of explicit involvement by the BRA, hints at a schism between the neighborhood and the City officials. Within the Zoning and Land Use section, KAFNI is more explicit: "Without input from KAFNI … the Boston Redevelopment Authority is designing an Interim Planning Overlay District (IPOD) with new zoning regulations for the West Fenway … the BRA's delays in proposing new zoning has strained residents' patience" (*63*).

doesn't overwhelm our community" (*i*).

KAFNI's plan was composed of five prongs: Housing, Economic Development, Transportation, Open Space and the Environment, and Zoning and Land Use. While each prong is of great importance to the neighborhood, for brevity I will focus solely on the component of greatest relevance to this proposal, Zoning and Land Use. KAFNI's recommendations focus on extending the human scale, aesthetic, and mix of uses characterizing the existing West Fenway core into the Boylston Street corridor, thereby remaking the street as "an integral part of the Urban Village and provid[ing] a buffer between the West Fens Residential District on the south and the entertainment and commercial sections to the north" (*66*). The resulting recommendations called for a dramatic increase in open space provision,[85] compatibility with existing West Fenway architectural standards,[86] height and density in concert with the residential neighborhood,[87] and the prohibition of auto-related uses and medical or institutional uses.[88] The near replication of the existing neighborhood fabric called for by KAFNI proved untenable; politics, real estate economics, and the impending Red Sox stadium proposal (see below) all worked against KAFNI's relatively conservative development criteria—which were eventually pushed aside in the subsequent rezoning process.[89]

In the late 1990s, the Red Sox, by now under the leadership of John Harrington of the Yawkey Trust,[90] proposed building a new $665 million, 44,000 seat park on 15 acres[91] immediately to the west of the existing park on Boylston Street. The plan, which would have doubled the ballpark's overall footprint, was designed not simply to accommodate 10,000 extra fans, however, but a host of associated entertainment uses as well—a common, extra revenue-generating feature of many professional sports complexes (Farrey 2000). Community members protested that the additional traffic impacts, coupled with a host of seasonal, non-community oriented bars and restaurants and an imposing, non-porous street-facing façade would lead to the further deterioration of Boylston Street and further marginalize the adjacent neighborhood.[92] To many, the Mayor's endorsement of the plan appeared to constitute a direct repudiation of the goals and ideas expressed in the KAFNI plan. In part because of the sensitive land use issues intertwined in the ballpark proposal, a rezoning process, conducted with the input of a Citizen Advisory Committee (CAC), was launched in the late 1990s.[93]

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85. To 40% of newly developed land area. KAFNI acknowledges that this requirement is high for urban zoning, but claims that it is consistent with existing residential buildings in the West Fenway.
86. "New buildings should be compatible with existing residential structures in terms of materials, windows, proportions, scale, colors, and architectural details" (*67*).
87. KAFNI recommends an IPOD limiting height to 60 feet and FAR to 3.4.
88. KAFNI also asked for recognized design review powers and incentives to attain 50% affordability for new development, with a bonus of two floors, a decrease in open space requirements, and the reduction of parking to .2 cars per unit.
89. While KAFNI is no longer in existence, the Urban Village Plan formed the basis of a new committee at the Fenway CDC, appropriately entitled The Urban Village Planning Committee. The Committee's current chair, Marc Laderman, was FCDC's representative to the Fenway Planning Task Force after its original representative, Roscoe Sandlin, moved.
90. Thomas Austin Yawkey, owner of the Red Sox and Fenway Park since 1933, had died in 1976, and his wife, Jean Yawkey, died in 1992. Laderman (2007) describes the successor Trust as "insular at best."
91. As opposed to a 34,000 seat park on 8 acres.
92. Most famous of the organizations that sprung up, almost overnight, to combat the new plan was Save Fenway Park!, which issued the ubiquitous green bumper stickers bearing its name.
93. In the meantime, the Red Sox ownership changed in 2002 and the new ownership group publicly committed to remaining in the

While the Red Sox plan faltered, KAFNI's general vision of a diverse, vibrant, walkable, human-scaled urban neighborhood offered broad appeal, and would eventually thread itself throughout the BRA's *Land Use and Urban Design Guidelines* for the Fenway (2002).[94] This report, which directly informed the Fenway rezoning (adopted on October 24, 2004) was created in conjunction with the Fenway Planning Task Force (the CAC).[95] Like KAFNI, the FPTF's Urban Design Subcommitte agreed that "Boylston Street should relate to the residential neighborhood, not only on the south side," while granting the north side greater flexibility in terms of height and density (*3*). As a result, two separate subdistricts were formed in order to tailor zoning to the unique roles occupied by the north and south sides of the Boylston corridor: the Fenway South Boylston Neighborhood and the Fenway North Boylston Neighborhood, eventually codified as NS-1 and NS-2,[96] respectively. The unified "Goals/Purpose" of the districts drew heavily from KAFNI's work, declaring that the new subdistricts would permit "an array of land uses and promote pedestrian friendly, mixed-use development, including the encouragement of diverse housing opportunities, neighborhood-oriented business, retail, and service uses."

The proposed allowable height and density, however, were not what KAFNI considered conducive to an "urban village"; 75 feet and a 4.0 FAR base for south Boylston Street, with 95 feet and a 5.0 FAR base for northern parcels.[97] In addition, two residential incentive provisions created the potential for additional height and density. A 1.0 FAR, 30 foot bonus applies to projects that are 50% or more residential, with 5% or more affordable housing (80%-120% of the Boston MSA median income), and an additional .5 FAR, 10 foot bonus for 10% or more affordable housing.[98] Given the Mayor's Executive Order on affordable housing (2000), requiring a minimum of 10% affordable units on site (or 15% off site), these provisions are essentially mandatory bonuses.[99] As a consequence, the effective residential regulations are 5.5 FAR, 115 feet for south Boylston and 6.5 FAR, 135 feet on the north side. The establishment of Planned Development Areas (PDAs) in both NS-1 and NS-2 subdistricts creates the potential for still greater heights and densities. Any parcel of one acre or more is governed by this conditional provision, allowing densities of 7.0 FAR and heights of 150 feet.[100]

A host of dimensional requirements and design guidelines however, promise to at least partially mitigate the light and air impacts of increased height and density. A 15-foot setback, paired with 5-foot projecting bays, creates sidewalks explicitly intended to accommodate street trees and furniture as well as outdoor dining.

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ballpark for the foreseeable future.

94. The KAFNI plan was also updated during this period, and a community visioning charrette was co-sponsored by the Fenway CDC and Save Fenway Park! (Laderman 2007).

95. The zoning regulations, codified as Article 66, replaced an Interim Planning Overlay District (IPOD) that had been in place since the start of the rezoning process in the late 1990s. The IPOD granted a maximum height of 60 feet over the entire district, excluding Planned Development Areas (PDAs).

96. "NS" stands for "neighborhood shopping."

97. Originally both subdistricts were to have the same height and density allowances. These figures are from Article 66.

98. This reversed the planning document's original bonus structure, which gave a 10% bonus for residential and 20% addition bonus for affordable units.

99. The Executive Order only affects residential projects of 10 or more units.

100. The use of PDAs is a subject of some controversy in the Fenway, with much distrust and misunderstanding surrounding the concept. I refer the reader to Article 80-C-4 of the Boston Zoning Code for more information on the regulation.

A complementary 15-foot stepback at 75 feet lessens the perceived heights from street level. 75-square feet of open space must be provided for every dwelling unit—a modest amount, but enough to create a substantial courtyard for the most-recently completed development (Trilogy).[101] Finally, the Article 80-B process mandates a fairly stringent urban design review to determine whether the project is "(a) is architecturally compatible with surrounding structures; (b) exhibits an architectural concept that enhances the urban design features of the subdistrict in which it is located; (c) augments the quality of the pedestrian environment; and (d) is consistent with any established design guidelines that exist for the area in which the Proposed Project is located" (*32*).

It is clear that, if development pressure is sustained, the neighborhood that results will not, in fact, be an extension of the West Fenway[102]—at least not in the way KAFNI had conceptualized it. The parking lots, gas stations, and fast food restaurants of this notoriously auto-oriented strip will be—and in some cases already have been—replaced by higher intensity uses. There is little doubt, particularly given the corridor's past infamy, that the replacement of these unloved uses and forms is an outcome highly sought after by the community. However, the ultimate desirability of the Boylston corridor redevelopment (as judged in the court of neighborhood opinion) will be determined by the balance between the benefits and the impacts of significantly increased intensity.

101. Given the substantial liberalization of zoning regulations granted by the city to this development, perhaps this highly-landscaped space should have been opened to the public, rather than enclosed on all sides by luxury apartments.

102. Laderman (2007) slyly refers to Boylston Street as the West Fenway Neighborhood Growth Area in order to balance the desire for a continuation of community character with the realities of new development along the corridor.

Chapter 4: Green Building and LEED

4.1 Introduction

To review, the Fenway was rezoned in 2004. The most drastic change was along the Boylston Street corridor, where new uses were introduced and base FARs doubled. Further height and density are enabled by a pair of cumulative density bonuses for residential use/affordable housing (1.5 additional FAR, total, up to 6.5 FAR) and a *de facto* bonus (of .5 to 1.5 FAR, up to 7.0 FAR) for assembling an acre of land and undergoing the PDA process. As a result, there is now an outlet (supply-side) for much, but likely not all, of the significant development pressure (demand-side) on Boylston Street.

While greater recognition of the Fenway as a viable neighborhood is desirable to most residents, without careful attention this recent increase in development activity could negatively impact the environmental quality of the neighborhood. In order to avoid unduly increasing (or even consider lessening) the level of environmental stress on the West Fenway, the direct and indirect ecological impacts of each individual building will have to shrink. I believe, however, that mitigating the impacts of development should not pose undue burdens on the development community, the continuing work of which is crucial to the ongoing revitalization of the Fenway. Indiscriminately stifling development through burdensome development controls, in other words, is not something I consider a desirable result; the problematic *status quo*, after all, represents just such an outcome. The neighborhood's environmental, social, and urban design-related expectations for new development should be high and unwavering, no doubt, but the community must ultimately proceed in a measured, realistic manner; the four-story walkups (with 40% open space) envisioned by KAFNI are simply not the future of Boylston Street.

This proposal attempts to mediate the perceived tension between sustainability and density/prosperity in the Fenway, acknowledging the critical necessity of each and highlighting the multitude of alignments between them—there is ample opportunity for value creation when these objectives are pursued in an integrated manner. The proposal I offer suggests trading public development rights, through a density bonus mechanism, for a pre-established standard of environmental quality, for which I use the increasingly popular LEED system as a proxy (explained below). The leveraged amenity is, in other words, the environment (comprised of local, regional, and global components), of which large-scale development is often unmindful. Admittedly, this proposal for the relative[1] enhancement of environmental quality could itself impose significant environmental burdens, and so begs significant discretion in its formulation and application.

The previous sections of this thesis, in fact, were written to establish solid legal, social, political, and economic bases by which the benefits and burdens inherent in any density bonus proposal should be balanced. To briefly reiterate these points, the density bonus is "a conditional liberalization" of the underlying zoning. As such, the bonus is an exchange of public development rights in return for a public amenity—in this case, environmental quality. The calibration of this bonus, effectively the rate and conditions of exchange, relies

1. Relative because LEED will not enhance the environment, but rather lessen the degradation of the environment caused by development. If higher-density, LEED-certified buildings displace even a portion of sprawling single-family or commercial strip development, however, the overall impacts (regional and global) may indeed be lower than the base case—but this thesis is not prepared to make the claim that this growth reallocation will indeed be realized.

on the existence of overlapping net valuations—that which is gained by the developer and that which accrues to the host community. If no overlap exists, no trade can (or should, at least) be made. A substantive community process, along the lines of that suggested in Chapter 2, is absolutely necessary in order to make this judgment—once again, no planner or politician can accurately gauge the public's valuation without the participation of the public itself.

4.2 Building Impacts

Before considering the benefits of green building, it is important to consider, in a general way, the environmental impacts of buildings and of building practice in the United States. According to the United States Green Building Council (2005), buildings have "a huge impact on the environment," accounting for 30% of our greenhouse gas emissions and an astounding 70% of national energy consumption. In Massachusetts, 71% of energy is consumed by buildings, and in Boston, due to its better than average transit connectivity, the share is almost certainly higher. 31% of greenhouse gas emissions in Massachusetts come from "buildings and industry," 33% from electricity generation (a primary consumer of which is, of course, buildings), and 28% from transportation (most of which is commuter related) (MTC 2007). Building emissions also directly impact local health and welfare. The US Department of Energy claims that buildings produce 49% of total sulfur dioxide emissions, 25% of nitrous oxide, and 10% of particulate matter (cited by Mayor's GBTF 2004).

Most buildings, of course, do not generate their own power, and so must rely on energy from the grid. In 2002, Massachusetts' electric power generators emitted 90,726 tons of sulfur dioxide, 31,722 tons of nitrogen oxides—both of which have potential public health impacts—and 21,486,936 tons of carbon dioxide—a major greenhouse gas. Of fuels used for electricity generation in Massachusetts, coal, notorious for its high carbon emissions, owns the largest share (28%), followed by natural gas (26%), petroleum (23%), nuclear (14%), and wood and wastes (9%) (DOE 2001).

The evocative smoky factory, meanwhile, is responsible for fewer energy and emissions impacts than ever before, partially due to the decline of industry in Massachusetts, and partly because it is easier (and likely more popular) to regulate large, point source emitters. Over the last 20 years, per capita residential energy consumption has risen from 2017 to 2816 KwH, while energy consumption for industrial uses declined from nearly 26% to 17% of total energy use. It is clear that, in the Massachusetts economy of the future, the major battles for energy conservation and emissions control will be fought household by household (or office by office) rather than at the factory level.

Although energy and emissions have historically figured most prominently in discussions of the environmental burdens imposed by buildings (Kreisler 2006), buildings are responsible for a host of other impacts as well. The USGBC reports that 12% of fresh water use is attributed to buildings, and, although fresh water supplies in eastern Massachusetts are now sufficient to support consumption (MWRA 2007), it

required massive infrastructure investments spanning decades in order to do so.[2] Almost 65% of fresh water withdrawn for residential, commercial, industrial, agricultural, and recreational use is released back into rivers and other waterbodies, sometimes after treatment, other times without treatment.

Further, buildings generate 65% of solid waste, nationwide, particularly during the construction process. Much of this waste must be trucked out of state (Maine is a top destination) for landfilling in communities that are often poor and rural (Veitch 1997). Many of the landfilled materials contain toxins and other unsavory elements that will require vigilance from future generations and effectively limit the use of the land under which they are buried for hundreds of years. And because these materials—even those that under careful stewardship are environmentally innocuous—have ended up in the waste stream instead of being reused or recycled, the often environmentally detrimental extraction of these resources will continue unabated as new products are created from virgin materials (McDonough and Braungart 2002).

Buildings can also supplant or disrupt critical habitats, create stormwater and groundwater management issues by removing pervious surfaces, exacerbate the urban heat island effect, use materials that lead to resource exploitation and deforestation, slowly poison us through the gasification of volatile organic compounds, and, through poor land use decisions, create the traffic problems that in turn lead to local pollution and global warming (USGBC 2005). In many ways, the structures that frame our lives and offer us the benefits of shelter, comfort, and privacy often also negatively impact our (and everyone else's) quality of life. As McDonough and Braungart (2002) lament, "Something seems terribly wrong with this picture" (*5*). Green building advocates, McDonough and Braungart included, argue that this tradeoff is a false one—that we can indeed have our cake and eat it too.

4.3 Benefits of Green Building

The purported benefits of green building are numerous. I use the framework set out by the Massachusetts Technology Collaborative (MTC), the state's renewable energy and energy innovation agency, as an organizational tool.[3] Briefly, according to the MTC, "the benefits of green buildings range from energy and water savings, to increased worker productivity, to overall environmental sustainability and conscientious use of local resources" (2007). In fact, I argue, these benefits are simply among the most prominent, and economically motivating, of the many prospective benefits of green building. It is also worth noting that "green building" is a very fluid term, potentially encompassing many aspects of building design, construction, and operation—not all of which every so-called green building will admirably manage. A consideration of both the components and measurement of green building is best reserved for the following section (LEED). Therefore, this section treats the range of benefits that *can be* but not necessarily *are* attainable through green building practice.

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2. From 1969-1988, the Massachusetts Water Resources Authority (MWRA) safe fresh water capacity was actually below consumption levels. Currently, the MWRA provides an average of about 250 million gallons/day, with a safe capacity of about 300 million gallons/day.
3. I do, however, reorder the framework to better serve the purposes of this paper.

Productivity and Health

Often green building is couched in discussions of employee productivity and occupant health. The MTC (2007) quotes studies that claim that environmental controls such as proper climate control, ventilation, and lighting can reduce sick time and employee turnover and augment performance and concentration. In residential contexts, low-VOC paints, carpets, adhesives, sealants, and composite wood products can help reduce respiratory ailments, headaches, and other potentially serious health conditions, particularly in children. This line of benefits is particularly appealing because the benefits accrue to the occupants (or the occupants' employers, as it may be) themselves, thereby "strengthen[ing] occupant companies' ability to recruit and retain employees" (Mayor's GBTF 2004, *5*).

Although occupant health is certainly an issue of importance, public health (which the MTC mentions only obliquely) is of primary interest in the context of this proposal. Often behaviors intended to ensure occupant health and safety are self-interested, but behaviors aimed at protecting the health and welfare of others might require incentives. The Mayor's GBTF, operating in an urban context with unacceptably high asthma rates[4] (particularly in predominantly minority neighborhoods[5]), makes public health, particularly respiratory health, a priority. As cited previously, buildings are responsible for a substantial share of leading urban air pollutants, including sulfur dioxide, nitrous oxide, and particulates. "Green buildings," the Task Force reports, "produce fewer air pollutants, enhancing both health and quality of life for Bostonians. Boston is already a national leader in the healthcare field … turning our buildings into our allies in the fields of environmental and public health is a natural next step for Boston (*7*). This sentiment—moving closer to the ideal of making our buildings into double positives, instead of tradeoffs between occupant comfort and public health—is at the core of this thesis.

"Green," it should be noted, is not a self-contained, single building-scale phenomenon, particularly concerning the issue of public health. The siting of a building next to public transit and/or the provision of facilities for bicyclists, for example, can reduce the automobile traffic, and thus the indirect air pollution, generated by that building. If situated correctly and supplemented by programs and policies designed to induce behavioral changes, a building can either augment or reduce the environmental impacts created by activities beyond its walls.

Upfront Costs vs. Lifecycle Savings

Various studies consider the financial implications of green building, a topic that is of critical importance to the development community. Several experienced parties report very little increase in hard costs for LEED buildings—even those achieving higher tiers. Davis Langdon & Seah, an international construction

4. In 2003 the Centers for Disease Control discovered that Massachusetts had the highest adult asthma rate in the nation, at 9.5% almost 2% higher than the national average (cited by Smith, Stephen. The Boston Globe. Asthma Worst in Bay State, study finds. 16 May 2003).

5. "Dorchester, Roxbury, and Mattapan have Boston's highest percentage of asthma hospitalization" (Mayor's GBTF 2004, *7*). According to the Boston Health Commission (1999), 30.5% of asthma hospitalizations occurred in Dorchester (also the largest neighborhood by population), 21% in Roxbury, 9.4% in Jamaica Plain, and 9% in Mattapan.

and property management consultancy, authored a comparative costing study of green building in 2004. It should be stressed that LEED was still in its nascence—materials markets have since evolved significantly—and the sample size was small (138 buildings, 45 of which were LEED seeking). Despite these disadvantages, the authors determined that a modest 2.6% premium for Silver and 4.2% for Gold applied to Boston-area construction.

To put this study in context, soft costs are not considered. While, given Boston's in-house adjudication of LEED, the controversial issue of certification cost is effectively moot, a substantial learning curve—for developers, consultants, and regulators—undoubtedly adds cost as the project team feels its way through its first LEED development. However, many of the major service providers—architects, engineers, contractors, owner's representatives—have, in the eight years since LEED 1.0 debuted, gained substantial expertise through hands-on experience with LEED projects. In Boston's broad professional services market, a lack of LEED/green building experience is increasingly viewed as a deficiency.

Neither are increased capital costs balanced against potential reductions in operating costs in the DLS study—particularly when fossil fuel costs are relatively high and unstable. Energy conservation measures (and, more rarely, on-site energy production capacity), can and should be tested in development pro formas to establish their impact on net present value up to the investment horizon (or, more ideally, system/building lifespan). The California Sustainable Building Task Force (2003) did just that, determining that a 2% premium applied to green building, but that the lifecycle savings were at least 10 fold greater over twenty years. Although this data was culled from a climatically different region of the country—with different resources and labor costs—the Mayor's GBTF concurs with the general conclusion: "While the perception that green buildings just plain cost more lingers, recent examinations of the full spectrum of building costs suggest that people misunderstand the opportunity costs incurred by those who do not build green … the long-term costs of NOT building green are substantial" (*10*).[6] Until decision-makers properly weight the life-cycle cost savings of green buildings, however, evidence of reduced energy costs may go unheeded—even among long-term building owners (Mitchell 2007).

Finally, in line with the GBTF's general sentiments, residential and commercial markets for green buildings have emerged in the past decade, and while still characterized as "niche," continue to expand. These markets demonstrate a willingness to pay a modest premium for sustainable designations, like LEED, or performance features, whether for energy savings, worker productivity, or simply the prestige still attached to green building. At the very least, green status could help distinguish a property from the field in sluggish real estate markets. At the other extreme, a highly energy-efficient building with on-site power generating capacity could help shield building owners and tenants from future energy shocks.

6. Kreisler (2005) notes the existence of green building financial modeling tools, particularly Ecologic3 (www.ecologic.com).

Expanding Economic Markets

The MTC considers green industries, including "green construction" and renewable energy services, to constitute major opportunities for economic growth in Massachusetts. Governor Deval Patrick has also been explicit about linking the environment and economic development. The Boston Globe paraphrases the Governor's goal as "to attract the entire renewable energy industry to the state, including companies that would design and manufacture wind turbines, hybrid cars, and solar panels, in addition to establishing conservation consulting firms" (Dudley 2007). The GBTF also placed major emphasis on the creation (or maintenance) of innovation economy jobs and industries, with a vision of Boston as a city that "will attract businesses that offer green building services," particularly in the fields of architectural design, construction, engineering, and manufacturing (5). The green building and renewable energy industries, as both socially desirable and (in the mold of the computer and biotechnology industries before them) attractive to highly skilled workers from the area's universities, fit well with Boston's past economic successes.

Natural Resources and Environment

This category is broadest in scope, covering greenhouse gas emissions, local air pollutants, water and forest ecosystems, waste streams, and ecological footprint. The relationship between greenhouse gas emissions and the dangers of global warming have lately received particular attention in Massachusetts and elsewhere in the northeastern United States. The New England states, along with New York, New Jersey, Delaware, and Maryland[7] recently formed a cooperative initiative to control carbon dioxide emissions from electric power plants through a cap-and-trade system. The result, entitled the Regional Greenhouse Gas Initiative, affectionately known as RGGI (pronounced Reggie), is a regional effort to fight the phenomenon of global warming (Hamel 2007). There are indications that RGGI might one day expand to regulate other greenhouse gas emitters; in a carefully worded statement, RGGI states that, after the power plant initiative has been implemented, "the states may consider expanding the program to other kinds of sources" (2007). Along with vehicles, commercial and residential buildings—responsible for up to 36% of all anthropogenic carbon dioxide emissions—would be important targets for the next-generation of RGGI to address. Within a regional cap-and-trade scheme, not only would a green-built Massachusetts be more forgiving to the planet, but also hold a comparative advantage with the other member states.

The MTC lists potable water consumption as a major environmental impact of buildings (12% of total consumption), which places undue stress on water sources, treatment facilities, and delivery infrastructure. Green buildings, through the use of low-flow fixtures, waterless urinals, dual flush toilets, and the reduction or elimination of potable water for landscape irrigation, reduce this burden. Of additional concern, particularly in the Fenway where not all sewers are segregated, is the reduction or pre-treatment of wastewater and the effective management of stormwater quantity and quality. Reducing impervious surfaces, creating grassy swales, constructed wetlands, or detention tanks can accomplish many of these objectives simultane-

7. Pennsylvania has not yet joined (as of April 2007) but was one of the originating states.

ously: a building might collect rainwater from the roof in a cistern, for example, and then use this water (with minimal filtering or treatment) to flush toilets or water lawns.

Forest ecosystem protection is less of an issue in high-density urban construction (especially without balloon-frames or wooden interior studs), but other material resource issues enter into the picture when building densities go up. The issue of resource exploitation is perhaps best considered when paired with concerns about the construction waste stream. The United States Green Building Council (USGBC) recommends addressing both problems simultaneously by using recycled or reused materials whenever possible. The USGBC suggests employing rapidly renewable materials, such as bamboo (for flooring), when recycling or reclamation is infeasible.

Finally, ecological footprint, which the MTC defines as a building's "impact on its surroundings," particularly natural systems or habitat, is an issue requiring critical consideration in the formulation of a density bonus overlay. Even in most urban areas, land has been set aside for conservation or habitat protection, and surrounding land uses should be regulated to reflect the common concern for these fragile areas. A different type of overlay, one that limits development activity, is appropriate in these contexts. Density bonus overlays, on the other hand, are intended to accommodate growth where growth is appropriate, and must therefore be restricted to areas without uncommon ecological sensitivity[8] or environmental stress and with adequate infrastructure and transit connectivity.

Community Enhancement

The Mayor's Green Building Task Force report is, fundamentally, predicated on the assumption that green building can enhance the profile of a community, increase the competitiveness of a community, and enhance the quality of life for the inhabitants of that community. This thesis, in turn, assumes that these benefits can, under the right circumstances, outweigh the burdens imposed by greater height and density: "increased density," say Tarnay and McMahon (2005), "must be matched with measures that support human health and a high quality of life for urban residents" (*56*). Only affected residents and their public officials are positioned to determine whether these circumstances exist and, if they do exist, what types of tradeoffs bring net value to the community.

4.4 Leadership in Energy and Environmental Design

The incorporation of green planning, design, and construction practices into zoning and/or building codes is one important means of addressing the critical challenge of maintaining sustainable urban environments. However, as previously noted, green is a fluid term with different meanings to different parties. If green building/environmental quality as an amenity is to be traded for increased height and density, the dimensions of that amenity (like all others employed in density bonus methodologies) must be known and measurable. Enter the LEED rating system, designed specifically for those purposes. LEED is an acronym for

8. Which is why I omit GPOD parcels from the Overlay.

Leadership in Energy and Environmental Design, a trademark of the United States Green Building Council (USGBC).[9] Since debuting in the year 1999 (as LEED Pilot or 1.0), LEED has become an increasing popular standard for sustainable projects and has been embraced by dozens of government entities, institutions, and, perhaps more tentatively, private developers seeking to incorporate sustainable building practices into their projects and gain recognition for their efforts.

The USGBC claims that the LEED system is "voluntary, consensus-based, market-driven, based on accepted energy and environmental principles, and [strikes] a balance between established practices and emerging concepts" (2005, *3*). The system, now in its second major (fourth overall) iteration (LEED 2.2), was developed—and continues to be developed—by committees of industry experts. Thus, the standards behind each evaluation measure, or point, are established through a negotiation, as is the weighting of the evaluation categories, which together comprise the system.

LEED is an interdisciplinary system—incorporating architecture and landscape architecture with civil, mechanical, and electrical engineering and even construction management—for evaluating environmental impacts at the single building scale. LEED is performance-based, preferring to eschew prescription in order to encourage solutions that are contextual[10] and cost-effective. LEED also permits significant flexibility; the evaluation is expressed through a sustainability ranking, or certification level, which combines a few prerequisites with a host of optional measures for which points (also referred to as "credits") are awarded. There are 69 "possible points," although attaining all 69 is, in fact, impossible because some are mutually exclusive. Four levels of certification exist: certified, (26-32 points, and all prerequisites, of course) is the minimum sustainability standard, stepping up to Silver (33-38 points), Gold (39-51 points), and Platinum (52 points and above) for truly exceptional projects.[11]

The framework is holistic, and the scope of considered impacts is broad, with criteria pertaining to planning and siting, building and landscape design, systems performance, materials and construction practice, and building maintenance and operation. These considerations are expressed as six categories:

- Sustainable Sites (14 possible points) grants points for situating a project within an already-urbanized context, redeveloping a brownfield, ensuring transit connectivity, making accommodations for bicyclists, protecting habitat and open space, managing stormwater quality and quantity, mitigating heat island effects, and limiting light pollution.
- Water Efficiency (5 points) rewards water-efficient landscaping, innovative wastewater management, and overall potable water use reduction.
- Energy and Atmosphere (17 points) awards credits for energy efficiency (from 1-10 points), the

9. A variety of LEED products have been developed since. I refer in all cases to LEED-NC (New Construction), which is the original LEED product. The latest version at the time of writing is 2.2.
10. Approaches to many credits might vary with the climate, local building techniques, the availability of resources, etc.
11. In 2004, with the architecture firm of Bruner/Cott & Associates, I began work on a LEED Platinum targeted project for Harvard University. At the time, only five LEED 2.0 projects had achieved Platinum certification—the number is now around 35. Our project was the first adaptive reuse/historic rehabilitation ever to receive the Platinum designation.

provision of on-site renewable energy (1-3 points), refrigerant management, systems commissioning[12] and monitoring, and the purchase of power from renewable sources.[13]

- Materials and Resources (13 points) is concerned with building reuse and the recycling of construction waste, and gives points for the use of materials that are renewable, recycled, reused, or locally produced.
- Indoor Environmental Quality (15 points) gives credits for ensuring proper ventilation, daylighting, and temperature controls (for occupant comfort), as well as the avoidance of materials (paints, carpets, composite wood products) that contain volatile organic compounds (VOCs).
- Innovation and Design Process (4 points) rewards projects that employ sustainable strategies (occupant education, for example) that fall outside of the standard framework.

This list, of course, is far from all-inclusive, and fails to capture the intent or nuance of these credits. For that, I have attached a standard LEED scorecard (Appendix B), and an abbreviated LEED-NC 2.2 Reference Manual may, at the time of writing, be downloaded from www.usbc.org.

Finally, if a project is to attain certification, it must be adjudicated. Most of the credits are awarded on faith: the architect, landscape architect, engineer, or contractor performs calculations or provides documentation claiming that the credit intent has been fulfilled. Similar to the Internal Revenue Service, only a few credits will be audited; the USGBC sends the relevant information on a particular credit to an independent expert for peer review, who then determines whether or not it should be awarded. If the applicant fails on enough credit attempts, the USGBC flags the submission for further scrutiny.

4.5 Article 37

In most locales LEED is voluntary for private developers—the expressed intention of the USGBC, which evinces discomfort at the notion of its independent group judging code compliance. While many government entities—local, state, and federal—have adopted LEED, often LEED Silver, as a standard for their own projects, until recently, no major cities had made LEED mandatory for private development. Before December 22, 2006 (when Article 37 was announced), if the City had been able to obtain a commitment of LEED certifiable development from every new large project proponent it would have constituted a major victory for green building advocates and the citizens of Boston.

However, Boston's incorporation, in late 2006, of LEED standards into its large project review process (Article 80B) changed expectations. With Article 37, the "Green Building" zoning amendment, Boston took a crucial first step in promoting a higher standard of environmental quality—broadly construed—for all major building projects within city limits. Any project of 50,000 square feet or more is now bound to attain—at a minimum—LEED certifiable[14] status (if permit applications had not been submitted

12. Commissioning is an M/E/P peer review by consulting engineers to ensure systems efficiency. It also involves training operations personnel.
13. Oftentimes through the purchase of Tradable Renewable Credits (TRCs).
14. "Certifiable" means that the proponent is not compelled to submit to the USGBC's third-party adjudication process, but is required to meet that body's minimum rating of "LEED Certified," a standard achieved by attaining 26 of 69 possible green planning,

by Dec. 22, 2006[15]). The BRA has committed its own staff to adjudicating applications, thus removing the direct application cost to developers (a potential savings of many thousands of dollars) and avoiding charging the USGBC with a responsibility it clearly does not want.

The standard represents the culmination of several years of discussion carried on within the broad membership of Mayor Menino's Green Building Task Force (GBTF). The GBTF brought together an incredibly diverse array of interests to discuss the potential of green building (focusing on LEED) for addressing matters of public health, environmental and energy resources, labor force development, and economic competitiveness. The 22-member committee was composed of representatives from the development community, the banking and finance industry, contractors, asset managers, unions, housing advocates, institutions, architects, lawyers, and health care providers, with ample support from a host of city and state governmental agencies, engineers, and green building advocates.[16]

According to the GBTF Chair, initially, the process was laborious at best, with particular resistance on behalf of the development community (Conway 2007). Eventually, as it became clear that the GBTF had firm political backing, the group coalesced to produce a (very upbeat) report entitled *everyone benefits from building green … everyone* (2004). The GBTF finds that green building (for which they often substitute LEED) protects air and water quality and human health while lowering operations costs. These conclusions are, importantly, echoed in Mayor Menino's introductory statement. Green building, he claims, "will produce energy cost savings and improved health without the negative environmental impacts of conventional construction … high performance green building is … good for your wallet … good for the environment … and it is good for people." It is clear that Mayor Menino's exceptional leadership on this issue is a crucial underpinning to future initiatives to improve local environmental quality.

However, while Article 37 is widely considered to be a progressive standard, it is now, as the primary green building representative of the BRA commented, the minimum acceptable standard for development in Boston: Baseline LEED is now literally baseline practice (Dalzell 2007). This is not to denigrate the achievement in any way; Article 37 (and Article 80-B, through which it is enforced) is the basis of my own proposal. Article 37 establishes the political commitment, the baseline standard of practice, and administrative mechanisms needed to operationalize the LEED density bonus. What it does not do, and that which I seek to remedy, is encourage (or even explicitly reference) higher levels of LEED achievement. The developer that invests in a LEED Gold building, a proposition that entails at least the strong perception of risk to developers unfamiliar with LEED, will likely reap a host of rewards, but will not receive more than the standard building and occupancy permits from the City itself.

A higher standard, Silver, Gold, or Platinum, does indeed yield a more environmentally-friendly building. Sustainable features are added, or carried out to a higher standard, which not only increases

design, and construction credits. I sometimes refer to this level of certification as "baseline."

15. Applicable permitting agencies include Inspectional Services (ISD) or the Zoning Board of Appeals (ZBA), and the Boston Redevelopment Authority (BRA).

16. The Green Roundtable in particular.

the overall degree of sustainability, but decreases the chance of grave omissions (or, from a more optimistic standpoint, increases the likelihood that sustainable features are better integrated into the overall design). Silver certifiable, for example, has been the minimum standard for City of Boston owned or sponsored facilities for some time, and has been adopted by numerous city and state governments across the country for publicly-owned or financed projects. Gold and Platinum have thus far been reserved for higher profile, or prestige, developments such as the luxury residential Solaire in New York City (Gold) and the Genzyme corporate headquarters in Cambridge, Massachusetts (Platinum). These highest standards of environmental achievement, I argue, will only significantly affect overall environmental quality when they are applied to broader building practice (e.g. middle class apartments and class B office space) not just expensive anomalies.[17]

4.6 Key Considerations

In making this proposal, a number of issues, both positive and negative, emerge that are specific to the amenity (LEED) or the study area (the Fenway).

Choosing the Overlay

For this proposal, I chose the overlay based on intimate, first-hand knowledge of the neighborhood in which it is situated. While the general overlay area was known to me at the commencement of this thesis, I later chose the precise boundaries to coincide with two zoning districts (NS-1 and NS-2) that had been formulated to accommodate higher densities (minus, again, the two GPOD parcels). This is one legitimate method of discovering prospective LEED density bonus overlay districts. During a community planning process, neighborhood planners assigned to the project may come across a district for which they feel this technique is appropriate and chose to pursue this avenue through the community process.

The other means, which, with adequate data, might be executed on a city-wide scale, is the use of GIS to highlight districts that meet minimum technical criteria (see Chapter 2). I suggest starting with the LEED-NC 2.2 Sustainable Sites framework as a guide, although cities facing unique issues will wish to heavily customize these criteria (Boston, for example, has added the protection of groundwater levels to Article 37 as an issue of special importance to the city). The LEED credits for transit proximity (½ mile from a subway line, ¼ mile from two or more public bus lines) is a useful criterion for demonstration. Many sections of Boston proper (but not all sections of the West Fenway) meet this standard, and would thereby (if this were the only criterion) be fit for consideration. In practice, the planning authority would likely layer several criteria, including measures of infrastructure capacity, environmental stress, and land utilization in order to generate potential overlay districts.[18]

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17. I am particularly proud of my involvement with Harvard's only Platinum project to date because it involved a lower-budget, back-of-the house building for University Operations Services.
18. In the sense that technical, political, and values-drive criteria are effectively overlayed and mapped, the approach I suggest resembles McHarg's idea of physiographic composites (1969).

Technical suitability, however, is not enough to guarantee the feasibility of a given overlay. If a comprehensive plan is in place—not the case in Boston, but mandatory in several states including Florida and Colorado—increased density in proposed overlays should satisfy, or at least not detract from, the aims of the plan. Finally, politicians, citizens (and citizens groups), and, for better or worse, special interests will need to weigh in with qualitative considerations, including the distribution of opportunities or "life chances" (Burton 2000) and perceptions of environmental justice (or injustice). While the general proposal area must be identified in order to begin dialogue, more specific borders will evolve in the course of negotiations as stakeholders evaluate the potential effects of selected alternatives. This will be a primary criterion for identifying stakeholders initially (I.e., given the general overlay outline, which groups are likely to have a stake in how the borders are ultimately set), and then for expanding (or reducing) the stakeholder pool as new proposals evolve. Ideally, when the exact overlay borders are solidified and imprinted on the zoning map, all affected stakeholders will have had a voice in the decision.

Normal Zoning

The density bonus has long been used as a patch for inadequate zoning (Lassar 1989). The community should establish "normal" zoning (Fischel 1985) soon before, or, better yet, concurrently with the creation of the density bonus provision. The Fenway's recent rezoning ensures that the underlying FAR (4.0 for NS-1, 5.0 for NS-2) is a fair baseline for the development community. While ideally the LEED density bonus would have been established during the comprehensive rezoning process, and thus considered in relation to other proposed land use regulations, a new process would need to be convened in order to establish the proper rate of exchange and conditions (including caps and sunsets).

The Perils of Flexibility

As I noted earlier, not all of the numerous potential benefits of green building are often (if ever) realized in a single building project. LEED offers standards and some structure, but is often touted for its flexible framework, which allows the owner/developer to choose from a menu of credits based on cost, project aims, and project context (after fulfilling prerequisites, of which there are few). Too much flexibility creates the potential for problems in the area-specific proposal I offer. A LEED-certified building (26 points) could, for example, provide exemplary Indoor Environmental Quality (up to 15 points) and use only the most sustainable Materials and Resources (13 points), which, with the additional credits automatically conveyed in the establishment of the overlay (Transportation, for instance), could easily lead to a LEED Silver Building—and the attendant density bonus—while placing significant environmental burdens (emissions, stormwater, traffic, etc.) on the host community.

In response, I suggest the addition of prerequisites to address issues of fundamental environmental concern. These prerequisites should be chosen by the community in the course of the consensus building process, and may correspond to otherwise optional LEED credits (say, no irrigation and a 30% reduction in

potable water usage for an area with water supply problems) or special credits formulated specifically by the citizenry (perhaps no oil fueled boilers in order to cut harmful emissions). In the Fenway, prerequisites might include the minimization of parking capacity (SS 4.4), the maximization of open space (SS 5.2), stormwater quantity and quality control (SS 6.1, 6.2), a specific energy performance threshold (EA 1), a requirement for onsite renewable energy (EA 2), or even the provision of daylight and views in order to create more porous buildings (EQ 8.1, 8.2).

Ultimately, it is the prerogative of the community to establish additional prerequisites. Ideally, however, new prerequisites would have (to return to the language of the law) an obvious, "rational nexus" to issues of particular environmental concern to the community. If, instead, a large list of prerequisites is offered by stakeholders in the obvious attempt to erect impassible barriers to new, dense development, the public valuation of green buildings might in fact be too low to facilitate a trade at the proposed level of density. In this instance, the exchange rate may require recalibration—or the proposal may simply be inappropriate for the proposed overlay and the surrounding community.

Project Impact Review

Although the goal of the LEED Density Bonus is to provide for a carefully thought-out, codified exchange of development rights for the provision of amenities, each resulting project will be unique, and, given the heightened potential for impacts stemming from increased project sizes and/or intensity of uses, will require a discretionary review. Article 80-B-3 of the Boston Zoning Code, to which Article 37 is, in many ways, supplementary, was established for this purpose. The Large Project Review evaluation requirements (I.e., Article 80-B-3) are Transportation, including traffic and parking management, Urban Design, Historic Resources, Infrastructure Systems, and Site Plan Review. The criterion of greatest complication, and greatest interest for this study, is Environmental Protection, which requires a review of air quality, water quality, flood hazard districts, groundwater, geotechnical impact, solid and hazardous wastes (essentially a brownfields determination), noise, construction impact, rodent control, wildlife habitat, and, of course, green building.

Article 80 is currently carried out at the single-project scale, but could prove useful and expeditious if applied to the entire density bonus overlay. Much like a district-wide, comprehensive EIS, which then allows a single-step review for individual projects,[19] the BRA and associated city departments could conduct a comprehensive Article 80-B-3 analysis of impacts, and then offer expedited approvals for projects that comply with Article 37, as tailored to the needs of the specific overlay and surrounding district. This way, while the standards for components such as infrastructure and air/water quality impacts would be pre-established, a review of urban design impacts, for example, would address factors important to quality of life issues (to be quite blunt, ugly buildings) but not easily addressed in an as-of-right development control scheme.

19. For instance, this strategy is in place for the Massachusetts Port Authority's Commonwealth Flats development district. Massport obtained approval for a district-wide EIR, and therefore if the developers of individual parcels conform to the agreements and conditions attached to the initial document, they are only required to submit a single-step filing to MEPA.

State Level Environmental Review

I am unaware of any state level environmental reviews of local land use control mechanisms in Massachusetts (which would be conducted by the Massachusetts Environmental Policy Act, or MEPA, Office). In some other states,[20] however, the submission of an Environmental Impact Statement (EIS) for zoning changes that enable substantial increases in height and density has occurred. New Rochelle, New York, for example, created a "Downtown Density Bonus Overlay Zone," for which it submitted a Draft EIS in 2006 in order to assess the Proposed Action's "potential significant environmental impacts" pursuant to New York's State Environmental Quality Review Act (SEQRA). This document provides a useful set of evaluation criteria: land use, community character, public policy, traffic, socioeconomics, community facilities, infrastructure, impacts on energy, unavoidable adverse impacts, and alternatives, among many others. For the purposes of my proposal, however, several factors of interest are omitted, including local air and water quality impacts, greenhouse gas emissions, and light and shadow impacts. Moreover, like many Environmental Impact Statements, the New Rochelle DEIS was created by a consultant team and offered opportunities for public input and comment only upon the submission of the document.[21]

Although a full impacts analysis is beyond the scope or intention of this thesis, I have created a similar set of criteria for the evaluation of my proposed scenarios, with the addition of critical environmental factors omitted in the New Rochelle DEIS but generally included in Article 80. These criteria could be used to guide the selection of proposed overlays as well as provide a framework with which to begin the public process leading to bonus approval and calibration.

Representation and Public Understanding

Unlike open space or affordable housing, LEED, especially taken as a whole system, is a difficult amenity to represent to the public. Potential additional environmental burdens—although inherent to every density bonus proposal but rarely considered explicitly[22]—are also of central importance to this proposal. Taken together, the key question is, "will a particular building proposal in the LEED overlay district likely add environmental burdens, or in fact reduce those burdens versus a conventionally built building at a lower density?" The impact will, of course, differ between environmental indicators, and, even if the net burden is higher, considerations of lifestyle amenities and economic development may, for certain communities, outweigh the increase (in which case LEED can be considered more of a mitigation measure than an actual amenity).

To begin to address the issue of representation and understanding, in the following section I use standard GIS and a simple 3-D drawing tool (SketchUp) to help visualize and otherwise represent impacts to

20. While the New Rochelle EIS was the only one of its kind that I could find pertaining specifically to a density bonus, Seattle, Washington submitted a FEIR in January 2005 relating to proposed "Downtown Zoning Changes" which were to be adopted to enable more intense development closer to the Central Business District.

21. Meeting minutes show that only two people offered verbal comment, a community member and a lawyer representing a property owner/developer.

22. See above (State Level Environmental Review) for an intriguing exception.

the public (see "Three Scenarios," Chapter 5). This, as I will again make explicit, is styled as an effort to show that, even with modest data and limited resources, aids to informed public decision making are available. It is expected that a city planning agency (or barring that, a regional planning agency such as the Metropolitan Area Planning Council) will employ similar tools, richer data sets, and greater technical expertise to generate a broader set of materials.

Well-known sources on the visual representation of data (particularly Sheppard (1989) and Tufte (1990, 2001)) are available for consultation on this matter. Sheppard's work is specifically oriented for use by architects and planners, and provides five useful "Principles for Simulation Use"—which determine a simulation's comprehension, credibility, and degree of bias—worth outlining here. First, a simulation should be representative, showing "important and typical" views of a project. The viewpoint is important, but useless if the representation is not accurate, whether in terms of proportion, color, texture, lighting, and so on. A simulation should pay close attention to visual clarity so as to be "clearly distinguished and recognized," and interesting in order to adequately engage its intended audience. Finally, Sheppard insists that an image should be legitimate, meaning that its "correctness" is "demonstrated and defensible." It is worth reiterating that Joint Fact Finding can be employed in data representation, and could prove to be especially important in establishing the legitimacy of a simulation.

Land Values

Beyond noting, in the abstract, the necessity of real estate demand, this thesis eschews specific demand-side real estate analysis. Implications for land values and therefore property taxes will, however, be of interest to the development community and public officials, which is to say that this issue would undoubtedly undergo careful scrutiny from multiple parties with diverging interests during the consensus building process. This would be the case with any density bonus proposal coming out of a stakeholder-driven process.

My sole, theoretical assertion concerning local land values is that a LEED density bonus will, all else being equal, enable more environmentally-savvy developers to outbid their non-savvy counterparts for a given parcel of land. The developer who is confident that he can construct a LEED-Platinum building (with the highest bonus ratio) for a 5% premium, for example, will be able to carry more for land costs than his counterpart, for whom the same building entails many unknowns and a significantly greater perception of risk. This condition, I theorize, will foster a thriving market for "green talent," in which LEED experts in real estate, architecture, engineering, construction, and even finance and law, will be highly sought-after. Looking a few steps forward, the resulting abundance of educated and (one would hope) dedicated green professionals could lead to the wider application of green planning, design, and construction outside of the LEED overlay zones—and indeed outside of Boston.

Chapter 5: The Fenway LEED Density Bonus Overlay Area

5.1 Proposed LEED Density Bonus Provision

Producing a specific ordinance for the Fenway LEED Density Bonus Overlay (FLDBO) requires direct reference to three existing Articles of the Boston Zoning Code.[1] First is Article 37, Green Buildings (inserted January 10, 2007), which is included in full under Appendix A, along with excerpts of Article 80 and Article 66. I propose to enable the general establishment of LEED Density Bonus Overlay Areas in Boston under Article 37 through the addition or revision of several provisions. The revised Article 37 would contain the following sections:

> SECTION 37-1. Statement of Purpose. The purposes of this article are to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts; to conserve natural resources; to promote sustainable development; and to enhance the quality of life in Boston [no changes, included for reference].
>
> SECTION 37-2. Definitions. For the purposes of this article only, the following words and phrases shall have the meanings indicated.
>
> 4. "LEED Certifiable", a structure that is planned, designed and constructed to achieve certification using the LEED building rating system most appropriate for the Proposed Project.
>
> 4a. "Advanced LEED Certifiable," eligible for certification at the LEED level specified by the Proposed Project's Article 80-B-3 "Green Building" Project Impact Review document, either "Silver," "Gold," or "Platinum."
>
> ...
>
> 6. "LEED Density Bonus Overlay Area" or "LDBOA," a mapped zoning overlay permitting a specified increase of project FAR and height conditioned on the achievement of "Advanced LEED Certification," with differing bonus ratios permissible for LEED "Silver," Gold," or "Platinum" projects, the precise terms and conditions of which are to be established in the prevailing Subdistrict guidelines.
>
> 7. "Community Prerequisites," conditions attached to a LEED Density Bonus Overlay Area including, but not limited to, LEED credits ordinarily considered optional, that must be fulfilled in order to establish eligibility for increases in FAR and building height.
>
> 8. "Pre-Certification," a status attained through the Boston Redevelopment Authority's non-project specific review of a designated LEED Density Bonus Overlay Area under the provisions of Article 80B-3. The Boston Redevelopment Authority will establish Community Prerequisites, terms, and conditions ("Baseline Standards") applying to Pre-Certified LDBOAs. Proposed Projects meeting or exceeding all prevailing Baseline Standards may, at the sole discretion of the Boston Redevelopment Authority, be granted Expedited Large Project Review status under Section 80B-2.6.

1. In addition to the Enabling Act, Definitions, and other Chapters that serve to underpin the collective ordinance.

SECTION 37-3. Applicability. Any Proposed Project that is subject to or shall elect to comply with Section 80B of this Code, Large Project Review, shall be subject to the requirements of this article. The following Proposed Projects, however, shall be exempt from the provisions of this article:

…

4. Any Proposed Project seeking approvals within a Pre-Certified LEED Density Bonus Overlay Area, and which meets the minimum terms and conditions imposed by Pre-Certification, may elect to pursue an Expedited Large Project Review under Section 80B-2.6.

SECTION 37-4. Green Building Requirements. Any Proposed Project subject to the provisions of this article shall be LEED Certifiable or "Advanced LEED Certifiable" at the appropriate level ("Silver," "Gold," or "Platinum") under the most appropriate LEED building rating system. Up to four (4) of the required points may be obtained from the Boston Green Building Credits [identified in Appendix A]. Proposed Projects within LEED Density Bonus Overlay Areas seeking FAR and/or height increases must satisfy all Community Prerequisites and any other terms or conditions attached in order to establish eligibility.

Article 80, Development Review and Approval (inserted May 9, 1996), is essentially a mechanism for discretionary evaluation and enforcement. Article 37 is enforced through section 80B-3, Environmental Protection Component. That specific provision, with modifications, would read as follows:

Green Building. An analysis to determine which level of LEED certification ("Certifiable," "Silver," "Gold," or "Platinum) the Proposed Project is likely to achieve, to establish whether, if the Proposed Project has filed for a LEED Density Bonus, it successfully fulfills all Community Prerequisites, and to assess the level of environmental performance that will be achieved by the Proposed Project under the most appropriate LEED building rating system.

In addition, I suggest creating a "Partial Waiver or Modification of Large Project Review Requirements" under Section 80B-2.6, Applicability of Large Project Review and Related Approvals, in order to provide for expedited review for projects conforming to the Pre-Certification guidelines:[2]

80B-2.6 Partial Waiver or Modification of Large Project Review Requirements for Certain Projects in LEED Density Bonus Overlay Areas. The purpose of this subsection 80B-2.6 is to allow the Boston Redevelopment Authority to partially waive or modify the requirements of Large Project Review for certain projects within Pre-Certified LEED Density Bonus Overlay

2. Due to the size of Article 80 (over 100 pages), the section would likely require further modifications (under the Planned Development Area guidelines, for example). I include only the most important modifications.

> Areas … Waivers and/or modifications are based on a determination of appropriateness of the Proposed Project relative to the applicable Community Prerequisites, terms, and conditions established in the prevailing Subdistrict zoning ordinance, and are granted at the sole discretion of the Boston Redevelopment Authority. Waivers and/or modifications are limited to one or more of the following Large Project Review components under Section 80B-3, as determined by the Boston Redevelopment Authority: Transportation Component (80B-3.1), Air Quality (80B-3.2(e)), Water Quality (80B-3.2(f)), Flood Hazard Districts/Wetlands (80B-3.2(g)), Groundwater (80B-3.2(h)), Solid and Hazardous Wastes (80B-3.2(i)), Construction Impact (80B-3.2(j)), Wildlife Habitat (80B-3.2(n)), and/or Infrastructure Systems Component (80B-3.5). The criteria for partial waiver or modification of review requirements pursuant to this Section 80B-2.6 are as follows:
>
> a) such Proposed Project is located in a Pre-Certified LEED Density Bonus Overlay Area.
>
> b) such Proposed Project attains Advanced LEED Certifiable Status at or above the level ("Silver," "Gold," or "Platinum") mandated by the prevailing Subdistrict ordinance, and fulfills all attached Community Prerequisites and any other applicable terms, conditions, or requirements.

Article 66, Fenway Neighborhood District, contains all specific, map-related zoning information for the Fenway (the Table of Contents and map of which is included under Appendix A). The first necessary modification is the establishment of the FLDBOA in the opening subsections:

> SECTION 66-6a. Fenway LEED Density Bonus Overlay Area. The Fenway LEED Density Bonus Overlay Area is hereby established under the provisions of Section 66.13a.
>
> SECTION 66-13a. Establishment of the Fenway LEED Density Bonus Overlay Area. This Section 66-13a establishes a LEED Density Bonus Overlay Area within the Fenway Neighborhood District (hereafter known as the Fenway LEED Density Bonus Overlay Area or FLDBOA). The purpose of the FLDBOA is to provide conditional increases in FAR and height for projects that demonstrate a commitment to enhancing local, regional, and global environmental quality by attaining Advanced LEED Certification. The FLDBOA is so designated based on its suitability for higher intensity development (including close proximity to downtown Boston, ample public transit, and adequate infrastructure capacity) and the Fenway community's desire to avoid unduly adding to existing environmental burdens. The FLDBOA is expected to further "encourage the continued evolution of Boylston Street from an automobile-oriented thoroughfare to a neighborhood Main Street."[3]
>
> The following Community Prerequisites, normally optional credits under the LEED-NC 2.2

3. Text in quotations is from 66-35, Establishment of Residential Development Incentives.

system, are applicable for all projects seeking LEED Density Bonuses within the FLDBOA [for the purposes of this thesis, I generated the following list of prerequisites based on issues highlighted in the preceding area study. Ideally, the community itself would establish these conditions]:

- SS 4.2. Alternative Transportation: Bicycle Storage and Changing Rooms
- SS 4.3. Alternative Transportation: Low Emitting & Fuel Efficient Vehicles
- SS 4.4. Alternative Transportation: Parking Capacity
- SS 6.1. Stormwater Design: Quantity Control
- SS 6.2. Stormwater Design: Quality Control
- WE 3.1. Water Use Reduction: 20% Reduction.
- EA 1. Optimize Energy Performance (24.5% Reduction)
- EA 5. Measurement & Verification (with results to be reported annually to the Boston Redevelopment Authority and the Boston Environment Department during the first ten (10) years of operation).

In addition, the following conditions will apply for all projects seeking LEED Density Bonuses within the FLDBOA:

- SS 5.2. Site Development: Maximize Open Space. On-site provision OR by payment of $2.50 per gross square foot of building space to the "Back Bay Fens Restoration Fund" or successor entity, to be administered by the Boston Parks Department.
- The dedication of 25% (by gsf) of ground floor space to public uses, commercial or otherwise, to be publicly accessible for a minimum of 8 hours per weekday. This requirement shall remain in effect during the first ten (10) years of operation.[4]

The FLDBOA shall not otherwise modify underlying applicable use regulations.

SECTION 66-13.b. Base Dimensional Regulations Applicable in the Fenway LEED Density Bonus Overlay Area. The minimum allowed Lot Size, Lot Width, Lot Frontage, Front Yard, Side Yard, Rear Yard, and Usable Open Space required for any Lot in the Fenway LEED Density Bonus Overlay Area shall adhere to the requirements established by the applicable underlying zoning subdistrict. The maximum allowed Floor Area Ratio and Building Height for such Lot are set forth below [these figures are actual and are normally found in Table E of Article 66]:

Area	Max FAR	Max Height (ft)	Setback/Stepback (ft)
NS-1	4.0	75	15/ 15 at 75'
NS-2	5.0	95	15/ 15 at 75'
PDA	7.0	150	15/ 15 at 75'

4. I presume that these terms are legal, but a lawyer, of course, would be required to vet each relevant section of this ordinance. The second condition borrows from the concept of Facilities of Public Accommodation, in M.G.L. Chapter 91. The use of New York's open space plaque system could be used in order to identify this condition and aid in enforcement.

> SECTION 66-13c. LEED Bonus Dimensional Regulations Applicable in the Fenway LEED Density Bonus Overlay Area. Proposed Projects within the FLDBOA that are "required to or elect to comply with Large or Small Project Review and have received a Certification of Compliance"[5] including a preliminary determination of "Advanced LEED Certifiable" status, are eligible to add height and FAR as shown by the following LEED Density Bonus Schedule. LEED Bonuses are not cumulative within Section 66-13c, but may be combined with bonuses under Sections 66-35.1 and 66-35.2 (residential use and affordable housing). Additional height and FAR granted under this Section 66-13c are subject to the terms and provisions of Sections 66-35.1 and 66-35.2. Compliance failures will be fully enforced under the provisions of Article 80.[6]

The following LEED density bonus schedule includes three different scenarios, the significance of which I will make explicit in the following section. These scenarios are offered only as test cases, the simulated visualization of which I intend would be employed in order to enhance community understanding of the proposal and catalyze dialogue. The final LEED density bonus schedule would then be established through a participatory community planning process.

Scenario	LEED Certifiable	LEED Silver	LEED Gold	LEED Platinum
"Arlington" F	0.00	0.15	0.25	0.35
"Arlington" H	0	10	10	10
"Lower Boylston" F	0.00	1.50	2.50	3.50
"Lower Boylston" H	0	40	60	90
"Manhattan" F	0.00	3.5	6	8
"Manhattan" H	0	90	150	200

F=FAR,[7] H=Height[8]

5. The text in quotations is from 60-36.
6. Enforcement mechanisms might include withholding Certificates of Occupancy or requiring the proponent to post a performance bond.
7. FAR step-ups adhere roughly (rounded to the nearest half .5 FAR) to the ratio established by Arlington Country, Virginia: Gold = 1.66 * Silver, Platinum = 2.33 * Silver.
8. Corresponding heights were determined based on an average of the additional heights granted in Section 66-35. 66-35.1 grants a 30 foot increase for 1.0 FAR (I.e., 30 foot per 1.0 FAR increase), and 66-35.2 grants a 10 foot increase for .5 FAR (I.e., a 20 foot per 1.0 FAR increase). 50 feet/2 FAR = 25 feet per 1.0 FAR. All height figures are rounded up to the nearest 10 feet (I.e., all of the "Arlington" case heights were below 10 feet).

5.2 Three Scenarios

The three test scenarios included in the LEED Density Bonus Schedule (above) are offered as hypothetical examples in order to generate simulated visuals of the resulting density impacts. All three, however, are rooted in reality. "Arlington," the first scenario listed, refers to the LEED density bonus instituted by Arlington County, Virginia in 2003, one of only two such provisions in the United States (USGBC 2007). The Arlington County LEED bonus program is intended to yield only "slightly larger" buildings, and is therefore appropriate for my conservative case.

The Arlington LEED density bonus is enabled under Section 36.H.5 of the Site Plan Review provision for "special exception site plan requests." The bonus is not as-of-right, and is thus awarded on a case-by-case basis only. Arlington's ordinance differs from Article 37 in that it requires certification through the United States Green Building Council. Enforcement is carried out through a conditioned Master Certificate of Occupancy, which can only be "issued when the building is LEED certified (at the agreed upon level or better) by USGBC."[9] In the instance where "the developer is unable to include all of the approved green building components previously identified in the scorecard [submitted with the site plan], then the developer will be required to replace components not provided with other green building components acceptable to USGBC and the LEED Rating System."

Because the incentive provision is not anchored by a mandatory provision (such as Article 37), the bonus schedule begins at Certified, granting a FAR increase of .15, with Silver offering a total increase of .25, and Gold and Platinum each conferring .35. I have adapted this schedule to reflect the status of LEED as a component of baseline building practice in Boston (for buildings 50,000 gsf or greater), and to differentiate between Gold and Platinum levels of achievement (that is to say that I disagree with the tactic of collapsing these potentially very different standards into a single category). My adaptation is presented below:

Scenario	LEED Certifiable	LEED Silver	LEED Gold	LEED Platinum
"Arlington" F	0.00	0.15	0.25	0.35
"Arlington" H	0	10	10	10

The middle case is based on Lower Boylston Street, roughly the segment of Boylston Street running from Massachusetts Avenue to Arlington Street.[10] According to a study performed by the Boston Society of Architects (1985), zoning for the north side of the street (adjacent to the Back Bay) permitted heights of up to 155 feet, with a FAR maximum of 10. The study recommended a change to 120 feet and 8 FAR in order

9. Initially, I figured that this provision would not sit well with developers, given the relative rarity of initial certification success at the level submitted coupled with the USGBC's lengthy adjudication process, and thus would hurt participation. Joan Kelch, of the County's Environmental Services Department, assures me, however, that a provisional Certificate of Occupancy is issued to address this problem. She reports that two projects have already availed themselves of the bonus, and four others are currently in the planning process (2007).

10. Boylston Street continues from Arlington Street to Tremont Street, but because the Public Garden and Boston Common (both large open spaces) are the only uses on the north side of the street, thus balancing much of the height and density on the heavily built-up south side of Boylston Street, this section makes a poor analogue to Upper Boylston Street.

to mitigate impacts on the residential neighborhood. This range of density levels relates well to the Boston Redevelopment Authority's discussion, in 1977, of constructing "new mixed-used structures (residential, with ground floor retail) of 12 to 15 stories" (*21*). Multiplying the Arlington bonus schedule by 10 yields similar density levels for Upper Boylston: a maximum FAR of 9 (maximum height 205') on the southern, residential side of the street, and a maximum FAR of 10 (maximum height 225') on the north side.[11] For the forthcoming build-out analysis, I cap PDAs at the maximum allowable density under this schedule (I.e., I do not add the de facto land assembly bonus).

Scenario	LEED Certifiable	LEED Silver	LEED Gold	LEED Platinum
"Lower Boylston" F	0.00	1.50	2.50	3.50
"Lower Boylston" H	0	40	60	90

The extreme case represents so-called "Manhattanization," a very dense, very tall build-out.[12] For this schedule I borrow from Manhattan itself, using the allowable range of 12.0-14.0 FAR in the C6-4.5 and C6-7T Special Midtown District designations as a general guide. The south Boylston maximum FAR is, under this scheme, 13.5 (315'). A LEED Silver project is granted the same bonus as a Platinum project in the previous schedule.

Scenario	LEED Certifiable	LEED Silver	LEED Gold	LEED Platinum
"Manhattan" F	0.00	3.50	6.00	8.00
"Manhattan" H	0	90	150	200

In order to demonstrate the representation of one simple, but critical, component in the equation, I have conducted a build-out analysis for the three different density bonus schedules listed above. This exercise, in other words, is a three-dimensional visual representation of the most obvious impacts—those of height and density—on the neighborhood. These build-outs were performed in SketchUp and imported into Google Earth, with three-dimensional representations of existing Fenway buildings extruded in ArcGIS.

I used Excel to create and codify the urban design rules governing the build-outs (see Appendix C). The models I present are, in other words, designed by mathematics, not, as it will be evident, by artistry. Were architects and urban designers assigned this same task, they would doubtlessly better manage bulk and create a more attractive, variegated streetscape. Moreover, in reality, the architects designing Boylston Street (thus far only Elkus Manfredi) have the benefit (or burden) of ample feedback from the BRA during the Article 80 Urban Design review. Nonetheless, my "design by calculator" approach leads to consistency across

11. Bear in mind that Platinum is a very rare distinction. A project attaining Silver certification on south Boylston Street would have a maximum FAR of 7.0 (current PDA level) and a maximum height of 155 feet (5 feet above current PDA level). I address this issue in greater depth in the subsequent build-out analysis.
12. This term is, of course, quite subjective. Many would argue that the previous, "middle," case is itself an example of Manhattanization.

all cases, which is crucial in order to assure comparable build-out scenarios and a well-informed consideration of the results.

Allocation Assumptions:

- A new project will be proposed for each vacant parcel (I.e., this is a supply-side build-out). Parcels with two stories or fewer will be redeveloped (I.e., demolished and rebuilt).[13]
- Each project will seek to realize the LEED density bonus.
- The distribution of LEED certification levels on Boylston Street will follow the approximate ratio of Silver, Gold, and Platinum certifications to date. LEED certified buildings (I.e., not attaining advanced certification) are, in other words, dropped from the distribution. Of approximately 510 advanced certified projects (as of April 2007), about 250 are Silver, 225 Gold, and 35 Platinum. Therefore, the build-out distribution will be 49% Silver/44% Gold/7% Platinum. Each parcel will receive a randomly generated assignment based on this ratio.
- PDA-eligible parcels will be built out to levels permitted under Article 66 OR the height and density permitted as-of-right on that parcel plus the additional height and density conferred by the LEED density bonus, whichever is greater. No additional land assembly will occur, and thus no new PDAs are considered.[14]
- Parcels with greater than 50% of the total parcel area within the Greenbelt Protection Overlay District will not receive the LEED density bonus.

Design Guidelines:

- The first floor of each building is 15-feet high. All subsequent floors are 10-feet high.
- 15-foot setbacks are in effect on all street-facing façades (consistent with zoning). 15-foot stepbacks are in effect at the seventh floor and above (Article 66). Floors one through six will respect these dimensional constraints, but otherwise occupy the maximum allowable area per floor.[15]
- Floors seven and above will cover the entire allowable length of the building (when in question, "length" shall apply to the building face fronting on the dominant street, often Boylston Street). Width will be determined by computing the remaining allowable square footage (to maximize FAR), dividing that amount by the maximum allowable square footage per floor (to determine the number of additional floors), rounding the "additional floors" figure up to the nearest whole floor (no partial floors are allowed), and then again dividing the remaining allowable square footage by floors (rounded) and length (see footnote for guidance).[16] Width is always measured from the

13. The exception to this rule is the Baseball Tavern parcel, which, at less than 4300 sf, would not even qualify for Large Project Review at full build-out.
14. In all likelihood new PDAs will be assembled, particularly at the Goodyear site (Parcels 3,4, and 5 are under single ownership). However, for the purposes of this thesis, I did not feel it was appropriate to engage in this type of speculation.
15. In other words, if a given site measures 100' x 100' with one street face, floors one through six will occupy 8500 sf (100 x (100-15)=8500).
16. Using the above example as a base, floors seven and above will have a maximum area of 7000 sf (100 x (85-15)=7000). If the building has 50,000 sf remaining, it must be accommodated with 8 additional stories (50,000/7000=7.1428, rounded up = 8). 50,000/8=6250 (total floor area). 6250/100 (length for uniform street wall) = 62.5 feet in width, which will be measured backward from the 15-foot stepback. This leaves 7.5 feet at the back of the building that remains unbuilt past the sixth story.

dominant street stepback, which yields a uniform street wall.[17]

General Keys to Interpretation:

- Charcoal gray three-dimensional building forms in the Fenway area are existing buildings. Lighter gray buildings in the distance are three-dimensional buildings in Boston proper (included in Google Earth). Light gray/off-white buildings in the foreground together constitute the hypothetical build out—there are 15 separate buildings.
- Green (vegetated) roofs indicate that a project has applied the LEED density bonus. Gray roofs, indicating no LEED bonus participation, are used for the base case. Note that, in the Arlington scenario, none of the PDA projects (on parcels of one acre or more) employs the bonus because the PDA alone confers greater height and density.
- In the Arlington scenario, only in rare instances did the LEED density bonus necessitate adding an additional floor. Additional density awarded without commensurate height creation is shown in solid dark green.
- The pink building (with rooftop tables) is a recreation of The Baseball Tavern, which was erroneously demolished (in ArcGIS) because it was adjoined to a building meeting the demolition rules (it also makes for a distinctive placemark).
- The photo-realistic buildings (notably Fenway Park and the Hancock Tower) are public domain images available at Google's "3D Warehouse."

17. This strategy tends to minimize height (by expanding the overall floorplate to accommodate the bonus square footage). In reality, greater heights might be sought after for their higher rent generating potential.

Existing Conditions, Aerial

Aerial photograph with building parcels superimposed (570 ft) (base images from Google Earth).

Existing Conditions, LEED Designations

LEED Assignments by Parcel

Gray: LEED Silver (9 parcels)

Yellow: LEED Gold (4 parcels)

Off-white: LEED Platinum (2 parcels)

Existing West Fenway Neighborhood

Queensberry St. from Park Drive (west).

Jersey St. from Queensberry St. (south).

Park Drive from Queensberry St. (north).

Roberto Clemente Field from Park Drive (south-west).

Peterborough St. (west).

Peterborough St. from Kilmarnock St. (east).

All photos by author.

Existing Boylston Street Corridor

Boylston St. from Kilmarnock (west).

Boylston St. from Kilmarnock St. (east).

Boylston St. from Kilmarnock St. (east).

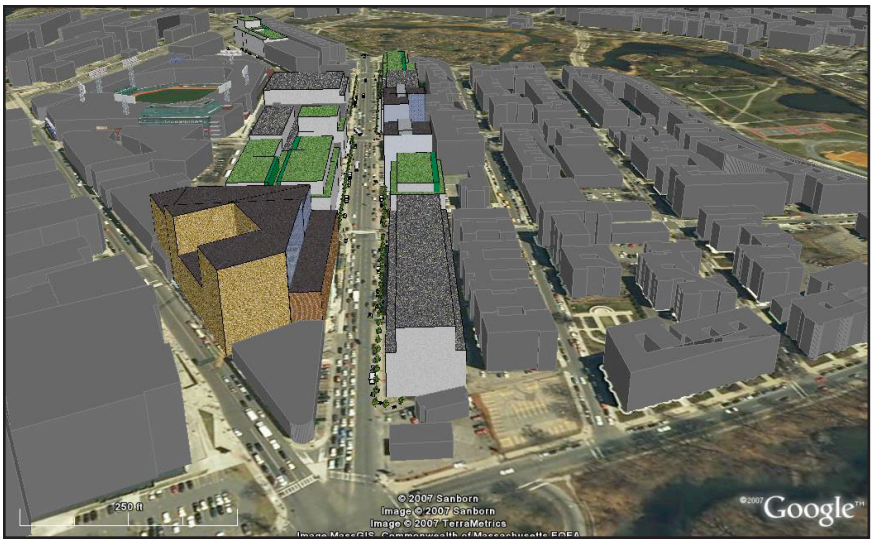
Boylston St. from Yawkey Way/Jersey St. (south west).

Boylston Street from Jersey St./Yawkey Way (east).

Boylston St. from Ipswich St. (west).

Simulation, Aerial Oblique Facing East (250')

BASE (current zoning)



ARLINGTON

LOWER BOYLSTON

MANHATTANIZATION

Simulation, Aerial Oblique Facing West (250')

BASE (current zoning)

ARLINGTON

LOWER BOYLSTON

MANHATTANIZATION

Simulation, Kilmarnock Street Facing East (15')

BASE (current zoning)

ARLINGTON

LOWER BOYLSTON

MANHATTANIZATION

Simulation, Jersey Street/Yawkey Way facing East (15')

BASE (current zoning)

ARLINGTON

LOWER BOYLSTON

MANHATTANIZATION

Simulation, Ipswich Street Facing West (15')

BASE (current zoning)

ARLINGTON

LOWER BOYLSTON

MANHATTANIZATION

Simulation, Baseball Tavern Facing West (15')

BASE (current zoning)

ARLINGTON

LOWER BOYLSTON

MANHATTANIZATION

5.3 Discussion of Impacts

It is not my intention to evaluate the general suitability or desirability of the previous scenarios. Issues of aesthetics and visual character are particularly subjective, and each individual will introduce his or her own perspectives, biases, and standards of appropriateness into the judgment. Moreover, although it is beyond the scope of this endeavor to rigorously evaluate other, non-visual benefits and burdens (social, financial, or environmental factors, for example), it is my intention that the visual impacts of height and density serve as only one of many decision-making components. The visual impacts of height and density, in other words, constitute one (important) element in a given "package" and are therefore difficult to consider in isolation.

With those important caveats in place, it is not inappropriate for me to offer an analysis of my work. First, I offer a significant, but far from fatal, criticism of my urban design generator. This formula clearly results in excessively chunky massings, thereby suppressing height—height never acts as a constraining factor. The light, shadow, and wind impacts of taller buildings deserve serious consideration, however. Perhaps, were I to reformulate the design calculator, I would either mandate the maximum allowable height and work backward to determine massing, or include an efficiency factor to simulate the effects (the reallocation of massing) of open space and building articulation. Frankly, if I sat as a stakeholder on the incentive zoning CAC, I would likely raise these issues and advocate for a collaborative "redesign" of the simulation criteria.

As I stated earlier, however, my design-by-spreadsheet is meant to ensure consistency across scenarios in order to facilitate accurate comparisons—a criterion that I believe I fulfilled. Therefore, I feel confident that in offering the reader my estimation of the visual impacts entailed by the three bonus scenarios and base case, I am indeed considering comparables. Beginning with the base case, I was honestly surprised at the resulting height and density, although I still believe it falls within an acceptable range. In 2004, the Boston Redevelopment Authority conducted a hearing/workshop for community residents, which I attended, in order to explain the new zoning. A segment of the BRA's presentation was devoted to projecting visual simulations of possible build-out scenarios. I tread on risky ground here because I was unable to obtain these images from the BRA (nor does memory serve as to their precise details), but the base case[18] images almost certainly appeared less dense and significantly more variegated than the simulation I produced. These discrepancies might stem from differences in buildout formulae (or the BRA's lack thereof), standards of representation, or viewpoint perspectives (they relied heavily on aerial obliques). Whatever the underlying reasons, the gap between what I expected and what I got reinforces the importance of establishing standards for visualization collaboratively.

If the base case buildout came out to more closely resemble my expectations for the "conservative" bonus, the Arlington scenario appears to add very little in the way of additional height or density impacts. This result is consistent with the provision's intent to create a "slightly larger" building. Particularly as governed by my massing calculator, the extra square footage is either hardly or not at all noticeable from the street. In only two instances does it even add a single floor, and then on Ipswich Street, where the only

18. The BRA, as I recall, themselves presented some "canyonization" images in alternative scenarios.

neighbors are nightclubs, a high school, and Fenway Park. If indeed the development community found these incentives to be adequate, which I regard with some skepticism, the resulting projects would almost certainly bring net positive value to the host community.

The implications and potential acceptability of the higher density bonuses are much more uncertain. The east-facing 250-foot aerial obliques, in particular, show a sizeable difference between the Lower Boylston and Manhattanization Scenarios. The Shaws lot (right foreground), for instance, is very substantial in the Lower Boylston image, but simply massive under Manhattanization (for reference, the Sears building and Trilogy are both around 150 feet at their highest points). The difference is reinforced by the west-facing 250-foot obliques (showing all parcels): the McDonald's lot, a Platinum parcel, roughly resembles 1330 Boylston in the Lower Boylston buildout (135' and 150', respectively) but towers over its surroundings under Manhattanization (205').[19]

From the street (or near street[20]), the differences are quite noticeable, and include a marked reduction of light, commensurately greater shadows, and the loss of certain view corridors. East-facing street level views from Kilmarnock (15 feet) and west-facing views from Baseball Tavern show that the stepback is no longer effective under Manhattanization (which explains the rise of Ziggurat), but arguably continues to allow for ample light and sky views in the Lower Boylston case. East-facing views show that, under Manhattanization, the Prudential Building (the gray building to the right of the Hancock Tower) is lost from view, despite its height of almost 700 feet. Ultimately, with the right conditions, Lower Boylston might find acceptance with the community, although it would surely be controversial at first. Manhattanization was an interesting exercise (and certainly improves the relative desirability of all lower density scenarios), but is almost certainly infeasible given the observed attitudes of residents at this time.

While little about my simulation is non-visual, the buildout calculators I created generated figures of total developable square footage for each scenario. Coupled with the reduction-based Community Prerequisites, in this case a 20% reduction of potable water use and a 24.5% reduction of energy consumption, it becomes possible to derive a rough measure of environmental impact. If we assume that each square foot of conventional building space generates one unit, however specified, of consumption, then the achievement of a 20% reduction means that each square foot of LEED building consumes only .8 units.

The base case buildout generates 2,750,880 square feet of new development, which does not account for replacement square footage. The general validity of this figure is confirmed by the Fenway Transportation Plan, which bases calculations on 2.9 million sf. Arlington yields only 37,681 sf above base, Lower Boylston 793,923 above base, and Manhattanization bonuses almost 2.1 million sf. Unsurprisingly, Manhattanization requires significant resource consumption above the base, adding 40% to water usage and 32% to energy consumption (although a great deal of money would be generated for park restoration, over $12 million). The other, purposely more reasonable scenarios, however, show better results, with Arlington (due to high

19. Although under my model this parcel has a height maximum of 315 feet. The impact of a building utilizing the full height allowance would be astounding.
20. Unfortunately, the Google Earth interface would not allow for realistic street level views.

standards and modest bonuses) yielding consumption reductions across the board, but low park payments, and Lower Boylston leading to a small increase in water consumption and decrease in energy consumption. While I hesitate to draw firm conclusions from this rudimentary method, the results would seem to suggest opportunities for square footage expansions and simultaneous impact reductions. A full battery of JFF-informed environmental impact analyses would be required to confirm these potential synergies, but perhaps, in some aspects at least, we can indeed have our cake and eat it too.[21]

x	Total sf	Additional sf	Add. Water	Add. Energy	Park Contribution
Base	2750880	0	0.0%	0.0%	$0
Arlington	2788560	37681	**-8.3%**	**-10.5%**	$1,328,654
Lower Boylston	3544803	793923	3.1%	**-2.7%**	$8,862,006
Manhattanization	4823987	2073108	40.3%	32.4%	$12,059,968

5.4 Next Steps

While the results of these visual simulations are encouraging, they constitute but one element in the decision-making process. Therefore they must be fed back into the public process in the "deciding and deliberating" phase, where the plenary group, with the aid of the JFF sub-committees, will need to evaluate all factors—visual, environmental, economic, demographic, and so forth—side-by-side. A customized version of the previously introduced consensus building flow chart, found at the conclusion of the chapter, illustrates how this process might be structured.

Some stakeholders will likely weight the impacts of height and density very heavily—there is most certainly an anti-height and -density constituency in the Fenway, and the two large PDA projects on Boylston are often lamented in the Fenway News or at community meetings. Other groups evince less anxiety about height and density per se, and instead emphasize performance, with a focus on traffic impacts, affordable housing production, local air and water quality, and global environmental effects (again, I personally fall into this category). And, considering that the two aforementioned PDAs include only the minimum required affordable housing creation and are not LEED certifiable, I believe it is fair to claim (with disappointment but without wrath) that landowners and developers currently operating on Boylston Street will heavily prioritize the economic aspects of height and density. These positions, of course, are points on a broad spectrum, with several nuances in between (and, of course, some "outlier" or internally-inconsistent positions—pro-affordable housing production/anti-growth, for instance).

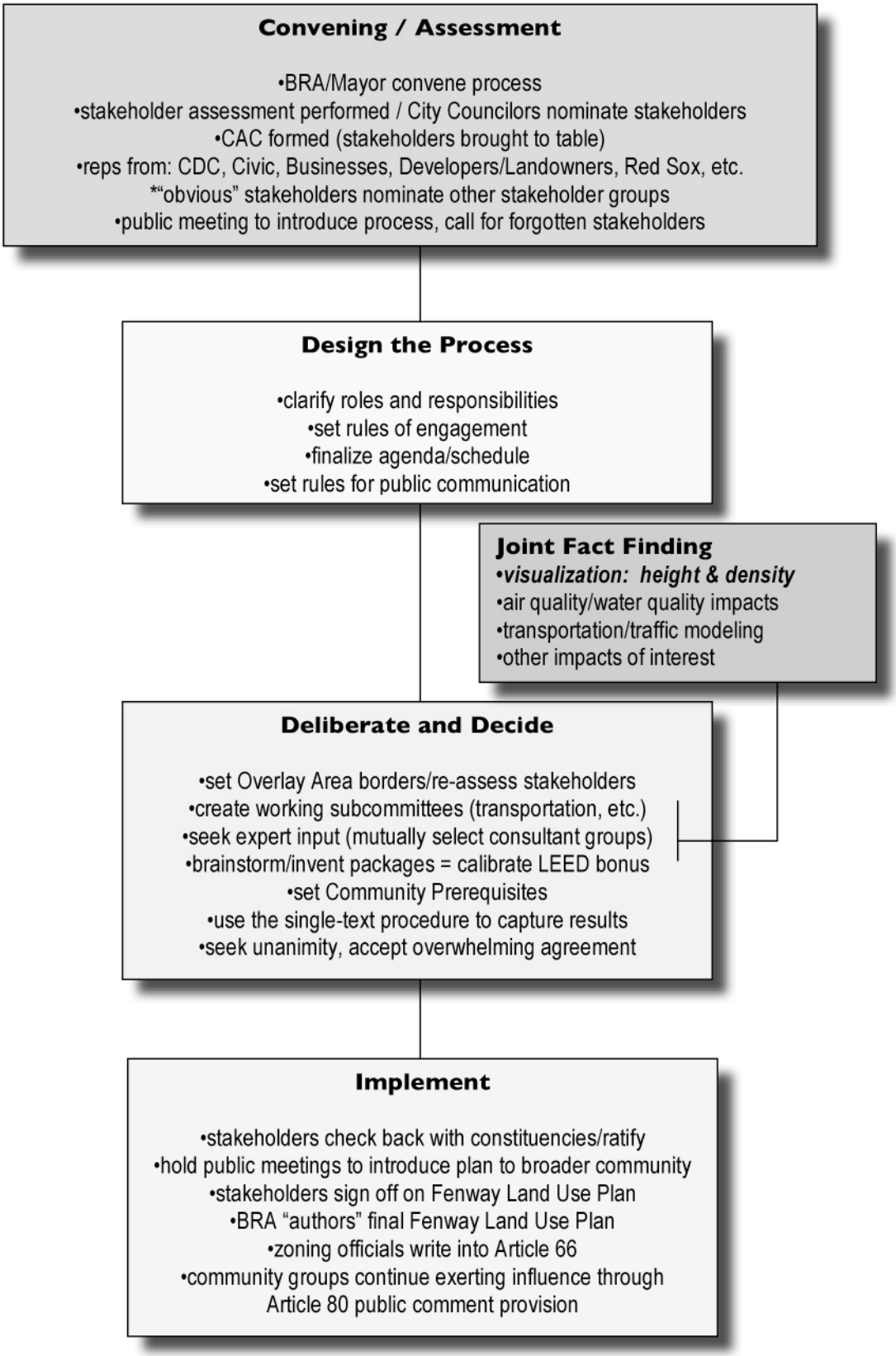
In order for the density bonus overlay provision to succeed—as a mechanism that creates value for an

21. Recalling the "bargaining range" concept I introduced in my initial discussion of bonus calibration, the Arlington and Lower Boylston scenarios might together approximate that range: Lower Boylston confers a great deal of square footage, but, in some aspects at least, mitigates its own environmental impacts—it might be the lowest-ranked acceptable option for the community, and perhaps a mid-ranked option for developers. Arlington might yield the opposite situation (very desirable for the community and least desirable acceptable option for developers). The consensus building process may well find not only a happy medium, but find ways to expand the pie in order to leave both groups more satisfied.

overwhelming majority of stakeholder groups—trades must occur across all categories of evaluation in order to assemble a "package" of highly complementary, minimally conflicting outcomes. Using the very simplified stakeholder groups and variables identified in the previous paragraph, the anti-height and –density coalition might see little objection in the Arlington scenario but dislike the Lower Boylston scenario, the development community might push for both a bigger bonus and the reduction of accompanying environmental standards, and the performance coalition might opt for the Lower Boylston scenario only with a strict adherence to the proposed LEED schedule and affordable housing targets. The end result might yield a bonus schedule that creates heights and densities between those offered by the Arlington and Lower Boylston scenarios, with massing and urban design guidelines aimed at mitigating density, with expedited permitting under Article 80 to boost economic feasibility, and with the addition or subtraction of Community Prerequisites in order to better tailor environmental impacts. Thousands of different potential combinations exist—this thesis is premised on the assumption that LEED incentive zoning will increase the number of successful combinations and the magnitude of value created by them.

Ultimately, the result will be the assembly of a "package"—a set of integrated decisions across the range of relevant issues—for presentation to the presiding official or board, in this case the Boston Zoning Commission, advised by the Boston Redevelopment Authority. In the recent Fenway rezoning, the package was embodied by the trilogy of Fenway Planning Task Force plans (Land Use, Transportation, and East Fenway, which has gone unmentioned). These plans were explicit enough to be translated almost wholesale into Article 66—although the remaining disagreements highlighted in the plans, particularly concerning sports venues as allowed uses in the NS-2 district, were, of course, omitted. With the proposal specifics endorsed by the host community, an idea like LEED incentive zoning could, I believe, gain significant political traction in Boston; if the City were to introduce the concept and initiate the process, I have little doubt that its agents would have few qualms in enacting the proposal as an important component of Boston's already environmentally-progressive land use statutes.

Consensus Building Flow Chart: Fenway Zoning Process



Conclusion

The purpose of this document was to conceptually align the interests of real estate, land use, and the environment--an unfamiliar proposition--and propose a mechanism whereby this alignment might be operationalized. I believe I have shown that, theoretically at least, pairing the objectives of environmental quality and real estate profitability can expand the pie, adding value to project developers and host communities alike. This is not to say that doing so is easy or without perils—tradeoffs are required, fairness must be fought for, and finding the proper balance of each may well prove challenging. Nonetheless, for communities or neighborhoods seeking means of accommodating compact growth but concerned about the attendant burdens on public health and the environment, LEED incentive zoning may be well worth the time and effort.

The concepts and methods used in this thesis are highly scalable and transferable to other contexts. The density bonus is a relatively common land use mechanism, especially in central cities. LEED is a well-known, nationally-practiced standard. A facilitator or other process expert can often be found in the local yellow pages or at a local university. The establishment of Community Prerequisites allows each community to choose its own standard of environmental quality, to the extent such standards are within its control. And while ascertaining environmental impacts is still a relatively resource intensive process, the height and density build-outs require only a late model computer (which is sure to become any old computer in a few short years), two free programs (SketchUp and Google Earth), formulaic design standards, and a modest amount of patience and skill. Ease of use and broad applicability were of paramount importance for this project, and indeed any minimal resourceful municipality should be able to replicate my efforts and go well beyond.

While I believe in the promise of LEED incentive zoning, it is worth noting that this promise can only be realized in certain circumstances (using the density bonus mechanism, at least). Of foremost concern are local governments without significant development demand, many of which have need of both economic development and enhanced environmental quality. In many respects, the density bonus relies on the health of real estate markets, and even so-called "hot" markets endure downturns. For communities or neighborhoods with perpetually weak demand (second-tier, post-industrial cities or blighted urban neighborhoods, for example) incentive zoning might not offer the answer. Perhaps, if this is the case, the solution might not be found at the local level. For instance the state might condition aid monies to struggling cities (which in turn would be funneled into public-private projects) on green building, or HUD might do the same for Community Development Block Grant funds. These are less elegant solutions, unfortunately, for less elegant circumstances—not every city is Boston, Massachusetts (with Article 37 as a mandatory baseline), and not every neighborhood is transit-connected within three miles of the Central Business District.

Another, formidable obstacle to enabling beneficial LEED density bonus trades is found in public valuation. With accurate massing models and conscientiously rendered photorealistic simulations, the potential visual impacts of a proposal can be (fairly) effectively communicated to the lay public. It is natural to react to height and density, but these aspects of a project are commonly considered burdens or impacts. Statistics on other impacts—emissions, traffic, stormwater—however, can be much more difficult and less intuitive for the public to evaluate. How then, can publics avoid irrationally weighting the visual over the quantitative?

While this is primarily a rhetorical question, my hunch is that the answer is rooted in a community's broader attitudes toward environmental stewardship, a product of education, demographics, and institutional, political, and individual leadership. Even if a community values the environment (and public health), steps to aid in the interpretation, understanding, and clarity of non-visual proposal aspects must be taken. Again, Joint Fact Finding could help bring a more balanced perspective to the table, but practitioners should, for the time being, expect an uphill battle.

In addition to addressing the issues highlighted above, were I to expand the scope of this project (into a dissertation, for example), I would test my assumptions and theoretical conclusions to a much greater extent. First, it would be ideal to consider the broader environmental implications of this proposal, much in the way an EIS or Article 80 review would do. This work could be conducted in isolation, as in this thesis, or better yet, in the context of actual implementation (how does one coax actual implementation without having "proved" the proposal's effectiveness through simulation?). Further, in this treatment, the only basis from which I predict (albeit in a limited way) the Fenway community's reaction is my own sustained engagement in development affairs in the neighborhood. For a broader, richer application, the researcher could conduct extensive interviews, run focus groups, or—in order to witness two-way interactions—run role simulations in order to observe the process unfold. Moreover, Arlington County, VA might someday (soon) offer an interesting case study (as may Nashville, TN, which added a substantial, scalable LEED density bonus provision a few days before the submission of this thesis). With two projects completed, four more in the planning pipeline, and three in the proposal phase, the student or academic reading this in a few years time may wish to pursue that avenue as a thesis or research project.

Other directions for further research might include demonstrating how, or if, LEED incentive zoning would work in other geographic, demographic, economic, political, or environmental contexts experiencing high development demand—along environmentally-sensitive Lake Tahoe, burgeoning but spectacle-dependent Las Vegas, or climatically-challenging Minneapolis. Neither have I given a great deal of thought to the application of this technique to suburban or rural communities, even where demand is present, but my general contention is that, if other types of bonuses work in those contexts, so would the LEED density bonus (or, for smaller, single-family projects, perhaps an ENERGY STAR Homes unit bonus). In localities without mandatory LEED standards, like Article 37 in Boston, is a voluntary bonus provision the proper starting point (as in Arlington County, Virginia) or is an Article 37-like provision necessary for widespread participation? Five or ten years from now, will Boston's self-adjudication of LEED prove beneficial, or will it pull the teeth from Article 37 through lax administration? Should, for that matter, Article 37 be expanded to accommodate Small Projects (20,000 sf or greater) or even ALL projects in Boston?

There are also several aspects to this proposal that are conducive to more in-depth disciplinary analysis. For the economically-inclined, does Article 37 hurt Boston's competitiveness or raise the cost of housing—and if so, would a density bonus provision counteract that effect? For students of real estate, what are the impacts of such a proposal on project economics, salability, year-by-year returns and return on investment,

and financing? For the engineer or environmental scientist, how does this proposal affect actual environmental performance—at what point might density and environmental quality be mutually exclusive, despite the inclusion of LEED? For the international studies expert, is this system appropriate in the context of other systems of land use and environmental protection? Which aspects of foreign green building policy and practice are exportable to the United States land use system? Scholars focused on land use and development control might wish to consider integrating LEED into other environmentally-friendly land use mechanisms or statutes, including transferable development rights, transit-oriented development, or M.G.L. Chapter 40R. Finally, what comes after LEED Platinum, and how can we keep the carrot just far enough ahead of building practice to continue incentivizing progress, as opposed to simply handing out rewards for yesterday's buildings? The avenues for research are numerous, and the potential for innovation is great.

It is my hope that this thesis will provide a useful starting point for the efforts of students or scholars—as well as practitioners—to refine or further test this proposal or to introduce other tactics for integrating the built and natural environments at the policy level. This thesis is just one link in a growing chain of ideas and practices that seek to remake the way we make our cities and settlements in order to better manage our precarious local, regional, and global environments. In that spirit, the LEED incentive zoning concept constitutes a promising transitional step toward a more environmentally sound future. Ultimately, however, the proposal's greatest victory will be realized in its anticipated irrelevance several years hence—not due to general disinterest, but rather because the currently disparate matters of real estate profitability and green building practice have been integrated as a single concern.

References

Altshuler, Alan. 1965. *The city planning process: A political analysis*. Ithaca: Cornell University Press.

Arnstein, Sherry R. 1969. A ladder of citizen participation. *Journal of the American Institute of Planners* 35, (4): 216-244.

Barr, Cynthia M. 1997. *Boston zoning : A lawyer's handbook*. Boston, MA: Massachusetts Continuing Legal Education.

Barrett, David R. 1973. *Incentive zoning for Boston : A report to the redevelopment authority*. Cambridge, Mass.: S.N.

Boston Redevelopment Authority. 2002. *Fenway special study areas final report: Land use and urban design guidelines.* Boston, Mass.: Boston Redevelopment Authority.

———. 1989. *The Fenway/Kenmore neighborhood: A framework for discussion. draft.* Boston, Mass.: Boston Redevelopment Authority.

———. 1988. *Fenway-Kenmore neighborhood profile 1988*. BRA research department publications. Vol. report no. 320. Boston, Mass.: Boston Redevelopment Authority.

———. 1968. *Zoning regulation for the city of Boston.* Boston: Boston Redevelopment Authority.

———. 1965. *Fenway urban renewal plan*. Boston, Mass.: Boston Redevelopment Authority.

———. 1975. *Background information, planning issues and preliminary neighborhood improvement strategies*. Boston, Mass.: Boston Redevelopment Authority.

Boston Society of Architects. 1985. *Boylston street study*. Boston, Mass.: BSA.

Boston Transportation Department, and Boston Redevelopment Authority. 2001. *Fenway transportation plan.*

Brody, Samuel, Raymond Burby, and David Godschalk. 2003. Mandating citizen participation in plan making: Six strategic planning choices. *Journal of the American Planning Association* 69, (3): 245-264.

Bromley Ward Maps. 1938. *Boston wards*.

———. 1928. *Boston wards*.

———. 1917. *Boston wards*.

———. 1902. *Boston wards*.

———. 1895. *Boston wards*.

Burby, Raymond. 2003. Making plans that matter: Citizen involvement and government action. *Journal of the American Planning Association* 69, (1): 33-49.

Burton, Elizabeth. 2000. The compact city: Just or just compact? A preliminary analysis. *Urban Studies* 37, (11): 1969-2006.

Carson, RT, RC Mitchell, WM Hanemann, and RJ Kopp. 1992. *A contingent valuation study of lost passive use values resulting from the Exxon Valdez oil spill.* La Jolla, California: Report to the Attorney General of the State of Alaska.

Cheshire, Paul, and Steven Sheppard. 1995. On the price of land and the value of amenities. *Economica* 62: 247-267.

City of Boston, and Town of Brookline. 2005. *Phase 1 muddy river flood control, water quality and habitat enhancement, and historic preservation project, supplemental final environmental impact report.* EOEA #11865.

Coase, RH. 1960. The problem of social cost. *The Journal of Law and Economics* 3, (October): 1-44.

Conklin, Bruce, and David Noonan. 2002. Managing storm flows in Boston and Brookline's historic emerald necklace. *Stormwater* (September/October).

Conway, Joy. Personal Communication. January 17, 2007.

Dalzell, John. Personal Communication. April 26, 2007.

Davidoff, Paul. 1965. Advocacy and pluralism in planning. *Journal of the American Institute of Planners* 31, (4): 331-337.

Diamond, Peter, and Jerry Hausman. 1994. Contingent valuation: Is some number better than no number? *The Journal of Economic Perspectives* 8, (4): 45-64.

Dillon, John. 1997. Sold off. *John Harvard's Journal*.

Donovan, Charles. 1983. *Boston College's move to Chestnut Hill*. Occasional papers. Chestnut Hill: Boston College.

Dudley, Renee. Patrick says state wants clean energy business. *The Boston Globe*, 27 February, 2007.

Eagles, M, Katz, R.S., and D. Mark. Contoversies in political redistricting--GIS, geography, and society. *Political Geography* 19 (2), 135-39.

Emerald Necklace Conservancy. [cited April 16 2007]. Available from http://www.emeraldnecklace.org.

Evans, Micah Ian. 2001. The convention center as catalyst for investment and development on the South Boston waterfront. Masters Degree. University of Massachusetts, Boston.

Farrey, Tom. National landmark status could held red sox. 2000 [cited April 17 2007]. Available from http://espn.go.com/mlb/s/2000/1110/869451.html.

Fenway Civic Association. [cited April 16 2007]. Available from http://www.fenwaycivic.org/.

Fenway Community Development Corporation. [cited April 16 2007]. Available from http://www.fenwaycdc.org.

Fenway Garden Society. [cited April 14 2007]. Available from http://www.fenwayvictorygardens.com.

Fiorino, Daniel J. 1990. Citizen participation and environmental risk: A survey of institutional mechanisms. *Science, Technology, and Human Values* 15, (2): 226-243.

Fischel, William A. 1985. *The economics of zoning laws: A property rights approach to American land use controls*. Baltimore: Johns Hopkins University Press.

Forester, John. 1999. *The deliberative practitioner: Encouraging participatory planning processes*. Cambridge, Mass.: MIT Press.

Foster, Joyce. Personal Communication. April 4, 2007.

Friedmann, John. 1987. *Planning in the public domain: From knowledge to action*. Princeton: Princeton University Press.

Gans, Herbert J. 1982. *The urban villagers : Group and class in the life of Italian-Americans*. Updated and expanded. New York: Free Press.

Ganz, Alexander, and Boston Redevelopment Authority. 1988. *Questions and answers on the state of the Boston economy*. BRA research department publications. Vol. report no. 347. Boston, Mass.: Boston Redevelopment Authority.

Getzels, Judith, Martin S. Jaffe, and American Planning Association. 1988. *Zoning bonuses in central cities*. Report (American Planning Association. planning advisory service). Vol. 410. Chicago: American Planning Association.

Goetze, Rolf, Mark R. Johnson, and Boston Redevelopment Authority. Policy Development and Research Dept. 1992. *Fenway-Kenmore planning district: 1990 population & housing tables, with comparisons to Boston city share and selected 1980 data: U.S. census (STF1)*. [BRA research department publications. Rev., expand January 15, 1992 ed. Vol. report no.437]. Boston: Boston Redevelopment Authority.

———. 1991. *Fenway, Kenmore : Population & housing profile : U.S. census STF1, 1990*. [BRA research department publications. Vol. report no. 417]. Boston: Boston Redevelopment Authority.

Grenadier, Steven. 1996. The strategic exercise of options: Development cascades and overbuilding in real estate markets. *The Journal of Finance* 51, (5): 1653-1679.

———. 1995. The persistence of real estate cycles. *The Journal of Real Estate Finance and Economics* 10, (2): 95-119.

Hamel, Sonia. Personal Communication. January 25, 2007.

Hamilton, Bruce. 1975. Zoning and property taxation in a system of local governments. *Urban Studies* 12, (June): 116-130.

Innes, Judith E. 1996. Planning through consensus building. *Journal of the American Planning Association* 62, (4) (Autumn): 460-474.

Isaacs, Sasaki, Nagel, Consultants, and Sponsors' Committee on the Fenway-Parker Hill Study. 1958. *Fenway-Parker Hill area: Its problems and potential, Boston, Massachusetts : Preliminary report of the sponsors' committee*. Watertown, Mass.: Consultants.

Jackson, Kenneth T. 1985. *Crabgrass frontier : The suburbanization of America*. New York: Oxford University Press.

KAFNI. 1992. *The urban village plan for the West Fenway.*

Kayden, Jerold S., and Robert Pollard. 1987. Linkage ordinances and traditional exactions analysis: The connection between office development and housing. *Law and Contemporary Problems* 50, (1): 127-137.

Kayden, Jerold S. 1992. Market-based regulatory approaches: A comparative discussion of environmental and land use techniques in the United States. *Boston College Environmental Affairs Law Review* 19, (3) (Spring): 565.

Kayden, Jerold S. 1977. *Incentive zoning in New York City : A cost-benefit analysis*. Land policy roundtable policy analysis series. Vol. 201. Cambridge, Mass.: Lincoln Institute of Land Policy.

Kelch, Joan. Personal Communication. May 5, 2007.

Kreisler, Barbara. 2006. Moving beyond green. *Urban Land* (June).

Laderman, Marc. Personal Communication. April 29, 2007.

———. 2005. *Town-Gown History in the East Fens: The Residents' View of Relations with Northeastern University.* Boston: NP.

Lassar, Terry J. 1989. *Carrots & sticks: New zoning downtown*. Washington, D.C.: ULI-the Urban Land Institute.

Lawyer's Committe for Civil Rights Under the Law, Boston. [cited March 21 2007]. Available from http://www.lawyerscom.org.

Levine, Hillel, and Lawrence Harmon. 1992. *The death of an American Jewish community: A tragedy of good intentions*. New York: The Free Press.

Levine, Jonathan. 2006. *Zoned out: Regulation, markets, and choices in transportation and metropolitan land-use*. Washington, DC: Resources for the Future.

Lilleston, Randy. 2005. Rolling stones live: Opening night at Fenway Park. *USA Today*, August 21, 2005, sec Life.

Lindblom, Charles E. 1959. The science of "muddling through." *Public Administration Review* 19, (2): 79-88.

Logan, John R., and Harvey Luskin Molotch. 1987. *Urban fortunes : The political economy of place*. Berkeley, CA: University of California Press.

Lukas, J. Anthony. 1985. *Common ground: A turbulent decade in the lives of three American families*. New York: Knopf.

Malpezzi, Stephen. 2002. *Hedonic pricing models: A selective and applied review*. Housing economics: Essays in honor of Duncan Maclennan., eds. Kenneth Gibb, Anthony O'Sullivan.

Mandelker, Daniel R., and John M. Payne. 2001. *Planning and control of land development: Cases and materials*. 5th ed. New York: Lexis Pub.

Massachusetts Executive Office of Environmental Affairs. ENVIRONMENTAL JUSTICE POLICY OF THE EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS. 2002 [cited April 15 2007]. Available from http://www.mass.gov/envir/ej/pdf/EJ_Policy_English_Full_Version.pdf.

Massachusetts Institute of Technology. Dept. of Architecture. 1955. *The Fenway redevelopment plan for the Back Bay Fens area of Boston*. Cambridge, Mass.: NP.

Massachusetts Technology Collaborative. [cited April 28 2007]. Available from http://www.mtpc.org/.

Massachusetts Water Resources Authority. [cited April 28 2007]. Available from http://www.mwra.state.ma.us.

Matthiessen, Lisa Fay, and Peter Morris. 2004. *Costing green: A comprehensive cost database and budgeting methodology.*

Mayor Menino's Green Building Task Force. 2007. *Everyone benefits from building green ... everyone.* Boston: City of Boston.

McDonough, William, and Michael Braungart. 2002. *Cradle to cradle : Remaking the way we make things*. 1st ed. New York: North Point Press.

McHarg, Ian L. 1969. *Design with nature*. 1st ed. Garden City, N.Y.: Natural History Press.

Meiners, RE, AH Ringleb, and FL Edwards. 2002. *The legal environment of business*. 8th ed. Boston: South-Western College/West.

Merriam-Webster, Inc. 1991. *Webster's ninth new collegiate dictionary*. Springfield, Mass., U.S.A.: Merriam-Webster.

Miller, Trisha. 2001. *The greening of community development: An analysis of ecological restoration and neighborhood planning in the Fenway*. Masters degree, Massachusetts Institute of Technology.

Murakami, Elaine, and Jennifer Young. 1997. Daily travel by persons with low income. Paper presented at NPTS Symposium, Bethesda, MD.

Neuman, Michael. 1998. Does planning need the plan? *Journal of the American Planning Association* 64, (2): 208-220.

New Encyclopaedia Britannica. 1984. 15th ed. Chicago: Encyclopaedia Britannica.

Paris, Jonathan S. 1977. The proper use of referenda in rezoning. *Stanford Law Review* 29, (4): 819-851.

Parker, Gene. 1999. *Stormwater and mainstem loads of bacteria, nutrients, and selected metals, lower Charles River watershed, Massachusetts.* USGS MA-RI Water Science Center, MA154.

Pigou, A. C. 1924. *The economics of welfare*. 2d ed. London: Macmillan.

Pollan, Rosalind, Carol Kennedy, Edward Gordon, and Boston Landmarks Commission. 1984. *Fenway project completion report*. Boston: Boston Landmarks Commission/Boston Redevelopment Authority.

Porter, Douglas R., Patrick L. Phillips, and Terry J. Lassar. 1988. *Flexible zoning : How it works*. Washington, D.C.: Urban Land Institute.

Portney, Paul. 1994. The contingent valuation debate: Why economists should care. *The Journal of Economic Perspectives* 8, (4): 3-17.

Preer, Robert. 2005. Little love for Muddy's water. *The Boston Globe*, March 5, 2005, sec Local.

Pruetz, Rick. 2003. *Beyond takings and givings: Saving natural areas, farmland, and historic landmarks with transfer of development rights and density transfer charges*. Marina Del Rey, Calif.: Arje Press.

Rabin, Matthew. 2000. Risk aversion and expected-utility theory: A calibration theorem. *Econometrica* 68, (5): 1281-1292.

Regional Green House Gas Initiative (RGGI). [cited April 28 2007]. Available from http://www.rggi.org/.

Rush, Mark. Gerrymandering: Out of the Political Thicket and into the Quagmire. *PS: Political Science and Politics* 27 (4), 682-85.

Sammarco, Anthony. 2002. *Boston's Fenway*. Images of America. Mount Pleasant, SC: Arcadia Publishing.

Sanoff, Henry. 2000. *Community participation methods in design and planning*. New York: Wiley.

Scott, James C. 1998. *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven: Yale University Press.

Seasholes, Nancy S. 2003. *Gaining ground : A history of landmaking in Boston*. Cambridge, Mass.: MIT Press.

Selvarajah, Eswaran, Rolf Goetze, Jim Vrabel, and Boston Redevelopment Authority. Policy Development and Research Dept. 2003. *Fenway - Kenmore : 2000 census of population and housing, summary file 3 (SF3) data*. Report. Vol. # 577. Boston: Boston Redevelopment Authority.

Seyfried, Warren. 1991. Measuring the feasibility of a zoning bonus. *Journal of the American Planning Association* 57, (3): 348-356.

Sheppard, S. R. J. 1989. *Visual simulation: A user's guide for architects, engineers, and planners*. New York: Van Nostrand Reinhold.

Smith, V. Kerry, William Desvousges, and Ann Fisher. 1986. A comparison of direct and indirect methods for estimating environmental benefits. *American Journal of Agricultural Economics* 68, (2): 280-290.

Stone, Deborah A. 1997. *Policy paradox : The art of political decision making*. New York: W.W. Norton.

Stout, Glenn, and Dick Johnson. 2000. *Red sox century: One hundred years of red sox baseball*. Boston: Houghton Mifflin.

Susskind, Lawrence. forthcoming (2007). *Resolving land use disputes*, ed. Joshua DeFlorio. Online course. Cambridge: Lincoln Institute of Land Policy.

Susskind, Lawrence, and Jeffrey L. Cruikshank. 2006. *Breaking Robert's Rules: The new way to run your meeting, build consensus, and get results*. Oxford: New York.

———. 1987. *Breaking the impasse: Consensual approaches to resolving public disputes*. New York: Basic Books.

Sweetser, Frank Loel. 1961. *The social ecology of metropolitan Boston: 1950*. Boston: Division of Mental Hygiene, Massachusetts Dept. of Mental Health.

Tarnay, Stella, and Ed McMahon. 2005. Toward green urbanism. *Urban Land* 64, (6): 54-59.

Tiebout, Charles. 1956. A pure theory of local expenditures. *Journal of Political Economy* 35, (March): 416-424.

Town of Brookline, and City of Boston. 2005. *Phase 1 muddy river flood control, water quality and habitat enhancement, and historic preservation project.* 11865.

Tufte, Edward R. 2001. *The visual display of quantitative information*. 2nd ed. Cheshire, Conn.: Graphics Press.

———. 1990. *Envisioning information*. Cheshire, Conn.: Graphics Press.

U.S. Green Building Council. 2005. *LEED-NC for new construction: Reference guide, version 2.2*. 1st ed. Washington, D.C.: U.S. Green Building Council.

United States Department of Energy. [cited April 28 2007]. Available from http://www.eere.energy.gov/state_specific_statistics.cfm/state=MA#consumption.

US Environmental Protection Agency. Areometric information retrieval system. [cited April 15 2007]. Available from http://www.epa.gov/compliance/data/systems/air/afssystem.html.

Vatn, Arild. 2004. Environmental valuation and rationality. *Land Economics* 80, (1) (Feb).

Veitch, Pat. 1997. Alabama poor fight New York trash. *The Planet Newsletter* 4, (8).

Wheaton, William. 1999. Real estate "cycles": Some fundamentals. *Real Estate Economics* 27.

Appendix A

^ARTICLE 37

GREEN BUILDINGS
(^Article inserted on January 10, 2007)

SECTION 37-1. **Statement of Purpose.** The purposes of this article are to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts; to conserve natural resources; to promote sustainable development; and to enhance the quality of life in Boston.

SECTION 37-2. **Definitions.** For the purposes of this article only, the following words and phrases when capitalized shall have the meanings indicated.

1. "Applicant", any person or entity having a legal or equitable interest in a Proposed Project subject to the requirements of this article, or the authorized agent of any such person or entity.

2. "Boston Green Building Credits", Credits identified in this article that may be included in the calculation toward achieving a LEED Certifiable project under the provisions of this article.

3. "Boston Interagency Green Building Committee", an interdisciplinary committee consisting of at least one (1), but not more than two (2) representatives of city agencies including but not limited to, the Boston Redevelopment Authority, the Boston Environment Department, the Boston Transportation Department, the Inspectional Services Department and the Mayor's Office. Such Committee will advise the Boston Redevelopment Authority on Proposed Project's compliance with the provisions of this article.

4. "LEED Certifiable", a structure that is planned, designed and constructed to achieve the level "certified" using the LEED building rating system most appropriate for the Proposed Project.

5. "Proposed Project", the erection, extension, rehabilitation, alteration, or substantial demolition of any structure or part thereof, or the change of use of any structure or land, for which the Applicant is required to obtain a building or use permit.

SECTION 37-3. **Applicability**. Any Proposed Project which is subject to or shall elect to comply with Section 80B of this Code, Large Project Review, shall be subject to the requirements of this article. The following Proposed Projects, however, shall be exempt from the provisions of this article:

1. Any Proposed Project for which application to the Inspectional Services Department for a building or use permit has been made prior to the first notice of hearing before the Zoning Commission for adoption of this article and for which no Zoning Relief is required.

2. Any Proposed Project for which appeal to the Board of Appeal for any Zoning Relief has been made prior to the first notice of hearing before the Commission for adoption of this article, provided that such Zoning Relief has been or is thereafter granted by the Board of Appeal pursuant to such appeal.

3. Any Proposed Project or site for which application for approval of a development impact project plan or planned development area development plan, has been submitted to the Boston Redevelopment Authority prior to the first notice of hearing before the Commission for adoption of this article, provided that such development impact project plan or planned development area development plan, has been or is thereafter approved by the Boston Redevelopment Authority pursuant to such application, whether or not such application or such development impact project plan or planned development area development plan is thereafter modified or amended.

SECTION 37-4. **Green Building Requirements**. Any Proposed Project subject to the provisions of this article shall be LEED Certifiable under the most appropriate LEED building rating system. Up to four (4) of the required points may be obtained from the Boston Green Building Credits identified in Appendix A.

SECTION 37-5. **Procedures**. Any Applicant subject to the provisions of this article shall provide to the Boston Redevelopment Authority a completed LEED scorecard, including any Boston Green Credits that the Proposed Project will achieve. The Applicant shall demonstrate that the Proposed Project will meet the requirements of this article with appropriate supporting documentation and by certification from a LEED Accredited Professional and/or other expert recognized by the Boston Redevelopment Authority. The submissions shall be in accordance with the provisions of Section 80B.

Within five (5) days of its receipt of a completed LEED submission, the Boston Redevelopment Authority shall transmit a copy of the submission to Boston Interagency Green Building Committee.

SECTION 37-6. **Regulations**. The Boston Redevelopment Authority may promulgate regulations to administer this article.

SECTION 37-7. **Enforcement**. The Commissioner of Inspectional Services shall not issue any building permit or use permit for a Proposed Project that is subject to the provisions of this article unless the Director of the Boston Redevelopment Authority has issued a Certification of Compliance pursuant to Section 80B-6.

SECTION 37-8. **Severability**. The provisions of this article are severable, and if any such provision or provisions shall be held invalid by any decision of any court of competent jurisdiction, such decision shall not impair or otherwise affect any other provision of this article.

↔ARTICLE 80

DEVELOPMENT REVIEW AND APPROVAL

(↔Article inserted on May 9, 1996*)

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Last amended: January 10, 2007

*Date of public notice: March 25, 1996 (see St. 1956, c. 665, s.5).

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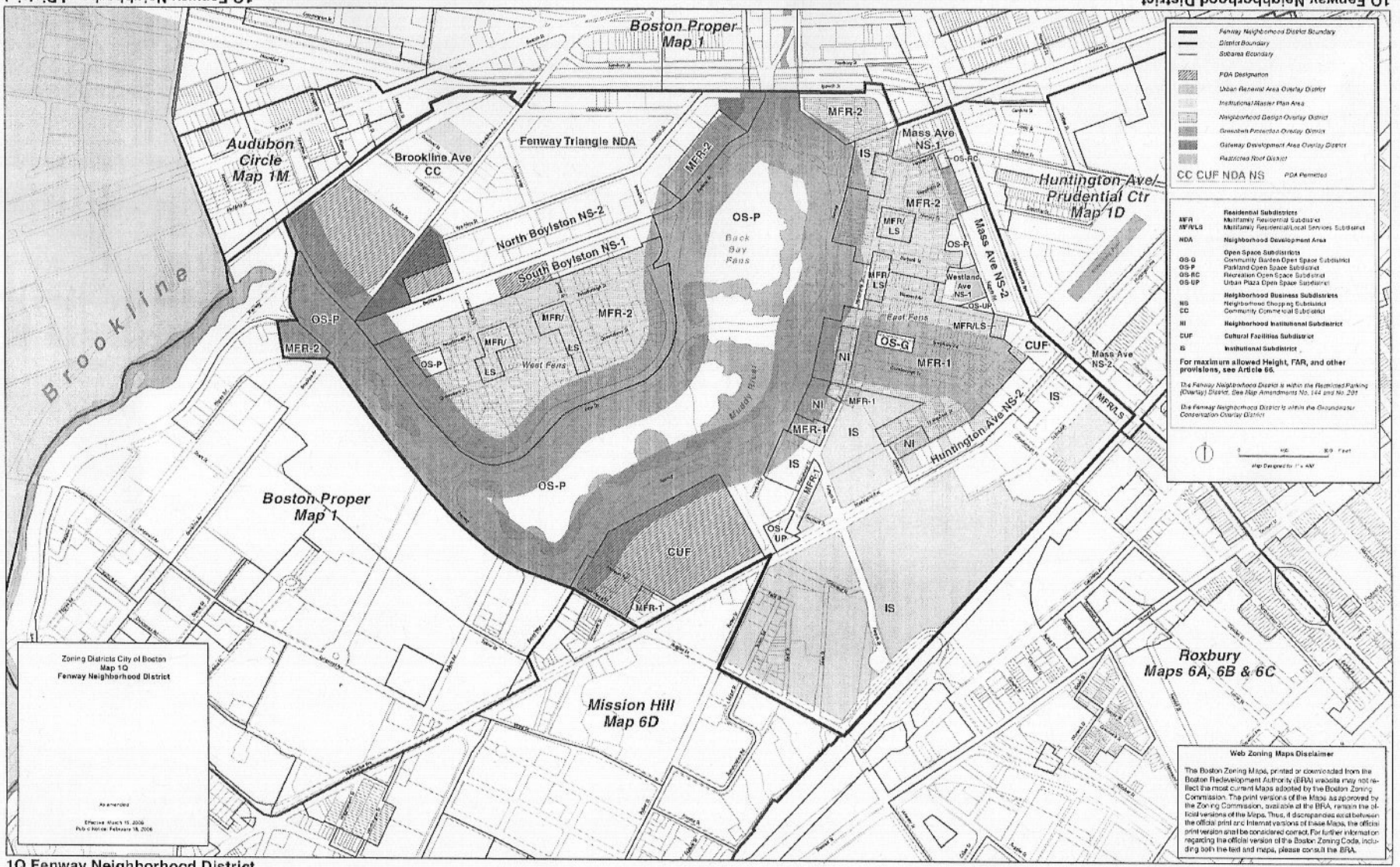
III. SMALL PROJECT REVIEW (continued)

IV. APPENDICES

1Q Fenway Neighborhood District



1Q Fenway Neighborhood District

ARTICLE 66

FENWAY NEIGHBORHOOD DISTRICT

Article inserted on October 22, 2004

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*Date of public notice: September 25, 2004 (see St. 1956, c. 665, s.5).

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Appendix B

Project Checklist

Sustainable Sites — 14 Possible Points

Prereq 1	**Construction Activity Pollution Prevention**	Required
Credit 1	**Site Selection**	1
Credit 2	**Development Density & Community Connectivity**	1
Credit 3	**Brownfield Redevelopment**	1
Credit 4.1	**Alternative Transportation.** Public Transportation Access	1
Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
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Credit 7.2	**Heat Island Effect**, Roof	1
Credit 8	**Light Pollution Reduction**	1

Water Efficiency — 5 Possible Points

Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
Credit 2	**Innovative Wastewater Technologies**	1
Credit 3.1	**Water Use Reduction**, 20% Reduction	1
Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Energy & Atmosphere — 17 Possible Points

Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Prereq 2	**Minimum Energy Performance**	Required
Prereq 3	**Fundamental Refrigerant Management**	Required
Credit 1	**Optimize Energy Performance**	1–10
Credit 2	**On-Site Renewable Energy**	1–3
Credit 3	**Enhanced Commissioning**	1
Credit 4	**Enhanced Refrigerant Management**	1
Credit 5	**Measurement & Verification**	1
Credit 6	**Green Power**	1

Materials & Resources — 13 Possible Points

Prereq 1	**Storage & Collection of Recyclables**	Required
Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
Credit 1.2	**Building Reuse**, Maintain 95% of Existing Walls, Floors & Roof	1

Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
Credit 3.1	**Materials Reuse**, 5%	1
Credit 3.2	**Materials Reuse**, 10%	1
Credit 4.1	**Recycled Content**, 10% (post-consumer + 1/2 pre-consumer)	1
Credit 4.2	**Recycled Content**, 20% (post-consumer + 1/2 pre-consumer)	1
Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regionally	1
Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regionally	1
Credit 6	**Rapidly Renewable Materials**	1
Credit 7	**Certified Wood**	1

Indoor Environmental Quality 15 Possible Points

Prereq 1	**Minimum IAQ Performance**	Required
Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
Credit 1	**Outdoor Air Delivery Monitoring**	1
Credit 2	**Increased Ventilation**	1
Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
Credit 5	**Indoor Chemical & Pollutant Source Control**	1
Credit 6.1	**Controllability of Systems**, Lighting	1
Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
Credit 7.1	**Thermal Comfort**, Design	1
Credit 7.2	**Thermal Comfort**, Verification	1
Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Innovation & Design Process 5 Possible Points

Credit 1.1	**Innovation in Design**	1
Credit 1.2	**Innovation in Design**	1
Credit 1.3	**Innovation in Design**	1
Credit 1.4	**Innovation in Design**	1
Credit 2	**LEED Accredited Professional**	1

Project Totals 69 Possible Points

Certified 26–32 points Silver 33–38 points Gold 39–51 points Platinum 52–69 points

Appendix C

Fenway LEED Density Bonus Overlay Area
Base Case

Parcel	Assessor	Use	Lot GSF	FAR	Bonus	Tot FAR	Total GSF	L	D	Lset	Dset	6 L	6D	6GSF	Remain	7L	7D	7Plate	Stories	Round	7GSF	7Length	7Width	Height	Tot H
1	2100047000	R	67052	7	0	7	469364	487	127	15	15	472	112	52864	152180	457	97	44329	3.433	4	38045	457	83	40	115
2	504313000	R	28084	5.5	0	5.5	154462	205	127	15	15	190	112	21280	26782	175	97	16975	1.578	2	13391	175	77	20	95
3	504324000	R	23209	6.5	0	6.5	150858.5	185	127	15	15	170	112	19040	36619	155	97	15035	2.436	3	12206	155	79	30	105
4	504322000	R	29925	6.5	0	6.5	194512.5	222	131	15	15	207	116	24012	50441	192	101	19392	2.601	3	16814	192	88	30	105
5	504325000	R	16173	6.5	0	6.5	105124.5	123	127	0	15	123	112	13776	22469	123	97	11931	1.883	2	11234	123	91	20	95
6	504321000	R	13300	6.5	0	6.5	86450	93	131	0	15	93	116	10788	21722	93	101	9393	2.313	3	7241	93	78	30	105
7	504326000	R	34858	7	0	7	244006	270	127	15	15	255	112	28560	72646	240	97	23280	3.121	4	18162	240	76	40	115
8	504317000	R	18620	6.5	0	6.5	121030	131	137	15	15	116	122	14152	36118	101	107	10807	3.342	4	9030	101	89	40	115
9	504208000	R	59347	7	0	7	415429	220	258	0	15	220	243	53460	94669	220	228	50160	1.887	2	47335	220	215	20	95
10	504225000	R	47301	7	0	7	331107	358	129	15	15	343	114	39102	96495	328	99	32472	2.972	3	32165	328	98	30	105
11	504230000	R	27812	5.5	0	5.5	152966	198	126	0	15	198	111	21978	21098	198	96	19008	1.11	2	10549	198	53	20	95
12	504212000	R	14630	5.5	0	5.5	80465	136	105	0	15	136	90	12240	7025	136	75	10200	0.689	1	7025	136	52	10	85
13	504190000	C	24723	5	0	5	123615	199	120	0	15	199	105	20895	-1755	199	90	17910	-0.098	-1	1755	199	9	-10	65
14	504190001	C	5575	5	0	5	27875	40	120	0	15	40	105	4200	2675	40	90	3600	0.743	1	2675	40	67	10	85
15	504191000	C	18723	5	0	5	93615	123	120	15	15	108	105	11340	25575	93	90	8370	3.056	4	6394	93	69	40	115
			429332			6.41	2750880																		

Fenway LEED Density Bonus Overlay Area
Arlington, VA

Parcel	Assessor	Use	Lot GSF	FAR	Bonus	Tot FAR	Total GSF	L	D	Lset	Dset	6 L	6D	6GSF	Remain	7L	7D	7Plate	Stories	Round	7GSF	7Length	7Width	Height	Tot H
1	2100047000	R	67052	7	0	7	469364	487	127	15	15	472	112	52864	152180	457	97	44329	3.433	4	38045	457	83	40	115
2	504313000	R	28084	5.5	0.15	5.65	158674.6	205	127	15	15	190	112	21280	30995	175	97	16975	1.826	2	15497	175	89	20	95
3	504324000	R	23209	6.5	0.15	6.65	154339.9	185	127	15	15	170	112	19040	40100	155	97	15035	2.667	3	13367	155	86	30	105
4	504322000	R	29925	6.5	0.15	6.65	199001.3	222	131	15	15	207	116	24012	54929	192	101	19392	2.833	3	18310	192	95	30	105
5	504325000	R	16173	6.5	0.35	6.85	110785.1	123	127	0	15	123	112	13776	28129	123	97	11931	2.358	3	9376	123	76	30	105
6	504321000	R	13300	6.5	0.25	6.75	89775	93	131	0	15	93	116	10788	25047	93	101	9393	2.667	3	8349	93	90	30	105
7	504326000	R	34858	7	0	7	244006	270	127	15	15	255	112	28560	72646	240	97	23280	3.121	4	18162	240	76	40	115
8	504317000	R	18620	6.5	0.15	6.65	123823	131	137	15	15	116	122	14152	38911	101	107	10807	3.601	4	9728	101	96	40	115
9	504208000	R	59347	7	0	7	415429	220	258	0	15	220	243	53460	94669	220	228	50160	1.887	2	47335	220	215	20	95
10	504225000	R	47301	7	0	7	331107	358	129	15	15	343	114	39102	96495	328	99	32472	2.972	3	32165	328	98	30	105
11	504230000	R	27812	5.5	0.15	5.65	157137.8	198	126	0	15	198	111	21978	25270	198	96	19008	1.329	2	12635	198	64	20	95
12	504212000	R	14630	5.5	0.15	5.65	82659.5	136	105	0	15	136	90	12240	9219.5	136	75	10200	0.904	1	9220	136	68	10	85
13	504190000	C	24723	5	0.15	5.15	127323.5	199	120	0	15	199	105	20895	1953.5	199	90	17910	0.109	1	1953	199	10	10	85
14	504190001	C	5575	5	0.15	5.15	28711.25	40	120	0	15	40	105	4200	3511.3	40	90	3600	0.975	1	3511	40	88	10	85
15	504191000	C	18723	5	0.15	5.15	96423.45	123	120	15	15	108	105	11340	28383	93	90	8370	3.391	4	7096	93	76	40	115
			429332			6.50	2788560																		
Green Built Square Footage							1328654																		
Conventional Square Footage (PDAs)							1459906																		

Fenway LEED Density Bonus Overlay Area
Lower Boylston

Parcel	Assessor	Use	Lot GSF	FAR	Bonus	Tot FAR	Total GSF	L	D	Lset	Dset	6 L	6D	6GSF	Remain	7L	7D	7Plate	Stories	Round	7GSF	7Length	7Width	Height	Tot H
1	2100047000	R	67052	6.5	2.5	9	603468	487	127	15	15	472	112	52864	286284	457	97	44329	6.458	7	40898	457	89	70	145
2	504313000	R	28084	5.5	1.5	7	196588	205	127	15	15	190	112	21280	68908	175	97	16975	4.059	5	13782	175	79	50	125
3	504324000	R	23209	6.5	1.5	8	185672	185	127	15	15	170	112	19040	71432	155	97	15035	4.751	5	14286	155	92	50	125
4	504322000	R	29925	6.5	1.5	8	239400	222	131	15	15	207	116	24012	95328	192	101	19392	4.916	5	19066	192	99	50	125
5	504325000	R	16173	6.5	3.5	10	161730	123	127	0	15	123	112	13776	79074	123	97	11931	6.628	7	11296	123	92	70	145
6	504321000	R	13300	6.5	2.5	9	119700	93	131	0	15	93	116	10788	54972	93	101	9393	5.852	6	9162	93	99	60	135
7	504326000	R	34858	6.5	2.5	9	313722	270	127	15	15	255	112	28560	142362	240	97	23280	6.115	7	20337	240	85	70	145
8	504317000	R	18620	6.5	1.5	8	148960	131	137	15	15	116	122	14152	64048	101	107	10807	5.927	6	10675	101	106	60	135
9	504208000	R	59347	6.5	2.5	9	534123	220	258	0	15	220	243	53460	213363	220	228	50160	4.254	5	42673	220	194	50	125
10	504225000	R	47301	5.5	3.5	9	425709	358	129	15	15	343	114	39102	191097	328	99	32472	5.885	6	31850	328	97	60	135
11	504230000	R	27812	5.5	1.5	7	194684	198	126	0	15	198	111	21978	62816	198	96	19008	3.305	4	15704	198	79	40	115
12	504212000	R	14630	5.5	1.5	7	102410	136	105	0	15	136	90	12240	28970	136	75	10200	2.84	3	9657	136	71	30	105
13	504190000	C	24723	5	1.5	6.5	160699.5	199	120	0	15	199	105	20895	35330	199	90	17910	1.973	2	17665	199	89	20	95
14	504190001	C	5575	5	1.5	6.5	36237.5	40	120	0	15	40	105	4200	11038	40	90	3600	3.066	4	2759	40	69	40	115
15	504191000	C	18723	5	1.5	6.5	121699.5	123	120	15	15	108	105	11340	53660	93	90	8370	6.411	7	7666	93	82	70	145
Total			429332			8.26	3544803																		

Fenway LEED Density Bonus Overlay Area
Manhattanization

Parcel	Assessor	Use	Lot GSF	FAR	Bonus	Tot FAR	Total GSF	L	D	Lset	Dset	6 L	6D	6GSF	Remain	7L	7D	7Plate	Stories	Round	7GSF	7Length	7Width	Height	Tot H
1	2100047000	R	67052	6.5	6	12.5	838150	487	127	15	15	472	112	52864	520966	457	97	44329	11.75	12	43414	457	95	120	195
2	504313000	R	28084	5.5	3.5	9	252756	205	127	15	15	190	112	21280	125076	175	97	16975	7.368	8	15635	175	89	80	155
3	504324000	R	23209	6.5	3.5	10	232090	185	127	15	15	170	112	19040	117850	155	97	15035	7.838	8	14731	155	95	80	155
4	504322000	R	29925	6.5	3.5	10	299250	222	131	15	15	207	116	24012	155178	192	101	19392	8.002	9	17242	192	90	90	165
5	504325000	R	16173	6.5	8	14.5	234508.5	123	127	0	15	123	112	13776	151853	123	97	11931	12.73	13	11681	123	95	130	205
6	504321000	R	13300	6.5	6	12.5	166250	93	131	0	15	93	116	10788	101522	93	101	9393	10.81	11	9229	93	99	110	185
7	504326000	R	34858	6.5	6	12.5	435725	270	127	15	15	255	112	28560	264365	240	97	23280	11.36	12	22030	240	92	120	195
8	504317000	R	18620	6.5	3.5	10	186200	131	137	15	15	116	122	14152	101288	101	107	10807	9.372	10	10129	101	100	100	175
9	504208000	R	59347	6.5	6	12.5	741837.5	220	258	0	15	220	243	53460	421078	220	228	50160	8.395	9	46786	220	213	90	165
10	504225000	R	47301	5.5	8	13.5	638563.5	358	129	15	15	343	114	39102	403952	328	99	32472	12.44	13	31073	328	95	130	205
11	504230000	R	27812	5.5	3.5	9	250308	198	126	0	15	198	111	21978	118440	198	96	19008	6.231	7	16920	198	85	70	145
12	504212000	R	14630	5.5	3.5	9	131670	136	105	0	15	136	90	12240	58230	136	75	10200	5.709	6	9705	136	71	60	135
13	504190000	C	24723	5	3.5	8.5	210145.5	199	120	0	15	199	105	20895	84776	199	90	17910	4.733	5	16955	199	85	50	125
14	504190001	C	5575	5	3.5	8.5	47387.5	40	120	0	15	40	105	4200	22188	40	90	3600	6.163	7	3170	40	79	70	145
15	504191000	C	18723	5	3.5	8.5	159145.5	123	120	15	15	108	105	11340	91106	93	90	8370	10.88	11	8282	93	89	110	185
Total			429332			11.24	4823987																		