

## Next Stop *Tren Urbano*: Adding Transit Stations Along Partially Defined Alignments

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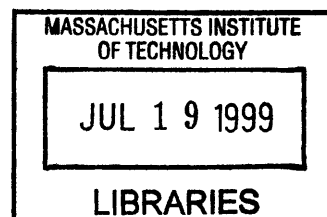
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## Abstract

The starting points of this thesis are the additions of two transit stations to the proposed route of San Juan Puerto Rico's new heavy rail system—*Tren Urbano*, which is currently under construction. The two stations—at the University of Puerto Rico and Domenech—were added late in the planning process, subsequent to submission of the *Final Environmental Impact Statement* (FEIS). As such, they offer interesting and provocative illustrations of the complexities, tradeoffs, and conflicts permeating station siting and spacing decisions.

As stations are the interface points between the system and the communities through which it runs, where they are placed is critical to both system and community. In this vein, the approaches taken to adding stations to partially defined alignments are considered, both at the theoretical and practical levels. At the theoretical level, three families of literature are identified, ranging from the narrowly-focused, system-level calculations of operational efficiency, to the neighborhood-level examinations of the bi-directional impacts of stations and communities on each other, to the broadly-focused, societal-level look at the role of social policy and politics on station location decisions. At the practical level, two sets of cases of actual station additions are examined: first, the recent San Juan cases, and second, examples from Boston, Massachusetts, where the added stations are now in operation and can thus be evaluated on the basis of their actual value to the community and system.

Following analysis and evaluation of the San Juan and Boston cases, the thesis concludes with a set of guideposts to be used by planners and policy makers at *Tren Urbano* and, more broadly, other existing and proposed transit systems. By way of summary, the guideposts advise planners to pay attention to community input, but also to be aware that the most vocal members of a community are likely not to be representative of the greater community. In making station placement decisions, planners need to be cognizant of who will be served, who will not, and gather input from both. Certain types of areas are more likely to support a transit station than others—particularly dense, pedestrian oriented, historic centers. Institutionally, the cases provide clear evidence that both internal and external support is vital to the success of a station. Likewise, politics and history matters, and their impact should not be underestimated. Finally, planners should be explicit about the vision and goals underlying the transit system and be consistent about measuring proposals for station additions against those goals.

Thesis Supervisor: Dr. Joseph Coughlin  
Thesis Reader: Professor Sam Bass Warner

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## Acknowledgements

Sadly, due to an inexcusable page numbering snafu, my acknowledgements will have to be wedged into this small section of page between a truncated table of contents and the body of the text. This would be unproblematic, were it not for the numerous people and other animals, all of whom are well worthy of mention and gratitude. First, thanks to everyone in Puerto Rico who welcomed me to their island with generosity and warmth. Almost everyone working at *Tren Urbano* displayed both patience and honesty. In particular, I would like to single out Edwin Ramos, coordinator of *Tren Urbano's* Community Relations Office in Río Piedras, for touring the neighborhood with me, introducing me to community leaders, and taking me into all the best places to eat. Edwin cares about Río Piedras and is determined to make *Tren Urbano* work for the neighborhood. It is a strength of the project that the people involved in it were willing to acknowledge flaws or concerns—I firmly believe that this self-reflection and willingness to expose potential weaknesses is in the long term best interest of the project. It is in this vein that I will occasionally be critical of the project in this report and in my research—in each case, however, such criticisms will be made within a context of immense support for the overall project. Special thanks are owed my thesis advisor, Joe Coughlin, for his guidance during my research as well as candid insights on how to survive in a world dominated by engineers, dating back to a chance meeting we had at a conference before either one of us was at MIT. Thanks are also owed to my reader, Sam Bass Warner, for his historical and colorful commentary and to Nigel Wilson, for inviting me to join the *Tren Urbano* project in the first place, and for being a trolley-jolly despite being an engineer.

At a personal level, I am indebted to my family, Mildred (Robin), Berger (Marshall), Adrienne, Stephanie, Alan and Eva, and to the memory of my mother, Rosalind. I also want to thank Andy, Jessica, William and Thurston for being my chosen family here in Massachusetts, and for being such good housemates and/or cats, whichever is appropriate in each case. Thanks to a wonderful support group of friends here at MIT, all of whom wittingly or unwittingly contributed to my thesis at various points along the way—Julie, Shailesh, Heather, Nadine, Anne, Munsun, and Mellone. Thanks to my friends outside MIT, including Dyck and Dicken, Marianthi, Ellen, Roger, Tom Aloisi, and Tom Buffkin, who got me a job, as well as Cyrus and Quinn. Thanks to Georgia, for seeing me into adulthood and pushing me to come to MIT to begin with. And thanks to Indu, for making my whole body smile every time I think about her.

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# Chapter 1

## Introduction: The Importance of Station Spacing and Location

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### 1.1. Building a Subway Station in San Juan: Tradeoffs and Conflicts

In planning Tren Urbano, San Juan's new heavy rail transit line scheduled to begin revenue service in 2002, the placement of an underground station at the main entrance to the University of Puerto Rico (UPR) had many proponents. The University viewed the station as critical to its long term transportation plan calling for the reversal of a trend seeing the campus overrun with automobiles and parking lots. The administration also envisioned the station as a catalyst for a planned new University-led development across the street from the main campus—*Plaza Universitaria*. Students and other members of the university community welcomed the station as key towards making Tren Urbano a more convenient and viable commuting option. Two professional associations—*Colegio de Arquitectos de Puerto Rico* (Society of Architects) and *Colegio de Ingenieros y Agrimensores de Puerto Rico* (Society of Engineers and Surveyors), the Municipality of San Juan, and some residents of the nearby Blondin neighborhood, maintained that the station was important as it provided direct access to a major regional activity center. Within the Puerto Rico Highway and Transportation Authority (PRHTA), a political calculation was made that a UPR Station would forge a valuable alliance with the University, and build a future constituency for Tren Urbano by targeting university students. In making the case for including a station at UPR, a December 1996 *Environmental Assessment* argues that:

*UPR Station will serve as a major transportation node for the University of Puerto Rico campus and the proposed future development in the area. With this station and the nearby Río Piedras Station, Tren Urbano will be*



*a viable alternative to driving into the University, Central Business District, and future mixed use development areas. UPR station will be an integral element of the Tren Urbano transportation network<sup>1</sup>.*

The above quote notwithstanding, when the *Final Environmental Impact Statement* (FEIS) for Tren Urbano was submitted in November 1995, fourteen stations were proposed, but the UPR Station was not one of them.

The omission of a station at UPR in the initial plan was less an oversight than an indication of some of the tensions and tradeoffs imbuing station location decisions. Countervailing the arguments for including the station were concerns rooted in technical operations, finance, equity, and city form. The additional station would be only 400m north of the Río Piedras Station, a relatively close distance. Many argued that the regional benefit of the added travel time caused by the extra stop would not be offset by serving an area that would already be within easy walking distance of an existing station. From a financial perspective, as one of only two underground stations planned for Phase 1 of Tren Urbano, the UPR Station would also be expensive to build.

From a social standpoint, Río Piedras residents argued that the added station would exacerbate a growing rift between the campus and its host community in Río Piedras—students would only use the UPR Station, while residents would only use the Río Piedras Station. Río Piedras merchants feared that the station would have economic consequences for the neighborhood’s historic commercial center, because the UPR Station would siphon riders away from the Río Piedras Station area and its ancillary businesses. The disagreement over the merit of adding a station at UPR underscores a tension between often-conflicting operational, social, political, economic and aesthetic objectives. As the UPR Station addition illustrates, issues of station spacing and placement are complex as well as critical to the viability, usefulness, and value of a transit system.

#### **1.1.1. Background: New Stations Added at UPR and Domenech**

The UPR Station was one of two stations added subsequent to submission of the FEIS. The other added station, Domenech, in the southern end of Hato Rey, will, like the UPR Station, be relatively close (400m) to another Tren Urbano Station—Piñero. Each of the two stations were added, in part, due to the advocacy of large institutions

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<sup>1</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Environmental Assessment: University of Puerto Rico Station*, San Juan, PR,

(most notably the University of Puerto Rico in the case of the UPR Station), professional associations, and, to a lesser extent, other stakeholders, including community and neighborhood groups. In both cases, the decision to follow through with the relatively late additions of these two stations was made on an *ad hoc* basis, without the benefit of established criteria or a plan. While some degree of flexibility and discretion is appropriate to infrastructure decisions of this scale, several officials at the Federal Transit Administration (FTA) have expressed an uneasiness with the seeming lack of process and the prospect of Tren Urbano having to address future requests for stations without some policy foundation to guide later station addition decisions, or shape responses to calls for additional stations.

## **1.2. Research Questions and Objectives**

Motivated by the issues raised by the recent history of station additions within the context of the first phase of Tren Urbano, this thesis will examine the processes for adding transit stations and the optimal end products of those processes, with an eye towards the role played by the community—as well as the role of stations in shaping or reshaping places and regions. The overarching question framing this study is: *Under what circumstances, particularly at the behest of an affected community, institution, or other interested party, should stations be added along partially defined rapid transit alignments following initial design?* Four additional questions, each operating at a different level of specificity, are embedded within the initial question:

- (1) What are the system-wide impacts and tradeoffs of adding stations to a transit line?
- (2) What role or roles do transit stations play in defining neighborhoods and shaping cities?
- (3) What role have communities historically had in influencing and changing station location decisions? And
- (4) following (1), (2) and (3), How should Tren Urbano approach requests for station additions (or relocations) in the future.

In pursuing these questions, an analysis of the impact and role of transit stations on and in the regions and neighborhoods they serve will run like a thread throughout the thesis.

Guided by these questions, then, the ultimate goals of this research are:

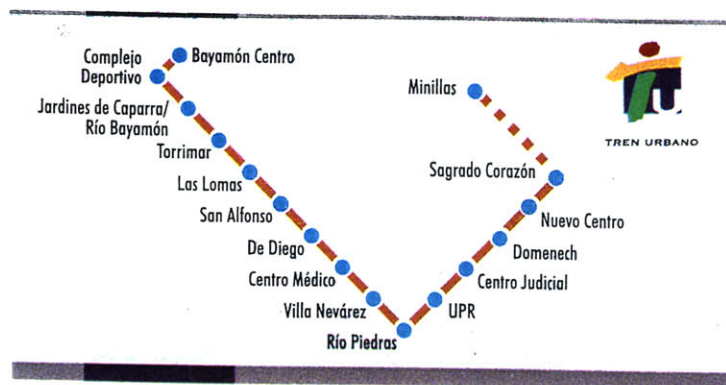
- (1) To provide a critical overview and analysis of the complex set of issues and tradeoffs embedded in station spacing and location decisions;
- (2) To chronicle and investigate the methods used, with particular attention to the role of community or other interest groups, in Phase 1 of Tren Urbano, and, by way of comparison, cases from Boston's MBTA, in updating transit infrastructure design plans in order to include additional stations (or relocate or eliminate stations); and
- (3) To establish guideposts, where appropriate, for making future station addition decisions, with particular application to subsequent phases of Tren Urbano.

Liberal reference will be made throughout the text to examples from both Boston and San Juan. For the reader's convenience, schematic maps of both systems (MBTA and Tren Urbano) are included on the following page.

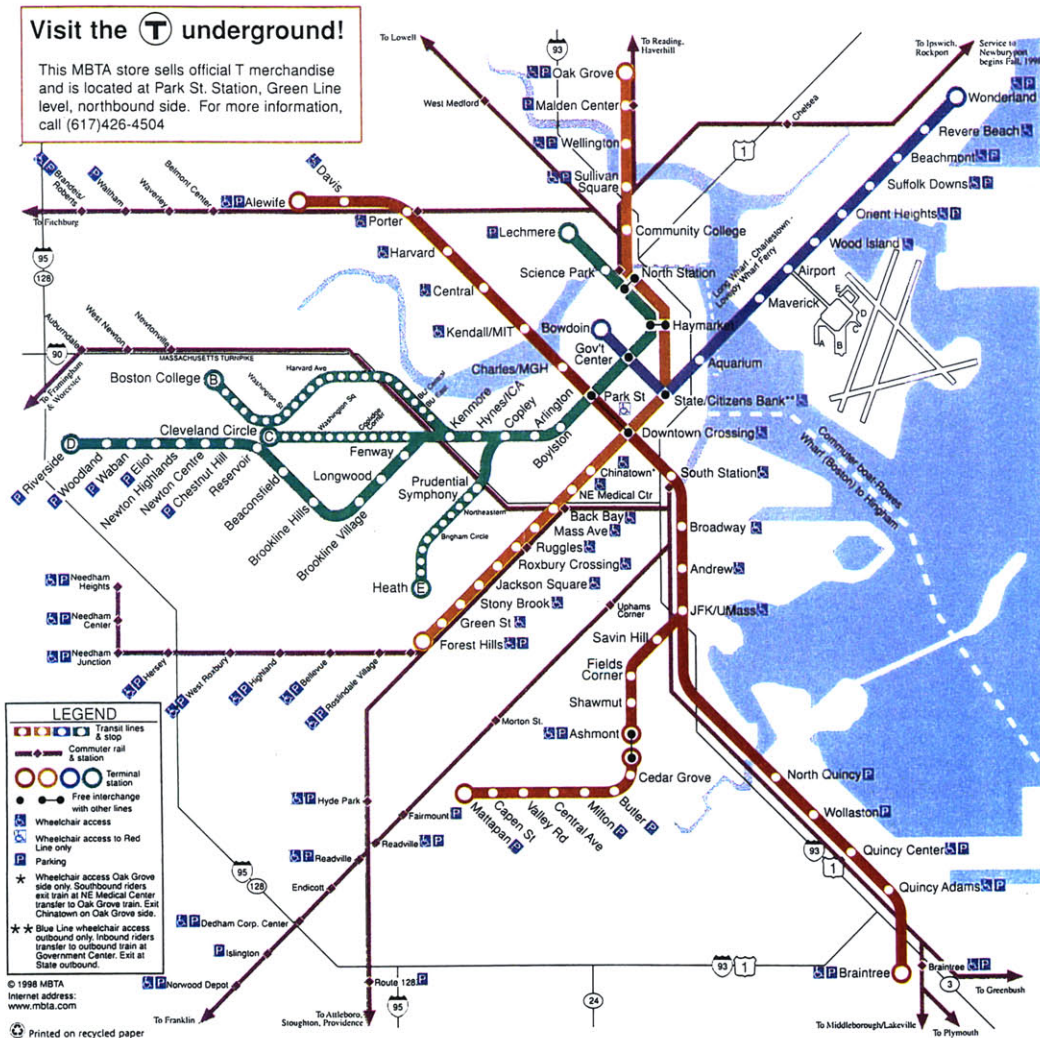
#### **1.2.1. Why Is Measuring Optimal Placement so Difficult?**

The transit demand modeling literature calculates optimal station placement based on such factors as the most operationally efficient distance between stations, the particular technology utilized (e.g. light rail, heavy rail, commuter rail, etc.), and ridership projections. Clearly, however, other factors come into play in planning station placement. As the example of the UPR Station illustrates, decisions regarding the spacing and location of stations must be made in an environment characterized by a tension between often-conflicting operational, social, political, economic and aesthetic objectives. Through both the analysis and criteria described above, I seek to go beyond, without ignoring, the purely operational approach to the question of station placement. Balancing the operational perspective (e.g. how can we move vehicles or passengers through the system most expeditiously?), will be the aesthetic perspective (e.g. how can we use transit stations to shape the most attractive, livable cities possible?), the political perspective (e.g. how can we build the greatest constituency for the transit system?), and the equity/social justice perspective (e.g. how can we best serve citizens in the greatest need of quality transportation?).

Unlike the effect of station placement on the pure operational efficiency of a transit line, the effect of station placement on less quantifiable factors such as transportation equity, political affinities, economic development, and the form of the built environment are difficult to measure objectively or to weight against each other. Assuming that we can even agree, for instance, as to what constitutes equity, what value



Map 1: Schematic map of San Juan's *Tren Urbano* Phase 1 and 1A (dotted line).  
Source: *Tren Urbano*.



Map 2: Schematic map of Boston's MBTA system.  
Source: MBTA.

are we to assign it? Can we reach consensus as to what the ideal built form is or what role a transit station will play in bringing it about? If so, and this is a large if, how do we prioritize this objective against equity or against economic development? Many of the issues inherent in station location and spacing decisions do not lend themselves to traditional cost-benefit analyses. Recently, I had the opportunity to discuss this research with the president of a major Geographic Information Systems (GIS) firm.<sup>2</sup> Why, she asked, did I not model the impacts of various station locations and spacings on GIS maps in order to identify what was optimal. I responded by pointing out that the problem with such an approach is that GIS-type modeling only works once we can identify objectively what the impacts are and how they can be measured quantitatively. Short of this, I submit, this type of modeling would be inappropriate and irresponsible.

At stake in a decision as to whether or not to add a station are who will use the transportation system, the relationship between the service and the communities it travels through, and how the public and the entire region perceive the service. Consequentially, decisions regarding the placement of stations are not only shaped by the external environment—they in turn shape the external social and built environment. Establishing guideposts for determining where to add stations, then, joins the theoretical question of how to run an efficient system with the practical question of the role that system plays in the environment through which it runs.

### **1.3. Why is station location so important?**

A transit system composed of conveyer belts or moving sidewalks, for instance, would be a *continuous* systems. Passengers could enter or exit the system at any point along the alignment. As a result, no one access point holds special significance, as each point along the line serves the same function. In contrast, rail transit systems, particularly heavy rail systems which require fairly long set minimum distances between stops due to demands of the technology, are *discrete* systems. Passengers may only enter at predetermined locations—at stations. As a result, the stations stand as the connection between the regional transit system and the communities they travel through. The stations are the access points to the system. It is a reflection of the critical roll of stations as gateways between the system and the community, that they have historically been built with a grandeur transcending functional requirements, symbolic of and in reverence for stations' powerful place. Writing about the historic railroad stations of the

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<sup>2</sup> Kija Kim, president of Harvard Design and Mapping Co., Inc., Cambridge, MA.

nineteenth century, Carroll Meeks notes that “the station was an essential part of a new system of transportation; it reflected the impact of technology and mobility of the masses. It played its part in the opening of the frontier.”<sup>3</sup>

Without the station—the interface between system and community—the system is useless to the community. Even if the system runs through a given area, that area does not enjoy direct access to the service if there is no station in that area. Where stations are situated, then, determines who will use the system and the relationship of the system to the areas it travels through. Ultimately, then, transit station placement is important because where stations are located determines the allocation of the resources of a presumably high cost infrastructure project. From the perspective of a transit agency or government, station location is key on two fundamental counts:

- (1) As a determinant of future access to the system and thus the future viability, usefulness, and ridership of the physical system; and
- (2) As a determinant of the equity or inequity of the system, in terms of who is served, or not served, coverage, and quality and level of service (LOS).

Consequent to the importance of stations to the system is that station spacing and locating policies and strategies will determine not just the success of the system, but the very function and character of the system. A system with stations located relatively close to each other, will be a different system than one with stations located relatively far apart. A system with stations located in the middle of existing nodes, will be a different system than one with stations located on the periphery of existing nodes. A system with stations located in areas convenient to pedestrians will be a different system than one that is convenient to automobiles.

Not only is the placement of stations critical to the viability of the transit system, it can also be critical to the viability of the areas in which the stations are located. Transit stations anchor neighborhoods and serve as access points to the regional transit system. Subway stations are cited by Kevin Lynch as an illustration of what he terms “nodes”—that is “the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he [or she] is traveling,” typically serving as a district’s “polarizing center.”<sup>4</sup> As Lynch notes, many observers “organize the rest of the city around” key subway stations.<sup>5</sup> As noted more recently in a 1997 TCRP report:

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<sup>3</sup> Carroll L.V. Meeks, *The Railroad Station: An Architectural History* (New York: Dover, 1964) pp. iii-ix.

<sup>4</sup> Kevin Lynch, *The Image of the City* (Cambridge, MA: MIT Press, 1960) p. 47

<sup>5</sup> p. 74.

Because transit brings people to a location, it influences the use and activity of these spaces and, indeed, transit is instrumental in making them work efficiently. Transit can enhance destinations, helping to create community places by supporting existing spaces, as well as providing a place for new activities and services. A transit facility need not be just a place for transportation but can also become a setting for community interaction and a place that accommodates a diversity of people.<sup>6</sup>

It is in this vein that the Federal Transit Administration (FTA) launched its “Livable Communities” initiative, which flags the importance of transit and transit centers as a community resource that shapes both the spatial and social environment. As such, the placement of transit stations becomes a quality of life issue. It is also a real question of the allocation of valuable community resources.

New transit stations are looked to as part of initiatives to revitalize historic urban centers, as occurred with the 1984 opening of the Davis Square Red Line Station in Somerville, Massachusetts and is planned for the Río Piedras Station in San Juan. Recent work by advocates of so-called “transit-oriented development” (T.O.D.) or “transit villages,” such as Robert Cervero, Peter Calthorpe, and Anthony Downs, cite the importance of transit stations in spurring economic and physical development. In their analysis, the relationship between the transit station and the form of the built environment is characterized by a synergistic feedback effect—the transit station allows for the development of dense, pedestrian-oriented spaces, which in turn support the transit system via ridership. It is worth noting here that the focus of most of this literature is more on the impact of stations in fostering greenfield development than in the revitalization of existing neighborhoods. Here too, lies a key decision point, or tradeoff, in how stations are located: Which is prioritized, the support of existing centers or the economic development of potential new center?

Obviously, not all of these tradeoffs need to be absolute. A system need not have all short spacings or long spacings—it can have medium spacings, or short spacings near the Central Business District (CBD) and longer spacings further out. A system can seek locations that balance convenient access for pedestrians and automobiles. A system can seek both to connect historic urban centers and areas of projected growth. However, in making decisions about the spacing and location of stations, it is important to be aware of the tradeoffs involved and what ramifications these decisions will have. Following is a brief analysis of some of the implications and

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<sup>6</sup> Transit Cooperative Research Program, *The Role of Transit in Creating Livable Metropolitan Communities (TCRP Report 22)* (Washington, DC: TRB/National Academy Press, 1997) p. 22.

tradeoffs of choosing a policy that favors, first, short or long spacings, and second, locations that favor existing development patterns, or potential new development.

### **1.3.1. Station Spacings: Long v. Short**

The greater the number of stations along a line, the greater the total travel time along that line, as there is delay associated with each stop due to deceleration and dwell time at the station. Thus, longer spacings between stations corresponds to shorter in-vehicle travel times, although not necessarily shorter trip times for passengers. From the perspective of riders, an additional station represents a net degradation in level of service (LOS) if the added station is not at a destination they desire to travel to or from, but does require the train they are riding to make an added stop. In explaining their mathematical tradeoff analysis of the problem, Vukan Vuchic and Gordon Newell note that “each person who wants to use the transportation system would like to have a station immediately at the origin of his [or her] trip. Having boarded the train, the person would want the train to go to his [or her] destination (e.g. central terminus) without stopping.”<sup>7</sup> In contrast, the rider not yet on board, would generally welcome an additional station if that station would bring the train closer to where he or she will be starting or ending trips. As a result, the optimal “density of stations depends on the relation of the passengers along the line and those on the train.”<sup>8</sup>

Despite the best efforts of Vuchic and Newell, however, the solution to the question of whether station spacings should be long, short, or somewhere in the middle cannot be solved simply by appealing to a mathematical formula. Station spacing decisions will also be driven by what goals and vision decision makers have for the system. If the primary goal of a transit system is, for instance, to reduce congestion by offering a fast, competitive alternative to the automobile for suburbanites seeking access to the CBD, then the decision might be made to utilize longer intermediary spacings that may even bypass entire inner city neighborhoods. Similarly, since suburban riders are more likely to access stations by car, it is less critical that there be a station close to their point of origin; thus proponents of a suburban-focused system would have additional reason to champion longer spacings.

In general, there has been a trend in most of the newer United States transit systems built within the last 30 years, such as Washington, D.C’s Metro, San

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<sup>7</sup> Vukan R. Vuchic and Gordon F. Newell, *Rapid Transit Interstation Spacings for Minimum Travel Time*, in *Transportation Sciences*, Volume 2, Number 4, November, 1968, p. 319.



Francisco's BART, or Atlanta's MARTA, as well as some of the new extensions made to older systems, to design longer station spacings as a result of a greater focus on the suburban rider. In an extreme example, the MBTA's (Boston) Braintree extension of the Red Line, which opened in 1971, initially ran from Andrew Square in South Boston to Quincy—a distance of 4.33 miles—without stopping in the inner city neighborhood of Dorchester through which it traveled.<sup>9</sup> In a 1976 article reflective of the thinking when many of the above cited newer systems were built, Henry Quinby argues that: "time and inconvenience, as well as cost, are factors which may appropriately tend to help tip the balance toward fewer rather than more stations and terminals in planning toward a total urban circulation system."<sup>10</sup>

Proponents of shorter station spacings counter that devotees of long spacings are too focused on speeding the commutes of suburbanites working in the CBD, at the expense of inner city needs. They argue that this suburban focus neglects the urban function and charge of mass transportation. Shorter spacings, such as exist in older systems like New York, Boston, Philadelphia, or Chicago, are more democratic in that they are of use to a greater variety of people, and encourage greater urban densities and pedestrian access. Vuchic notes that "it is particularly important that the spacings not be so long that stations do not serve sections of the corridor through which the line goes...Thus very high investments are made, and potential customers are left on top of the line without ability to use it."<sup>11</sup> In certain cases, some have questioned whether long spacings characteristic of the Red Line Braintree extension, are motivated by subtle racism and classism, whereby the impetus is to separate suburban riders—more likely to be affluent and white, from inner city riders—more likely to be lower income people of color. The belief is that the suburbanites would view it as a deterrent to their using the system if they had to share it with inner city residents. Likewise, if station spacings and location favor passengers accessing the station by car, the result will be that lower income people, who are less likely to own cars, will be less likely to use the system.

Just as station spacing and placement may speak to questions of who is served and who is not served by a transit system, as well as the equity concerns associated

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<sup>8</sup> Pp. 335-337.

<sup>9</sup> The interstation distance was reduced to 3.55 miles after the JFK/U Mass Station was expanded to allow Braintree Trains to stop in December 1988.

<sup>10</sup> Henry Quinby, "Transit Station Planning and Design Methodology," in Lester Hoel and Ervin Roszner (eds.), *Transit Station Planning and Design: State of the Art* (Pittsburgh: Transportation Research Institute, Carnegie-Mellon University, 1976) p. 76.

<sup>11</sup> Personal correspondence, October 31, 1998.

with these questions, the issue of where stations are located also speaks to the vision, scope and perspective of that system. Often there is a tension between local neighborhood interests and regional interests. It may not, for instance, always be in the best interest of a region to locate a stop at every neighborhood along an alignment, even if community leaders in each of those individual neighborhoods demand a station. Most people would prefer to have a station close to their residence—yet if everyone got their way, the system would be too slow and thus of limited use. Quinby cautions that in circumstances where what he describes as an excessive number of stations have been planned, it is invariably “fueled by incompletely-analyzed notions of providing better service and access, and even by notions of community impact development overriding transit service needs.”<sup>12</sup> According to this reasoning, planning for too many stations is symptomatic of the failure or lack of regional perspective or vision. Depending on how it is spun, short spacings that provide neighborhoods with greater coverage can be attributed to a strong attention to local community needs or excessive parochialism.

Finally, one additional but important motivating factor in determining station spacing is cost. Simply put, the greater the number of stations built along a line, the more that line will cost to construct. Operations will also be less costly with fewer stations, both because there will be fewer stations to maintain and fewer vehicles needed to be in service, as each train will be able to travel the system in less time. It may also be argued, particularly by people responsible for operations, that with fewer stations, service will be more reliable as stations are a primary locus of unanticipated delays, due to stochastic passenger flows and behaviors, particularly regarding boardings and alightings. Of course the weakness of the latter argument is that if it were carried to its logical conclusion, the most reliable system would be one with no stations at all.

### **1.3.2. Station Location: T.O.D. v. D.O.T.**

A corollary issue to how long station spacings should be is the question of where stations should be located within the existing urban fabric. First, there is a tension between locating stations based on optimal station spacings, whereby all stations are spaced exactly  $x$  meters apart regardless of geography, or by conforming to the area’s major nodes and activity centers, wherever they may lie, with little regard to spacings. While the former represents a more efficient use of the technology from an operations

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<sup>12</sup> Quinby, p. 76.

perspective, the latter is more responsive to the environment within which the system operates. However, given that all systems operate within the context of an already seasoned physical environment, no serious transit system can ignore the existing urban fabric in locating stations.

Assuming, then, that station location will be driven at least in part by the location of key nodes, it must be determined what will be prioritized in making station location decisions. In this vein, which is given higher priority: locating stations at historic centers—that is, the station *serves* an existing node; or locating stations such that they serve as a catalysts for the development of new centers—that is, the station *serves as* the node around which a new center develops?

The latter employs principles of the now fashionable “transit oriented development,” or T.O.D. motif. Accordingly, transit stations are used as catalysts to spur new development, following a “build it and they will come” philosophy. The transit station is a vehicle for the forging of a new, more concentrated growth center and the station itself lies at the fulcrum of that new development. In contrast, the former is an example of what I will term D.O.T., or development oriented transit. Accordingly, transit stations reinforce already existing development patterns. A D.O.T. motivated station location policy has two primary advantages: (1) It serves a known commodity where people already live or need to go, and (2) In cases where historic centers have become distressed, transit stations can help revitalize those areas. In many cases this involves locating stations at nodes formed by previous transportation modes, such as streetcars. Such a policy can be a double edged sword: While it allows a new system or extension to take advantage of existing corridors and nodes, it runs the risk of inertia—that is, placing a new transit facility in a particular location merely because that is where transit facilities have always been place.

Ultimately, this too is a question of whom the system is being built for—the existing community or a future hoped for community? An investment in historic centers may be thought of as an investment in the existing community, whereas an investment in a potential development site may be thought of as an investment in a future community. Of course, even within these categories, divergent objectives may be possible. A station may be located at the center of a distressed inner city neighborhood in order to improve accessibility and quality of life for current residents. Or it may be located there in order to gentrify the neighborhood, whereby the station is used to stimulate economic forces that will price current residents out of the neighborhood, as they are replaced with

people who are more affluent. Here the question is whether the goal is to improve the neighborhood or the conditions of the people in that neighborhood.

Once the nodes to be serviced with stations are decided—be they existing centers or potential new development sites—it must be resolved how those nodes are to be served. Does the train stop directly at the node itself, or at the periphery of the area revolving around the node? If stations are located directly at the center, then they are more likely to be integrated into the neighborhood—to function and be visible as part of that neighborhood. Likewise, it is more likely to be convenient to pedestrians. On the other hand, locating stations in the middle of an urban center makes it less likely to be attractive for automobiles, as urban centers are less accessible for vehicular traffic and less supportive of parking. Thus, location of stations with respect to existing nodes shapes the character of the system—and the types of riders attracted. Using the example of Tren Urbano, both the Bayamón and Río Piedras Stations serve historic urban centers. Yet the physical relationship of the two stations to their respective centers is very different. The Bayamón Station lies at the periphery of the old center—four blocks from the central plaza, approaching the area via an elevated alignment along Route 2. As a result, while it certainly serves Bayamón's center, the station will not be the center. In contrast, the Río Piedras Station is situated directly underneath the central plaza, approaching the area in subway. Thus, while both may be said to serve and provide access to their respective historic centers, only the Río Piedras Station will be an active part of the node in which it will be situated.

As the San Juan example illustrates, part of the decisions as to how stations are to be situated with respect to the existing built environment may be influenced by the structural conditions of the station and alignment. An aerial station, like Bayamón, as well as a surface station, is more disruptive than a subway station, like Río Piedras. As a result, it may be decided to avoid degrading key nodes with overhead stations, choosing instead to locate the station on the periphery of the node. A subway, in contrast, causes almost no disruption (excluding construction) and thus the advantages of locating subway stations at the heart of an activity center are not outweighed by the negative physical effects of the station on the neighborhood.

Station location decisions are also limited if the alignment needs to be fixed along a certain right of way (ROW). If for financial reasons, a transit line must follow an abandoned railroad ROW or an area cleared for a highway, where land is more affordable, then it may not be possible to locate stations directly at the heart of urban

centers. The Shawmut Station of MBTA's Red Line is fairly remote from Codman Square, the nearest node to the area served, because it was built along a former railroad ROW. In other cases, the restrictions imposed by predetermined alignments can be overcome through creative station design. As an example, the MBTA Red Line rail alignment and Porter Square Station do not actually run under Porter Square. However, the station's headhouse is located at the center of Porter Square and a deep escalator is used to funnel passengers from the headhouse to the subway platform. As a result, the station enjoys greater visibility and, presumably patronage, than were its headhouse located less centrally. The headhouse location also allows the station to play a more active role in the day-to-day activity of the activity center.

#### **1.4. Uniqueness of Station Additions**

Although the theory and practice of station location and spacings is critical to this examination, the ultimate concern here is with the specific case of adding (relocating or eliminating) stations along alignments subsequent to initial planning of station locations. While clearly a subset of the theory of optimal station placement, it must also be recognized that station additions present their own unique issues and concerns. First of all, the added station must be transplanted into an existing network of stations. In many cases, the added station may be of a different type from existing stations.

Added stations, for instance, are more likely to have a pedestrian focus, because spacings between the added station and adjacent stations are likely to be shorter, and a later planned station is less likely to include significant parking facilities. Likewise, advocacy on behalf of the addition of a pedestrian oriented station will be more compelling than advocacy for an auto oriented station—auto users can more reasonably be expected to drive to the next station than pedestrians to walk to the next station.

Added stations are also more likely to come about as the result of advocacy for that station by a particular interest group. As a result, studying the arena in which stations are added can provide a glimpse into the role played by outside forces in bringing about key project changes. Through the station addition planning process, the impact of community groups can be evaluated.

Another important consideration that needs to be taken into account when making decisions regarding station additions concern construction impacts. In building a transit line, the community traversed will be subjected to construction-related disruption whether or not a station is built in that community. Even if a station may not

be merited in the present, if it is forecasted that a station should be added at a later date, it may be prudent to build the station concurrent with the construction of the alignment, so as not to burden the area with two construction periods. Also, it is more difficult from both an engineering and design perspective to add a station later on than to build it into the system at initial construction. As an example, the MBTA Charles Station on the Red Line (see photo below) was added in 1932 along an alignment that had been in service since 1912. The result is a fairly awkward station that seems squeezed into the built environment.



**Charles Station.** Note awkward catwalks connecting passengers to station.  
*Unless otherwise noted, all photos are taken by the author.*

### 1.5. Role of the Community

Given the significance of station location decisions at both the neighborhood and regional levels, a key question that will underlie this thesis concerns the role played by community and neighborhood groups in the planning of station locations, particularly with respect to added stations. Who participates? Who is able to give the request for an additional station enough credibility that it is added to the route's design? Who is the

public and who gives that public a voice? Is it a truly grassroots phenomenon or is it closely guarded by peak associations and gatekeepers? How is influence distributed amongst the various interest groups—including large institutions, businesses, residents, and professional elites—with varying degrees of power and resources? Is the public motivated by parochial, so-called “not in my backyard” or NIMBY concerns, or is it articulating a wider vision, such as a social justice agenda?

Another key question is where in the process does the public become involved? True public participation starts at the beginning planning stages—however, this model is rare, and often comes at the cost of requiring more time between initial planning and final implementation. More often, what is called public participation is nothing more than the presentation of two alternatives at a public hearing called by project planners. When stations are added so late in the planning process, as were UPR or Domenech in San Juan, the question is begged as to why it took so long to recognize the need. What changed since the submission of the FEIS that made those stations more compelling?

The process in which transit stations such the two in San Juan are added to existing plans is an example of what has been defined in democratic theory as “agenda building.”<sup>13</sup> That is, it is a process through which interest groups move their demands to the point where they are addressed by people possessing policy control. Democratic theory distinguishes between inside and outside initiated mobilization models. In the former case, the issues are first generated by those with policy board—usually within government—and then expanded outward to the general public. In the latter case, the issues arise at the public level and are expanded inward to the formal government agenda, gaining the attention of policy makers. While this distinction seems clear-cut at the abstract level, there is often considerable subterfuge involved—particularly in cases where an inside initiated issue is packaged as an outside initiated issue. This is what some policy makers have cynically termed the “illusion of inclusion.”

## **1.6. Thesis Structure**

In the next chapter, I will divide the issues affecting station spacing and location into three broad categories: (1) Operational efficiency, (2) Urban design and

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<sup>13</sup> See Roger Cobb, Jennie-Keith Ross, and Marc Howard Ross, “Agenda Building as a Comparative Political Process,” in *The American Political Science Review*, Vol. 70, No. 1, March, 1976, pp. 126-138; and Roger Cobb and Charles Elder, *Participation in American Politics: The Dynamics of Agenda Building* (Baltimore: Johns Hopkins University Press, 1972).

development, which includes both the issue of the effect of station location on city form and economic development; and finally (3) Social Policy and Politics, which includes the issues of transportation equity and political entrepreneurship. For each family of concerns, I will review the literature and analyze the issues prioritized, as well as the issues overlooked. Following this theoretical, Chapter 3 will examine practical examples of the very recent station additions (primarily UPR and Domenech) and relocations (primarily Río Piedras) in San Juan. Through interviews with stakeholders, and reviews of official documents, Chapter 3 will be a distillation of the motivating forces and historical context that led to the station changes and an elucidation of the processes in which they occurred. Since the final goal of any advocate for an additional station is not the processes, but the station itself, it is important to look at the actual results—that is, at existent stations that are the result of being added later in the process. In this vein, Chapter 4 will look at examples of three station additions (Davis, Stony Brook, and Uphams Corner) that were pushed to the fore in Boston during the 1970s and 80s. Since all three Boston stations, unlike the San Juan stations which are still under construction, have been in service since the mid 1980s, the viability and effectiveness of these added stations offer insight into potential benefits as well as pitfalls of a later addition process. Based on the San Juan and Boston case studies and their application to the literature, Chapter 5 will analyze the significance of what happened in both regions. Finally, Chapter 6 will offer recommendations for what to prioritize in making future station additions, both within the context of later phases of Tren Urbano and, more generally, other systems, both nationally and worldwide.



# Chapter 2

## Theory and Practice of Station Placement: Operations, Development & Social Policy

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### 2.1. Introduction: Scope of Vision

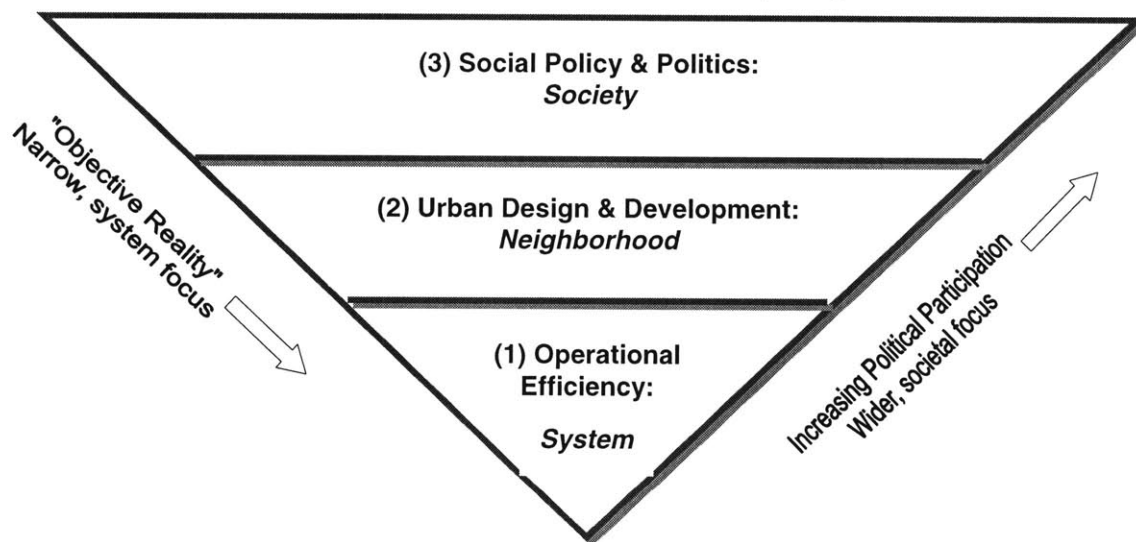
Given the high importance, as noted in Chapter 1, of the placement of transit stations both to the viability of the system and its impact on the neighborhoods and regions through which it travels, the literature focusing explicitly on the impacts of station spacing and location decisions is remarkably scant. The exceptions mostly fall into one of two categories: (1) the algorithmic tradeoff analyses undertaken within the genre of transportation demand modeling, and (2) new urbanism's championing of transit-oriented development (T.O.D.s) around transit stations. There is, however, a considerably greater wealth of literature that looks more generally at the regional or neighborhood impacts of transit as a whole. In these accounts, even where station location issues may not be specifically addressed, the literature can easily be applied to decisions of station location, at least for rail transit, because without stations any discussion of transit's impact on an area is immaterial. This literature dealing more implicitly with station placement expands the analysis of the impact of station location decisions to such crucial, yet often overlooked topics as transportation equity, the political dimensions underlying transit decisions, the role of transit in shaping city form, and the link between transit projects and economic development.

In reviewing the different perspectives taken with respect to station placement and spacing, I have divided the literature into the following three families of thought:

- (1) *Operational Efficiency*,
- (2) *Urban Design and Development*— which includes theoretical and practical analyses of the impacts of transit stations on city form and economic development, and
- (3) *Social Policy and Politics*—which includes theoretical and practical analyses of the impacts of transit stations on transportation equity and political entrepreneurship.

The three categories are not merely defined horizontally by area of interest. More importantly, they represent different specificities of focus and vision. (See **Figure 1** below)

**Figure 1**-Three Families of Literature on Station Spacing & Location



The first family represents the narrowest vision—its locus is restricted primarily to the system itself. It asks how we can run the abstract system as optimally as possible. The second family expands its vision out to the communities and neighborhoods through which it travels. It asks how we can best coordinate the transit system and its contextual environment so as to maximize the benefit of each. Finally, the third family has the broadest scope, looking at the larger societal implications of feedback loops between the system and larger issues such as social justice and political power.

Undeniably, this division is at some level artificial. In many cases, writings overlap two or even three categories. As it is one of the hypotheses of this thesis that a

multiplicity of perspectives needs to be taken into account when making station location decisions, it would be contradictory to stipulate unequivocally that any analysis of the issue must fall into one and only one of the three categories. Ultimately, the division is a convenient tool that helps to distill out the different, often conflicting approaches to the issues underlying station placement decisions—it does not represent a hard and fast delineation.

In examining each family of approaches to the subject, I will also pay special attention to the extent to which public input is included in the analysis. As this thesis is concerned with the process for adding stations, the role of community participation in that process and the degree, or range of degrees, to which community input is prioritized within the different analytic perspectives will help articulate each perspective.

## **2.2. Operational Efficiency**

The focus of this literature is on often-quantifiable operational impacts of station spacing and placement. Most of the research in this area comes from the field of transportation demand modeling and engineering. It takes the perspective of an operator and asks how a system can move riders from origin to destination most efficiently—taking the least time, running the fastest, maximizing ridership, and minimizing cost. Determining optimal interstation spacings, based primarily on lowest total costs, where costs include both operating costs to the provider and travel costs to the passengers, is generally the objective. A typical articulation of the context and concerns of this type of analysis is stated in a report released this year by the Regional Plan Association in New York:

More stations mean more people have easy walking access. But more stations also mean more stops that slow the service. Compromises will be necessary. To inform that process, riders who have their walking time reduced by how much should be compared with the number of riders who lose how much travel time with added stations. Consideration also must be given to the higher operating costs and greater fleet needs that are inevitable from slower service. Counterbalancing this is the potential station crowding if riders are concentrated at fewer stations.<sup>1</sup>

The focus is almost exclusively at the system level. Although some of the factors dealt with look beyond the system in its strictest sense, *e.g.* cost, or travel behavior, there is little concern with the relationship between the transit system and its contextual physical or social environment. Of all of the three families of literature dealing with

station placement, the work falling into this category is the one that most explicitly addresses the issue at hand and is most narrowly focused on the stations themselves. The advantage of this approach is that it takes an issue that is complex and reduces it to relatively simple, clear, and measurable formulation. Of course this reduction comes at the potential cost of over simplification or neglect of the greater role of stations within the context of the community and region.

### 2.2.1. Algorithmic Tradeoff Analysis

This genre of research traces its routes to algorithmic analyses conducted primarily in Germany between 1915 and 1930. In one of the earliest of these studies, an author identified only as G. develops a mathematical model that calculates optimal station spacings for streetcars as a function of total passenger travel time. The result, G. concludes, is that the ideal interstation spacing is exactly 637m.<sup>2</sup> Clearly, the limitations of this research go without saying. No streetcar or other transit line operates in a vacuum—a streetcar runs in an existing urban environment, linking key activity centers that are unlikely to all be spaced exactly 637m apart. The exactness of G.’s results is rigid to the point of ludicrousness and could have no real application to any real system. The inflexibility of G.’s method is in some ways a caricature of the failure of this type of analysis to properly appreciate the complexity and unquantifiability of many of the inputs and outputs of station placement decisions. Still, even if it is inappropriate to any real world transit line, G.’s work does reflect a method that has later been refined to yield less rigid results.

The classic modern example of tradeoff analysis in this area, and the progenitor of all contemporary work on optimum station spacings is Vuchic and Newell’s *Rapid Transit Interstation Spacings for Minimum Travel Time*.<sup>3</sup> Vuchic and Newell develop a model that determines optimal station spacing as that which brings about the minimum total travel times for all riders. Total travel time is calculated, classically, as a function of both access time to the stations and time on the line-haul facility. As already noted, the

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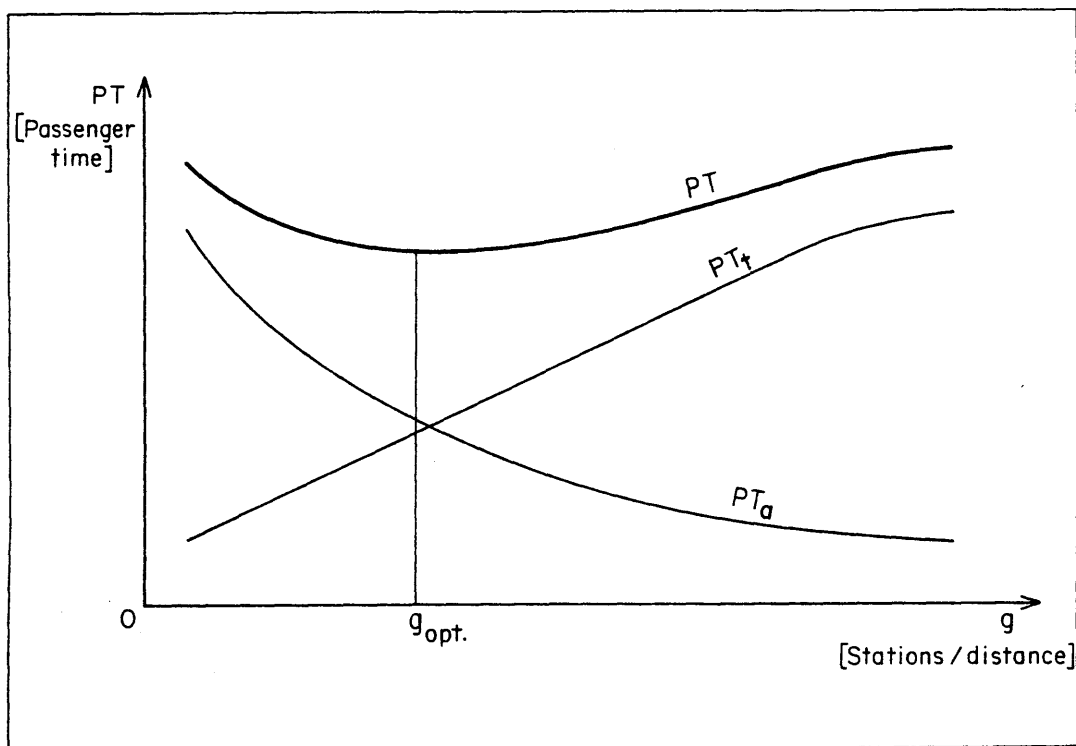
<sup>1</sup> Regional Plan Association, *Metrolink: New Transit for New York*, January, 1999, p. 20.

<sup>2</sup> G., “Ermittlung des günstigsten Haltestellenabstandes für Straßenbahnen, [Development of the optimal stopspacings for streetcars]” in *Elektrische Kraftbetriebe und Bahnen, Heft 1* (1915).

<sup>3</sup> Vukan R. Vuchic and Gordon F. Newell, *Rapid Transit Interstation Spacings for Minimum Travel Time*, in *Transportation Sciences*, Volume 2, Number 4, November, 1968, pp. 303-339. Note that Vuchic also authored a second, complementary piece, *Rapid Transit Interstation Spacings for Maximum Number of Passengers*, in *Transportation Sciences*, Volume 3, Number 3, August, 1969, pp. 214-232, which addresses the same basic question, although with a slightly different perspective.

former decreases as the number of stations increase, because a greater number of stations generally implies that more people have a shorter distance to travel in order to get to a station. The latter, on the other hand, increases, as a greater number of stations will delay the train. Total time is the sum of passenger access time, which is monotonically decreasing as the number of stations increase, and passenger travel time on the train, which is monotonically increasing as the number of stations increase.

**Figure 2**—Vuchic and Newell's graph of passenger travel time as a function of station density.



Source: Vukan R. Vuchic and Gordon F. Newell, *Rapid Transit Interstation Spacings for Minimum Travel Time*, in *Transportation Sciences*, Volume 2, Number 4, November, 1968, p. 320.

As depicted in the graph above, total passenger travel time is represented by a convex curve that has a unique minimum, which is the point of optimization.

Vuchic and Newell are critical of their predecessors for oversimplifying the inputs in their assumptions: "None of the models used by others, they note, "includes such elements as variable population density, different access speeds, parallel competitive facility, etc."<sup>4</sup> Nevertheless, their model too makes general assumptions that limit its

<sup>4</sup> Vuchic and Newell, 1968, p. 307.

applicability to real systems—as Vuchic himself notes, “the assumptions made for the model are of varying realistic value.”<sup>5</sup> For instance, the model assumes that all passengers travel to one station only—the CBD, which is not an accurate description of most urban rail systems—and certainly would be a particularly poor model for Tren Urbano in San Juan, given the city’s polycentric. Likewise, it assumes that all paths of access to the stations follow a grid form—a condition that does not apply to either San Juan or Boston. Perhaps most importantly, it assumes that demand for the service does not change with respect to the number of stations.

Extending beyond the domain of purely operational considerations, the model also neglects including social, political and economic impacts of locating a station in a given area. Factors such as equity or development potential have no bearing on the model. Neither does the simple assumption that riders ideally desire express service between their origin and destination fully account for passenger preferences. For instance, I may usually travel directly from my home to my work, but may occasionally like the flexibility of getting off at a station midway between the two to buy clothes, drop my kids off at daycare, go to the dentist, stop off at the bowling alley, drop my dog off to be groomed, or visit my uncle in prison. In such cases, it may be worth it to me to spend an extra thirty seconds on the train per day, if I also have the option of combining my trip with trips to these other destinations when it suits me.

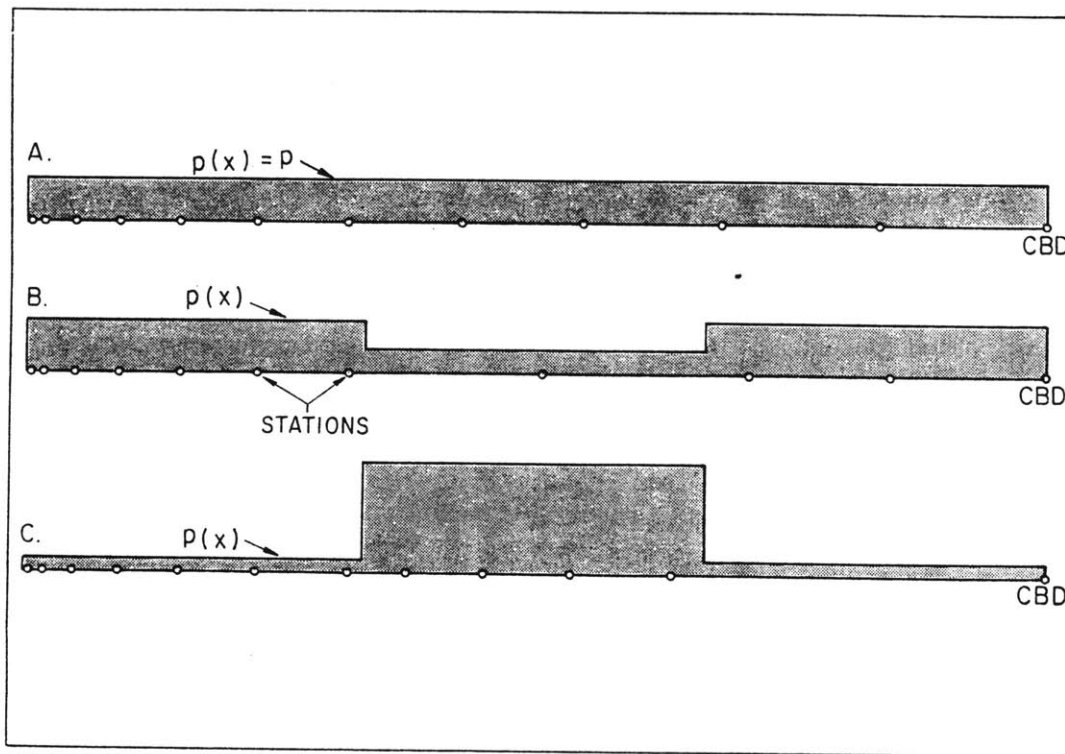
Curiously, although the model deals exclusively with rapid transit stations, it does not factor in the relative permanence of stations, or the potential for the system to expand. For example, one of the less intuitive results of Vuchic and Newell’s research is that their model seems to call for increasing station spacing as the train gets closer to the CBD, because as the train approaches the CBD there will an increasing number of riders already on board whose desire to travel directly to the CBD with as few stops as possible will outweigh the desires of riders not yet on board. As Vuchic observes, “if a typical commuter line is planned, the customary spacings increasing with the distance from the city may not be optimal. If the outlying served area has a relatively uniform population density, the contrary will be true: the aggregate travel time will be minimized with the spacings increasing toward the city.”<sup>6</sup>

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<sup>5</sup> Vuchic, 1969, p. 230.

<sup>6</sup> Vuchic, 1969, p. 231.

**Figure 3**—Vuchic and Newell's diagram of optimal station locations for different population distributions.



Source: Vukan R. Vuchic and Gordon F. Newell, *Rapid Transit Interstation Spacings for Minimum Travel Time*, in *Transportation Sciences*, Volume 2, Number 4, November, 1968, p. 336.

A shortcoming of this analysis is that it assumes the line will never be extended—after all, the short spacings at the end of the line will no longer be optimal if the line is extended beyond the initial terminal, because the extended route will presumably have more riders already on board, traveling through those stations. Likewise, the model does not have any provision for planning to build stations now, even if not warranted by current demographics, in anticipation of future growth around those stations.

Finally, another key consideration excluded from Vuchic and Newell's model is cost to the operator. As Vuchic explains, "the introduction of investment and operating cost of the system would carry the findings of this study one step further toward its direct applicability for actual planning. The major difficulty is finding a common denominator, i.e., an estimate of the cost equivalent of passenger time."<sup>7</sup>

This last limitation is addressed by V.F. Hurdle and S.C. Wirasinghe, who adapt Vuchic and Newell's analysis over ten years later, and add operating costs to the model.

<sup>7</sup> P. 230.

As they present it, their “objective, as opposed to [that] of Vuchic and Newell...will recognize that operating costs have to be minimized while providing a good level of service.”<sup>8</sup> The tradeoff, then, is between cost and LOS, for which travel time serves as an indicator. Thus, for Hurdle and Wirasinghe, total cost is a function of cost of access time, cost of line-haul travel time, and cost to operate. However, while they do account for the key consideration of operating cost in making station location decisions, they do not identify the common denominator that would allow the cost of travel time to be compared to the cost of operations.

Like Vuchic and Newell before them, Hurdle and Wirasinghe’s model is also limited by the simplifying nature of the assumptions supporting the model. Following Vuchic and Newell, they assume many to one travel demand, a gridded street system, and constant demand. Likewise, the model excludes social, political and economic factors. The value of both works is less in the actual outputs they are able to produce, but rather in the crude insights they give into the broad relationships between station spacings and other operational objectives. Unlike G.’s inflexible determination that 637m is always the optimal interstation spacing, these later approaches do allow some flexibility. As Hurdle and Wirasinghe note: “Clearly it is not necessary for a good design that every spacing be exactly optimal, but only that none be too much different than the optimal value—”<sup>9</sup>a small, but significant concession for engineers to make!

Other researchers have examined ideal stop spacings for non-rail transit modes—primarily bus routes.<sup>10</sup> Although bus stop spacing is in many ways analogous to rapid transit stop spacing, it differs from rapid transit in several key areas, based both on the different vehicle technologies and the permanence of the facility. While a rapid transit station requires a large investment in infrastructure, a bus stop need not be anything more than a yellow stripe on a curb and a sign (and in Boston, you are lucky to even get that). As a result, rapid transit station placement decisions must be made with the long term use of the station in mind, whereas bus stop placements can be made on

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<sup>8</sup> V.F. Hurdle and S.C. Wirasinghe, *Location of Rail Stations for Many to One Travel Demand and Several Feeder Modes*, in *Journal of Advanced Transport*. 1980. Spring 14(1) p. 30.

<sup>9</sup> P. 36.

<sup>10</sup> See L.J.S. Leslie, “Optimum Bus Stop Spacing: Part I & II” *Traffic Engineering Control*, 17 (October 1976), pp. 399-401/ 18 (November 1976), pp. 472-475; R.J. Vaughan and E.A. Cousins, “Optimum Location of Stops on a Bus Route,” in *Proceedings of the Seventh International Symposium on Transportation and Traffic Theory*, Tsuna Sasaka and Takeo Yamaoka, eds. (Kyoto: The Institute of Systems Science Research, 1977) pp. 697-716; S.C. Wirasinghe and Nadia Ghoneim, “Spacing of Bus-Stops for Many to Many Travel Demand,” in *Transportation*



a much shorter term basis, as they can be changed with minimal expense. In certain cases, the temporariness of bus stops may even be used to address seasonal variations in demand. As Wirasinghe and Ghoneim note, “there will likely be significant differences between summer and winter for example and one cannot see why additional bus-stops could not be placed during winter.”<sup>11</sup> Also, as buses are physically shorter than trains and require less distance to stop, the spacings between bus stops can and usually are considerably shorter than the spacings between rapid transit stations. Finally, since buses, unlike trains, only need to stop at a bus-stop if the demand is there, one can err on the side of closer spacings in planning stop placement more than one can with rail transit.

Nevertheless, some of the work on bus spacings have application to rail, at least in so far as they address deficiencies in the rail-oriented models. Unlike the work on rail station spacing, all of the bus spacing tradeoff analyses cited here assume many to many travel demand—that is, riders can have destinations that do not include the CBD, which is more representative of how rapid transit systems are used. Some of the works cited also attempt to address, with varying levels of success, the question of changes in demand with changing stop density. In Vaughn and Cousins’ model, potential riders will choose to walk if stop spacing becomes so great that the bus offers no time advantage. Leslie’s model also recalibrates demand as a function of stop spacing, however questionable assumptions lead him to draw counterintuitive conclusions. Leslie starts with the premise that the catchment area serving each stop is a circle with a radius of half the spacing between stops. As a consequence, shorter spacings will have smaller catchment areas (represented by circles with smaller radii) and thus a lower demand—a curious, as well as dubious conclusion to make regarding the functional relationship between stop spacing and demand.

### **2.2.2. Qualitative Analysis**

During the late 1960’s and 70’s, when many of the newer heavy rail systems in this country were being planned and designed, the issue of station spacing became pertinent. Many transportation professionals felt that, in contrast to older systems in New York, Boston, Philadelphia or Chicago, the newer systems where being built at a

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*Sciences*, 15, August, 1981, pp. 210-221; and Peter Furth and Adam Rahbee, “Optimal Bus Stop Location: A Discrete Modeling Approach,” unpublished manuscript.

<sup>11</sup> Wirasinghe and Ghoneim, p. 216.

time when the private auto was the preeminent mode of travel. To be competitive, it was argued that transit station spacings needed to be as long as possible, in order to speed line-haul travel, and plan for a significant percentage of riders accessing stations by car. Of course the obvious tradeoff to this approach is that the newer stations would be less accessible to pedestrians—both because the increased spacings would require a greater average walking distance to the facilities and the facilities would be built to accommodate auto access over pedestrian access.

As noted in 1976 by Frank Misek, coming from the perspective of a provider—in this case, the Chicago Transit Authority: “As expressways are added, the alternative non-stop automobile trip tends to become more attractive than a many-stop rapid transit journey. The balance point between convenient access through more stations and the attractiveness of a truly rapid transit achieved through less stations is constantly tending toward the goal of less stations and faster speed.”<sup>12</sup> Simply put, fewer stops feel more attractive to a customer used to direct auto travel via limited access highways.

Henry Quinby, coming from the perspective of a private planner and designer at Parsons, Brinkerhoff, Quade and Douglas, notes as well that “the time involved in...stopping and waiting in stations...appears to be perceived by transit patrons as more burdensome or irritation than their moving line-haul travel times.”<sup>13</sup> The appeal in these types of analysis is less to objective measures of efficiency and more to human psychology—what feels fast and efficient to riders who need to be convinced to give up their cars. Interestingly, critics have since come to reassess the assumption made by the planners of the systems built during the 1960s and 70s. According to Peter Hall, BART’s long spacings were the result of the system’s planners erroneously “thought the line-haul speed was far more important to the commuter than the feeder time; but they had no direct evidence of this, and they were clearly wrong. Subsequent studies, the world over, have proved conclusively that people place a higher value on waiting and transfer time than on time in motion.”<sup>14</sup>

Still, although dealing with seemingly less objective measures than those used in Vuchic and Newell’s tradeoff analysis, I argue that the approach is still one of looking at

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<sup>12</sup> Frank Misek, “Station Planning and Design: Where to Start,” in Lester Hoel and Ervin Roszner (eds.), *Transit Station Planning and Design: State of the Art* (Pittsburgh: Transportation Research Institute, Carnegie-Mellon University, 1976) p.102.

<sup>13</sup> Henry Quinby, “Transit Station Planning and Design Methodology,” in Lester Hoel and Ervin Roszner (eds.), *Transit Station Planning and Design: State of the Art* (Pittsburgh: Transportation Research Institute, Carnegie-Mellon University, 1976) p. 76.

the system level and weighing different station spacings based on a key objective, be it minimizing travel time, maximizing vehicle, or maximizing so-called “choice” riders.

Another consideration facing the planning and design of the newer systems is the context of diminishing public resources. It is in this vein that Quinby adds the issue of cost to Mises’s concern for transit’s competitiveness with the private auto: “Since most kinds of transit stations are, relatively or absolutely, quite expensive and too often vastly expensive in terms of both capital and operating costs, if there were a prevailing tendency in a given project to minimize them, this would usually be a healthy sign in system planning.”<sup>15</sup> According to Quinby, short station spacings are simply not cost-effective, and generally could not survive a cost-benefit analysis based on the high capital and operating costs associated with additional stations.

### **2.2.3. Is There a Role for the Public?**

As this is the most technical of the three families, it can be questioned whether there is any role for public participation in purely operational analyses. The rap on transit operations professionals is that the community is something they simply rather not be bothered with. Riders are simply things that interfere with the smooth operations of the system. There is a wonderful line from John Godey’s *The Taking of Pelham 1-2-3* that beautifully captures as well as caricatures the pure operations perspective: frustrated with what he views as an excessive concern for the lives of passengers held hostage aboard a hijacked New York City subway train at the cost of a severe disruption of service, the desk trainmaster at the Transit Authority’s operational control center yells “Screw the passengers, I have a railroad to run!”<sup>16</sup>

Unfortunately, in striving for efficient operations, it is easy to forget that efficient operations involves not just the movement of trains, but the movement of people—both within the trains and to the trains. As a consequence, the goal of effectively running the railroad can become divorced from goal of accommodating the people riding the railroad. This characterization notwithstanding, it should not be concluded that community participation and a primary concern for the operational efficiency of a transit system should be mutually exclusive. Some writers have even noted the importance of involving the community in the planning and design process in order to maximize operational

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<sup>14</sup> Peter Hall, *Great Planning Disasters* (Berkeley: University of California Press, 1980) pp. 112-113.

<sup>15</sup> p. 76.

<sup>16</sup> John Godey, *The Taking of Pelham 1-2-3* (New York: Dell Publishing Co., 1973) p. 140.

efficiency. As Quinby notes, “transit stations must be carefully located to provide the most efficient service to nighttime and daytime populations...Citizen and community participation is thus vital to the station development process.”<sup>17</sup> Accordingly, if efficient operations is taken to include the efficient movement of people, not vehicles, then those people might be able to provide constructive input into how they might best be moved. In short, if riders are given an opportunity to participate in a system’s planning process, it should yield an ultimately smoother, more efficient system.

## **2.3. Urban Design and Development**

The urban design and development response to the operation efficiency approach to station placement is to broaden the context within which the station is viewed. The area of interest extends beyond the system level to the level of the full geographical context of the system. Accordingly, the station is more than an access or transfer point—it is part of the community. As Roberta Brandes Grantz writes, “transportation officials think only about getting people on and off a transit mode. The idea of a transit stop as a real place, a desirable destination on its own, a center of community activity as opposed to just a ‘stop’, is alien.”<sup>18</sup> The urban design and development literature is both descriptive—that is, it accounts for how transit shapes the physical and economic spaces of cities, and normative—that is, it proposes how transit *should* be used to shape the physical and economic spaces of cities. The former appeals to historical analysis to make its arguments; the later to quality of life issues.

### **2.3.1. Historical Impact of Transit on City Form**

That there is a close relationship between transportation and urban form is well documented. As Joel Garreau summarizes:

Cities are always created around whatever the state-of-the-art transportation device is at the time. If the state of the art is sandal leather and donkeys, you get Jerusalem. Even when wheeled vehicles replaced pack animals as the freight technology of choice fifteen centuries after Jesus, Jerusalem remained shaped by its transportation origins.

When the state of the art is carriages and oceangoing sail, you get the compact, water-dominated East Coast cities of Paul Revere’s Boston and George Washington’s Alexandria. Or Amsterdam and Antwerp.

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<sup>17</sup> Quinby, p. 73.

<sup>18</sup> Roberta Brandes Gratz, *Cities Back from the Edge: New Life for Downtown* (New York: John Wiley & Sons, Inc., 1998) p. 117.

Canal barge and steamship give you Boss Tweed's New York. Intraurban (the EI) and transcontinental rail (the stockyards) yield Bugsy Moran's Chicago. The automobile results in Raymond Chandler's Los Angeles.

When, in 1958, you threw in the jet passenger plane, you got more Los Angeles in strange places—Atlanta, Denver, Houston, Dallas, and Phoenix.<sup>19</sup>

Looking back over a century, many historians credit the electric streetcar with transforming the spatial layout of American cities at the end of the nineteenth century. Peter Muller, for example, writes that “the invention of the electric traction motor...surely must rank among the most important [inventions] in American history.”<sup>20</sup> The electric streetcar facilitated the swift development beyond the limits of the old walking city. The result, Muller observes, is the expansion of “the emerging metropolis into a decidedly star-shaped entity. This morphological pattern was produced by radial trolley corridors extending several miles beyond the compact city's limits.”<sup>21</sup> According to Muller, everything from the street layout, to the segregation of land uses was formed by the new transit technology. “The typical streetcar suburb of the turn of the century was a continuous corridor whose backbone was the road carrying the trolley tracks (usually lined with stores and other local commercial facilities), from which gridded residential streets fanned out for several blocks on both sides of the tracks.”<sup>22</sup>

The very term *Streetcar Suburb*, which was first coined by Sam Bass Warner in his now classic work of the same title, itself reflects the historical importance of transit in shaping cities. In deference to the inextricable importance of the new mode of transportation in shaping a new urban realm, Warner includes the word ‘streetcar’ in his name for the new city form. Warner's book *Streetcar Suburbs* is an historical analysis of the development of three Boston residential neighborhoods (Dorchester, Roxbury, and West Roxbury) that emerged along the routes of some of the country's first electric trolley lines during the last two decades of the nineteenth century. As he chronicles, the new streetcar lines pushed development outwards from the central city, but concentrated it along the rail corridors that the trolleys followed. “In the late 1880's and 1890's,” Warner writes, “the electrification of the street railways brought convenient transportation

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<sup>19</sup> Joel Garreau, *Edge City: Life on the New Frontier* (New York: Anchor Books, 1991) p. 32.

<sup>20</sup> Peter Muller, “Transportation and Urban Form: Stages in the Spatial Evolution of the American Metropolis,” in Susan Hanson (ed.), *The Geography of Urban Transportation* (New York: The Guilford Press, 1995) p. 33.

<sup>21</sup> P. 34.

<sup>22</sup> P. 34.

to at least the range of six miles from City Hall. The rate of building and settlement in this period became so rapid that the whole scale and plan of Greater Boston was entirely made over.”<sup>23</sup> With unprecedented rapidity, the old walking city was completely transformed from “a dense merchant city clustered around an ocean port” to a “sprawling industrial metropolis—”<sup>24</sup> and transit was at the heart of that transformation.

Although Warner first used the term “streetcar suburb” only with respect to the development of Boston suburbs at the end of the nineteenth century, it has since been deployed by other historians to describe similar patterns in other cities around the country. Relevant to this study, Aníbal Sepúlveda applies the same historical investigation to the development of San Juan. Like Boston, San Juan grew around new streetcar and railroad corridors. As Sepúlveda notes, what is now the tourist district of Condado was the first streetcar suburb in Puerto Rico.<sup>25</sup> One interesting cultural artifact testifying to the effect of transit stops on city form in San Juan is that although it has been several decades since streetcars traversed the Puerto Rican landscape, residents still identify key intersections by the stop numbers of the former streetcar lines—e.g. *Parada 18* (Stop 18) in Santurce. As evidenced by the current bus map displayed on the next page, the named “*Parada 18*” has long outlived the actual streetcar stop. This lingering deference to the influence of old trolley lines in shaping city form recalls the important previous modes of transit have had in shaping the current layout of the region.

That the streetcar played a significant role in shaping city form at the end of the nineteenth century is generally beyond dispute. However, there is less consensus regarding the exact size or measure of that impact. As David Harrison Jr. stipulates, “it is not possible to quantify the impact that changes in the size of the transit system would have had on the density or the pace of residential development.”<sup>26</sup> Furthermore, the hypothesis of an unqualified cause and effect relationship between the innovation of the new transit mode and the expansion of the city is the result of speculation, even if it is convincing and well reasoned speculation. As Harrison points out: “It is possible that the level of street railway service is a proxy for other factors, such as per capita income,

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<sup>23</sup> Sam Bass Warner, *Streetcar Suburbs: The Process of Growth in Boston (1870-1900)* (Cambridge: Harvard University Press, 1962), p.22.

<sup>24</sup> p. 153.

<sup>25</sup> Aníbal Sepúlveda Rivera, *San Juan: Historia ilustrada de su desarrollo urbano, 1508-1898* (San Juan: Carimar, 1989).

<sup>26</sup> David Harrison, Jr., *The Impact of Transit Systems on Land Use Patterns in the Pre-Automobile Era*, (Cambridge, MA: Harvard University Department of City and Regional Planning, December, 1978) Urban Planning Policy Analysis and Administration Discussion Paper D78-21, p. 11.





which provide the more basic explanation for the lower density patterns observed in some urban areas in the pre-automobile era.”<sup>27</sup>

### **2.3.2. T.O.D. (Transit Oriented Development)**

The story summarized above of how cities grew around and with trolley and railroad lines at the turn of the century is often the starting place for more recent work by proponents of so-called “transit-oriented development” or “transit villages.” In *Transit Villages in the 21<sup>st</sup> Century*, Michael Bernick and Robert Cervero begin by looking back to the 19<sup>th</sup> century: “Though forgotten for much of the 20<sup>th</sup> century, America’s legacy of railroad suburbs has been ‘rediscovered’ in recent decades. Urban historians, social commentators, and reform-minded architects are finding in those early transit villages values lost in the contemporary 20<sup>th</sup> century American community.”<sup>28</sup> “The transit village model is not new, and in fact it was successfully put into practice a good century ago in a number of U.S. cities.”<sup>29</sup>

Both historically and in the present, transit villages are characterized by what Bernick and Cervero refer to as the “3-D’s” of density, diversity, and design—a relatively high concentration of people, living within a mixed land use environment, designed to encourage and facilitate pedestrian activity. It is important to our study here that, while most of the earlier accounts of the impacts of transit on city form during the turn of the century focus more on the transit lines rather than the stations themselves, champions of the new incarnations of the old streetcar suburbs give stations a central role—literally. “The centerpiece of the transit village,” write Bernick and Cervero, “is the transit station itself and the civic and public spaces that surround it. The transit station is what connects village residents and workers to the rest of the region.”<sup>30</sup> Likewise, they describe the transit village in terms of the station: “transit villages share many of the attributes of traditional communities, though their unique and distinguishing feature is that the train station and its immediate surroundings function as the focal point of the community.”<sup>31</sup> Finally, “the train station is the village’s gateway.”<sup>32</sup>

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<sup>27</sup> P. 18.

<sup>28</sup> Michael Bernick and Robert Cervero, *Transit Villages in the 21<sup>st</sup> Century* (New York: McGraw-Hill, 1997) p. 15.

<sup>29</sup> P. 3.

<sup>30</sup> P. 5.

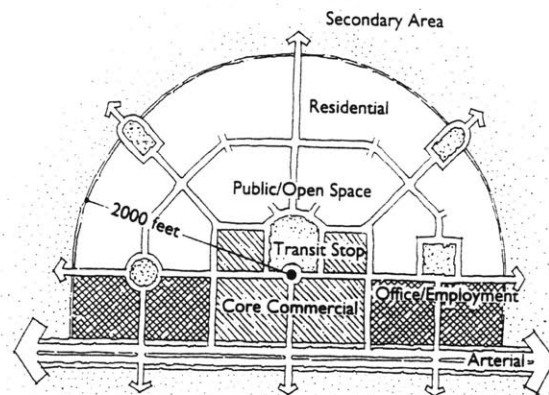
<sup>31</sup> P. 6.

<sup>32</sup> P. 7.



Peter Calthorpe—perhaps the most widely-known advocate of T.O.D.s, offers a cookbook-type guide providing step by step instructions for creating what he views as the ideal community. In doing so, he flags the importance and centrality of transit stations, noting that “the transit station would be in the middle of a T.O.D., providing the shortest walking distance for all users.”<sup>33</sup> In fact, for Calthorpe, these new communities

**Figure 4**—Calthorpe’s T.O.D.



Source: Peter Calthorpe, *The Next American Metropolis: Ecology, Community and the American Dream* (New York: Princeton Architectural Press, 1993) p. 56.

are defined by their proximity to transit as he defines it—“a Transit-Oriented Development (TOD) is a mixed-use community within an average 2,000-foot walking distance of a transit stop.”<sup>34</sup> Carried to its fullest extension, Calthorpe envisions many such T.O.D.s linked together by a network of transit with a stop in the middle of each.

While Calthorpe describes his T.O.D. as “the intersection between an ideal and real world,”<sup>35</sup> many criticize him for over prescribing to the point of not offering a practicable model. In the few cases where Calthorpe’s approach has been used, his vision has not been fully realized. For example, the much celebrated Laguna West in Sacramento, California calls itself a T.O.D., even though it lacks the T., as it has yet to enjoy a light rail stop within its borders.

<sup>33</sup> Peter Calthorpe, *The Next American Metropolis: Ecology, Community and the American Dream* (New York: Princeton Architectural Press, 1993) p. 105.

<sup>34</sup> P. 56

<sup>35</sup> p.12.

### **2.3.3. D.O.T. (Development Oriented Transit)**

It is also important to note that Calthorpe, like most T.O.D. advocates, is more concerned with greenfield, new suburban development than the development of existing urban centers. As the acronym indicates, the transit stations are a tool for development that has not yet occurred in currently undeveloped areas, which will be oriented around the station. This contrasts with a divergent strategic stance which, as noted in the previous chapter, I term “Development-Oriented Transit,” or D.O.T. Using a D.O.T. model, transit is used as a tool for revitalizing existing urban centers and developments, not in establishing new centers in the cornfields. There are several examples of celebrated D.O.T.-type projects, such as the Fruitvale BART Station in Oakland, California, occurring in existing urban areas selling themselves as examples of T.O.D. But it is important to distinguish these from Calthorpe’s project, for in these cases, the impetus is the revival of already developed areas, albeit with some new urban design amenities, not on the development of previously undeveloped areas.

Advocates of D.O.T. note that at a time when the private auto has given suburban areas a competitive advantage with respect to the inner city, transit can help reinforce the unique benefits of urban settings—transit, unlike the private auto, can well integrate into a densely built and populated spatial structure. Using a decidedly D.O.T. approach, Roberta Brandes Gratz identifies transit as critical to bringing cities and downtown areas “back from the edge.” For Gratz the focus is very much on the role of transit in revitalizing existing urban centers—on rebuilding, not building via transit. Accordingly, “transit services are reviving in ingenious and experimental ways, bringing new shoppers and pedestrians to their downtowns, and in the process, rebuilding place.”<sup>36</sup>

The D.O.T. approach permeates the Federal Transit Administration’s “Livable Communities Initiative.” The focus of the initiative is on existing communities, giving them a greater sense of place—that is making them more “livable.” The difficulty inherent in such an approach is that livability is an abstract term describing some measure of quality of life. As such, it is both difficult to define and even more difficult to identify agreed upon measures of livability—after all, what is livable for me may not be for you. Often, livability is defined in the negative, as the absence of a list of unlivable qualities. As noted in the Transit Cooperative Research Program’s (TCRP) report on *The Role of Transit in Creating Livable Metropolitan Areas*:

People express their strongest concerns about the livability of their communities when referring to problems encountered on a daily basis. For example, they talk about difficulty crossing streets and feeling threatened by automobile traffic. They grieve about the replacement of distinctive local structures with sterile characterless architecture. They complain about a lack of parks to sit or stroll in and the dearth of scenic vistas. They lament the disappearance of centers where people once came together and took part in activities such as shopping, mailing letters, eating out, going to the theater, catching a train or bus, visiting the library, or meeting friends. These concerns reflect an underlying sense of isolation and erosion of community life.<sup>37</sup>

As with T.O.D.s, transit stations are viewed as central, both literally and figuratively to the establishment of livable communities. As the TCRP report notes, “train stations can become centers of community life, be welcoming gateways, and provide information about local attractions.”<sup>38</sup> In this vein, a station is viewed as “more than just a place for transportation,” it is vital to the community and the starting point of its revival. As Roberta Brandes Gratz puts it, “stations must be thought of as extensions of a community. Stations and town must connect.”<sup>39</sup>

The focus of the Livable Communities Initiative is on using transit to address often overlooked quality of life issues affecting existing urban neighborhoods. Nevertheless, the vision articulated in the initiative can be faulted for espousing decidedly middle class values, such as eating out and going to the theater, over basic subsistence needs, such as daycare, grocery shopping, or laundry. As a consequence, it is not always clear that the ultimate goal is not gentrification.

An interesting trend within the D.O.T. movement is the restoration of previously abandoned trolley lines. Citing examples in Denver, San Francisco and Philadelphia, Jane Holtz Kay observes that “the historic corridors for the ubiquitous trolleys of times past remain more than a memory of pre-World War II cities. They are also an endoskeleton to unearth new-old lines.”<sup>40</sup> The advantage of utilizing historic corridors and station locations are many: they are a known commodity, have densities that are appropriate to transit, and, having been built along an old trolley line, tend to be spatially well suited to transit. The limitation of the trolley line restorations Holtz Kay describes is

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<sup>36</sup> Roberta Brandes Gratz, p. 122.

<sup>37</sup> Transit Cooperative Research Program's (TCRP) report on *The Role of Transit in Creating Livable Metropolitan Areas*, Report 22 (Washington, DC: National Academy Press, 1997) p. 5.

<sup>38</sup> P. 22.

<sup>39</sup> Roberta Brandes Gratz, p. 116.

<sup>40</sup> Jane Holtz Kay, *Asphalt Nation: How the Automobile Took Over America and How We Can Take it Back* (Berkeley: University of California Press, 1997) p. 310.

that they are often restricted in their marketing and appeal only to tourists. As Roberta Brades Gratz, who generally champions the revival of historic trolley lines, cautions:

The re-emergence of light rail systems in downtowns today does not automatically signal the strengthening of a downtown in the reconnecting, reintegrating, reweaving, and renewing sense. In Cleveland, for example, the new light rail connects primarily tourist sites... This expensive new light rail line was supposed to serve downtown office workers, as well as tourists and suburban visitors. Not unpredictably, it does not work as promised.<sup>41</sup>

Where the reuse of historic lines fail is where they rely too much on being quaint or cute, often serving as museum pieces displaying vintage transit, failing to reap the advantages of historic corridors and stations as identified above.

#### **2.3.4. Economic Development**

Although most of the writings in the design and development family discussed up until now focus on the spatial connection between transit stations and the communities they serve, there is another set of work within this category that deploys a more economic focus. While there is considerable debate as to whether new rail investments are a necessary or sufficient condition for economic development, there is general agreement that access is one key ingredient to economic growth. According to classic location theory, a transit link, made possible by the placement of a station in an area, makes that area accessible to shoppers, customers, or employees. In theory this accessibility will make that area competitive commercially, as businesses are more likely to locate in the area and thrive economically. As David Banister and Nathaniel Lichfield note, “the attractiveness of particular locations depends in part on the relative accessibility, and this in turn depends on the quality and quantity of the transport infrastructure.”<sup>42</sup> As the points of access to the transit system, stations are the loci of transport-based economic development. Again quoting Banister and Lichfield: “Changes in accessibility resulting from new rail infrastructure should encourage new development around stations.”<sup>43</sup> Recent work challenging the greater regional benefit of transportation infrastructure projects flag an even greater importance, economically, to

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<sup>41</sup> Roberta Brandes Gratz, p. 125.

<sup>42</sup> David Banister and Nathaniel Lichfield, *Key Issues in Transport and Urban Development* in *Transport and Urban Development*, David Banister (ed.) (London: E & FN Spon, 1995) p. 1.

<sup>43</sup> P. 3.

how stations are located. According to Peter Hall and David Banister, “impacts are highly localized around the new facility (e.g. rail station or airport).”<sup>44</sup>

In a TCRP report on *Transit and Urban Form*, the following potential economic benefits of the presence of transit stations are noted: When planned appropriately, stations can increase the value of both residential and commercial property, as well as the intensity and speed of development.<sup>45</sup> It is, however, critical to acknowledge the importance of the caveat regarding appropriate planning. While the catalytic impact of transit stations on economic development is of great potential, it is important to view this potential in context and not to assume that economic development, particularly in undeveloped areas, will happen automatically. Empirical examinations of economic development claims and the subsequent realities of more recent transit investments in the United States such as BART (San Francisco Bay Area), and MARTA (Atlanta) generally has shown that transit and transit stations should not be expected to provide a magic infusion of economic health by themselves. As Landis and Cervero observe: “Past work suggests that rail transit investments do not stimulate economic growth; rather they only help guide where already committed growth takes place.”<sup>46</sup> Accordingly, they argue that in addition to the transit investment itself, economic development also depends on “complementary zoning and taxation policies,...a healthy and buoyant regional economy, the availability of land that is easily assembled and developed, a hospitable physical setting..., and the existence of some automobile restraints (such as parking restrictions).”<sup>47</sup>

Economic development is also limited in cases where transit has been built in areas less desirable for development, such along abandoned freight railway right-of-ways, right-of-ways cleared for highways that were never built, within the medians of existing freeways, or when the transit link relies heavily on park-and-ride access. A final caution regarding economic development potential is that the benefits must be weighed against the costs of that development. If, for instance, the result is gentrification of a previously cohesive, working class neighborhood, such that its residents are no longer

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<sup>44</sup> Peter Hall and David Banister, *Summary and Conclusions in Transport and Urban Development*, David Banister (ed.) (London: E & FN Spon, 1995) p. 279.

<sup>45</sup> TCRP, *Transit and Urban Report 16* (Washington, DC: National Academy Press, 1996) pp. 26-31.

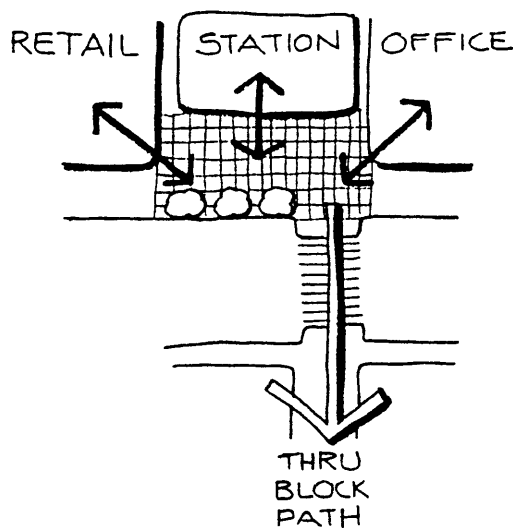
<sup>46</sup> Robert Cervero and John Landis, *Development Impacts of Urban Transport: A US Perspective*, in *Transport and Urban Development*, David Banister (ed.) (London: E & FN Spon, 1995) pp. 138-9.

<sup>47</sup> p. 138.

able to afford their own neighborhood and are forced to leave, then the value of the resulting economic development needs to be questioned.

Within this family of literature are a subset of writings that set guidelines for how to plan and design transit stations so as to optimize development. Specifically, this literature tends to be concerned with opportunities for so-called “joint development,” between the private sector and the transit property, such that the station itself is part of the new development in the area. As reported in the U.S. Department of Transportation’s *Market Based Transit Facility Design*: “The large volume of people using the rail station provide a large market for retail activities, office complexes and/or hotels...the results can be mutually beneficial with successful private development supported by transit activity and increased transit system usage related to a more intensive land use activity.”<sup>48</sup> The goal is to harness the demand for transit to support coordinated business and commercial activity around stations, which in turn increases demand for transit.

**Figure 5**—General joint development scheme



Source: U.S. Department of Transportation, *Market Based Transit Facility Design*, Washington, D.C., February, 1989, p. 42.

<sup>48</sup> U.S. Department of Transportation, *Market Based Transit Facility Design*, Washington, D.C., February, 1989, p. 34.

## 2.4. Social Policy and Politics

Literature in this family expands its focus out further still, from the interrelationship between the transit system and the neighborhood to the interrelationship between the transit system and the larger society. In most cases, this literature does not explicitly address the impacts of stations themselves—but given the already discussed importance of stations as gateways to the entire system, an implied application to stations can be inferred. Within this category, two perspectives predominate:

- (1) An examination of transportation equity: how things *should* be, and
- (2) An examination of political entrepreneurship: how things *are*.

### 2.4.1. Transportation Equity

Defining what constitutes transportation equity is not as straightforward as it may first seem. Toward this end, David Hodge makes some useful distinctions in *My Fair Share: Equity Issues in Urban Transportation*. First, he distinguishes between *Financing Equity* and *Benefit Equity*, where the former concerns who pays (*i.e.* transit riders, property owners, gasoline consumers, etc.), while the latter concerns how resources are allocated. Since this research is interested in stations—which is an allocated resource—the focus here will be on the this category. Within the category of Benefit Equity, Hodge distinguishes between *fiscal equity* and *service equity*. Fiscal equity concerns inputs—how much money is paid out to whom, generally measured in operating subsidies or capital expenditures. Service equity, on the other hand, concerns outputs—that is, is what everyone is getting distributed evenly, regardless of differing costs? The answer will of course depend on what is counted as the output. For instance, if bus vehicle miles is the output, one will draw very different conclusions than if mobility is the output, because in the latter case, people without access to a private auto need to be provided for with equivalent public transit service.<sup>49</sup>

Alan Altshuler proposes an additional measure of benefit equity, which he terms *Distribution According to Need*, defining it as: “To each a share of public expenditure or service based on need as government has chosen to define it, preferably drawn (by progressive taxation) predominantly from those in least financial need.”<sup>50</sup> Accordingly,

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<sup>49</sup> David Hodge, “My Fair Share: Equity Issues in Urban Transportation,” in Susan Hanson (ed.), *The Geography of Urban Transportation* (New York: The Guilford Press, 1995)

<sup>50</sup> Alan Altshuler, *The Urban Transportation System: Policies and Policy Innovation* (Cambridge, MA: MIT Press, 1979) p. 254.

equity is measured not by an equality of funding, or of service. Rather, equity is defined entirely by need, which in the absence of a utopian society, can be assumed to be unequal. As a result, equitable distribution will be unequal, because need will be unequal.

Quality transit is particularly critical to lower income communities, as residents, who often do not own private autos, have no other means of accessing employment, education or other services. As a consequence, a policy of maximizing transportation equity might suggest focusing transportation resources to areas of greatest need. This issue is particularly relevant in a San Juan context—as stated in the *Final Environmental Impact Statement*, in 1990 “23.3 percent of households in the area’s five largest municipalities did not own an automobile due to income constraints; these households accounted for 64.5 percent of all SJMA [San Juan Metropolitan Area] public transit trips.”<sup>51</sup>

As Robert Bullard and Glenn Johnson note in *Just Transportation*, transportation equity is not simply a matter of allocating transit resources, but balancing an already imbalanced system. Historically, as marked by cases such as *Plessy v. Ferguson*, regarding segregated seating on railroad cars in Louisiana, or Rosa Parks’ inspired refusal to submit to racially segregated levels of service on board a bus in Montgomery, Alabama, transportation investments have not always been allocated fairly with respect to race or class. As Bullard, Johnson and others contend, more subtle forms of racial or class preference has motivated the allocation of transportation investments in Washington, DC, Los Angeles, Chicago, New York and elsewhere. Quoting Bullard: “Transportation decision-making—whether at the federal, region, state, or local level—often mirrors the power arrangements of the dominant society and its institutions.”<sup>52</sup> In this vein, it needs to be asked whether the station location needs of lower income communities are addressed to the same degree as that of more affluent or powerful communities or institutions, and, if not, what procedures might be instituted to redress this imbalance?

Writers such as Anthony Downs are concerned with the equitable allocation of externalities such as traffic congestion and transport induced environmental degradation.

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<sup>51</sup> U.S. Department of Transportation/Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority, *Final Environmental Impact Statement (FEIS)*, November 1995, p. ES-6.

<sup>52</sup> Robert Bullard and Glenn Johnson, eds., *Just Transportation: Dismantling Race and Class Barriers to Mobility* (Gabriola Island, BC: New Society Publishers, 1987) p. 173.



Logically enough, transit is held up as one tool to encourage use of less destructive modes of travel.<sup>53</sup> A concern with this focus is that attention tends to be disproportionately weighted towards getting drivers out of their cars, not on accommodating people who have no car. There is a trend in the transit industry to favor the so called “choice rider,” which officially refers to riders who have other choices, usually a private auto, over the so-called “captive rider,” who will use public transit no matter what the level of service. The argument for such an approach is that if a system caters to lower income riders, middle class riders will not use the system and it will deteriorate, or be perceived as a social service program. A corollary to this argument holds that since reducing auto travel is a primary goal of public transit, it is more fruitful to concentrate on affluent populations who currently drive than less affluent populations who are less likely to own a car to begin with because they are unable to afford one.

John Whitelegg notes that transportation equity is not just concerned with the distribution of transportation benefits—it is just as much an issue of how disbenefits of transportation are distributed. As Whitelegg observes:

Disbenefits are not evenly distributed throughout society, and it is often the most disadvantaged groups and those least able to be heard who bear the brunt of the disbenefits and who pay directly through their health and their quality of life for other people’s mobility.<sup>54</sup>

Where alignments are not in subway (and much of Tren Urbano is elevated or at grade), there is also a question of fair distribution of costs and benefits. What, for instance, are the ramifications of subjecting a neighborhood to the negative impacts of intrusive transportation infrastructure without providing the potentially positive impacts of access to the transit system via a station? In this regard, there is no consensus as to whether compensation for the disruption caused by hosting a transit alignment is justification for providing a neighborhood with a station. Similarly, there is the question of whether a neighborhood deserves compensation via an added station for enduring the temporary disruption of construction.

#### **2.4.2. Political Entrepreneurship**

Within the context of elective politics, government’s role in the provision of transit is fragmented. As Frank Colcord describes it, “the transportation function is divided

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<sup>53</sup> Anthony Downs, *Stuck in Traffic: Coping with Peak Hour Traffic Congestion* (Washington: The Brookings Institute, 1992).

among four levels of government, each with a modicum of power.”<sup>55</sup> The four governmental levels are federal, state, municipal, and the regional transit authority. Making matters even more complex, rail transit systems generally cross municipal, administrative and agency boundaries. To be built and to receive on-going funding, they require the support of a multiplicity of actors representing government, the private sector and civil society. To build necessary alliances, tradeoffs need to be made, and in some cases, key station placements can serve to build constituencies for the system and leverage support.

Tren Urbano, like any transit system, will exist in a multi-player, regional context. Phase I covers three municipalities (San Juan, Guaynabo, Bayamón). Future phases will cover additional municipalities as well (e.g. Carolina). In some cases, the governing administrations of the local municipalities will be of a different political party than the government of Puerto Rico.

Furthermore, the political alliances that make or brake a transit project are not limited to government. It may be constructive to garner support from key institutions, employers, or community groups through strategic station placements. As Clarence Stone documents in *Regime Politics*, the construction of a rail rapid transit system in Atlanta (MARTA), following a 1968 referendum loss, only became possible once support was garnered from a bi-racial coalition of interest groups that included both the white business elite and the black residential majority. “The moral of the story,” writes Stone, “is that large and complicated projects stand little chance of becoming viable without business support...[Likewise] the need for popular approval was pivotal in the launching of MARTA, and that meant leverage for the city’s black majority.”<sup>56</sup> To facilitate these alliances, MARTA placed downtown stations so as to support commercial establishments, as well as adding a spur line to Proctor Creek to serve the mostly black residents of Perry Homes public-housing project. The risk is, however, is that the authority may be perceived as having stations for sale.

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<sup>54</sup> John Whitelegg, *Critical Mass: Transport, Environment and Society in the 21<sup>st</sup> Century* (London: Pluto Press, 1997) p. 139.

<sup>55</sup> Frank Colcard, *Urban Transportation and Political Ideology in Current Issues in Transportation Policy*, Alan Altshuler, ed. (Lexington, MA: Lexington Books, 1979) p.6.

<sup>56</sup> Clarence Stone, *Regime Politics: Governing Atlanta 1946-1988* (Lawrence, KS: University Press of Kansas, 1989) p. 102.

# Chapter 3

## San Juan: Oscillating Stations & Alignments, Immovable Historical Patterns

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### 3.1. Early History of Rail Transit in Puerto Rico (1870's to 1950's)

The current route of Tren Urbano is the end result of a long evolution of rail proposals—both realized and unrealized—in San Juan and Puerto Rico. As the phantom limbs of San Juan's historical rail corridors have been a force shaping Tren Urbano's route and station locations, it is important to this study to examine the routes of Tren Urbano's ancestors. The first rail line in the San Juan area, and the second in Puerto Rico overall following the 1872 opening of an animal powered tram line in Mayagüez, opened in 1880 with a steam trolley line from Old San Juan to Río Piedras. The trolley followed what is now Avenida Ponce de León to Río Piedras.<sup>1</sup> The original line was owned by Pablo Ubarri, a real estate speculator who, according Aníbal Sepúlveda, built the trolley as a scheme for attracting settlers to his land in what was then called Cangrejos (now Santurce). In testimony to the importance of the new trolley to the development of the area, three months after the line opened, the name of the area was officially changed to Santurce after the Earl of Santurce—Ubarri's title.<sup>2</sup>

Following US occupation of Puerto Rico (1898), Ubarri's steam trolley was bought out by the San Juan Light and Transit Co. (which later became the Puerto Rico Railway, Light and Power and Co.—PRRL&P) and converted to electric power by 1901.

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<sup>1</sup> J. William Vigrass, *A Short History of Rail Passenger Service in Puerto Rico*, unpublished manuscript, p. 40.

<sup>2</sup> Aníbal Sepúlveda Rivera, *San Juan de Puerto Rico: Growth of a Caribbean Capital City*, Doctoral Dissertation, Cornell University, Ithaca, NY, 1986, pp. 378-9.

In 1908, PRRL&P opened a meter-gauge tram line between Río Piedras and Caguas, which connected with the electric line at a transfer facility in Río Piedras. In 1911, PRRL&P opened a loop spur off of the main line to Condado. The Condado loop was all that remained of the original trolley following Hurricane San Felipe's destruction of the line east and south of Stop 23 in Santurce in 1928 (see map below). The Río Piedras segment of the line never reopened. Service on the Condado loop continued until 1946, when streetcar service in Puerto Rico was ultimately suspended.

The first railroad route opened in 1891, following the north coast of the island 86 kilometers from Old San Juan west to Arecibo. This initial route began in Old San Juan, following what is now Calle de Tren in the Isleta, Muñoz Rivera Highway in Santurce, Avenida Muñoz Rivera in Hato Rey, and then out to Bayamón following a right-of-way parallel to what is now Avenida Roosevelt. By 1907, tracks were extended 277 kilometers around the coast through Mayagüez in the west as far as Ponce in the south. A second branch continued south along what is now Avenida Muñoz Rivera to Río Piedras, then turning east to Carolina. This branch later continued along the north and east coasts as far as Humacao. Spur lines, such as the railway between Bayamón and the Cataño ferry to San Juan connected with main line tracks in Bayamón. In the end, the railroad actually outlasted the streetcar, surviving until 1957.<sup>3</sup>

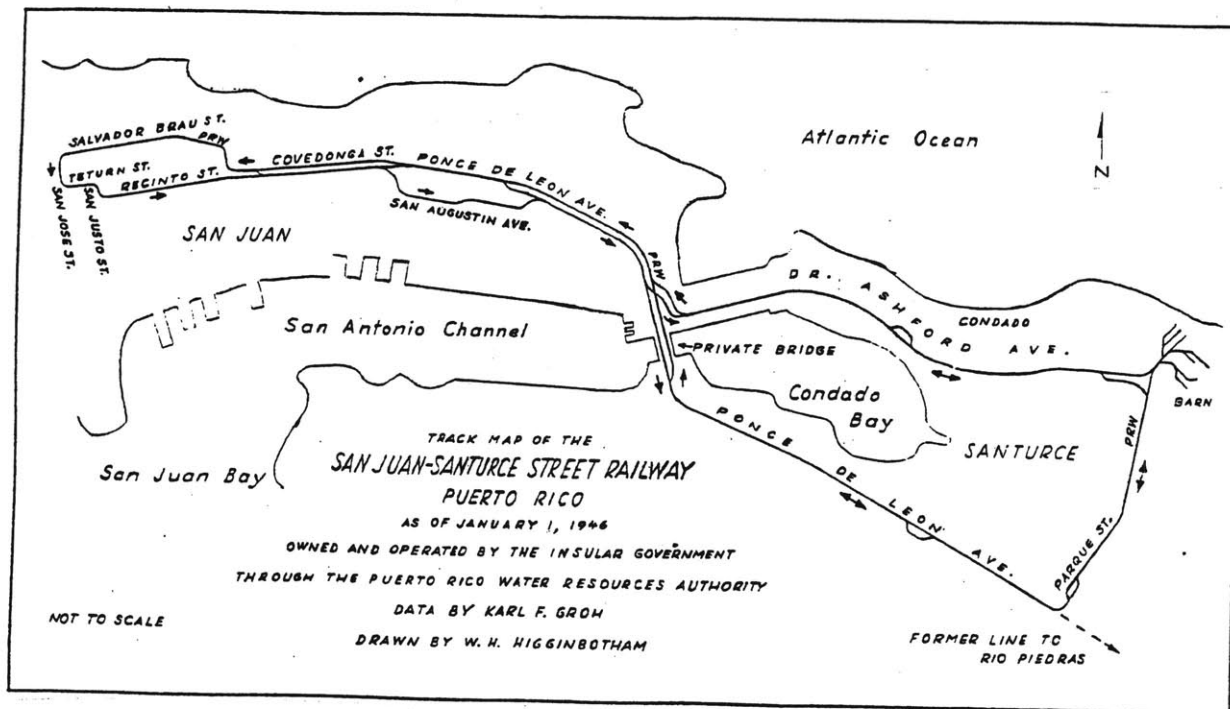
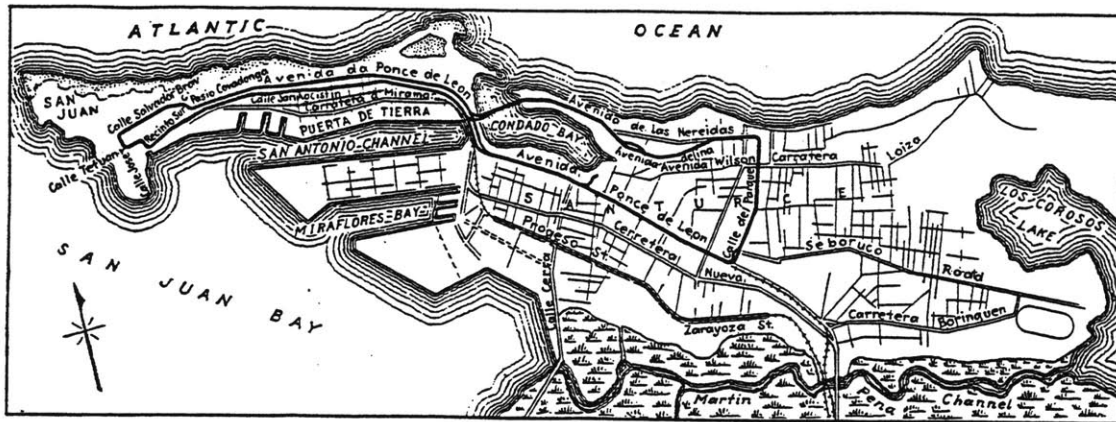
The miles of railway and streetcar track actually built on the island represent a small fraction of what was planned. Between 1900 and 1915, the Executive Council of the Puerto Rican legislature, which was granted the exclusive authority to issue franchises for the provision of public goods, issued thirty-seven franchises for railroad operations and fifteen to operate electric streetcars.<sup>4</sup> Obviously, most of these franchises were never utilized, and seem to have been applied for with an exuberance that overshadowed practical considerations. As Efrain Gonzalez Tejera notes, "Some of the railroad operations authorized sound unrealistic and even ridiculous considering the mountainous terrain, small population to be served and the lack of commercial or industrial activity on most sectors of the line."<sup>5</sup> Nevertheless, as briefly chronicled above, several railroad and streetcar franchises were built and operated successfully at the end of the nineteenth century and the beginning of the twentieth.

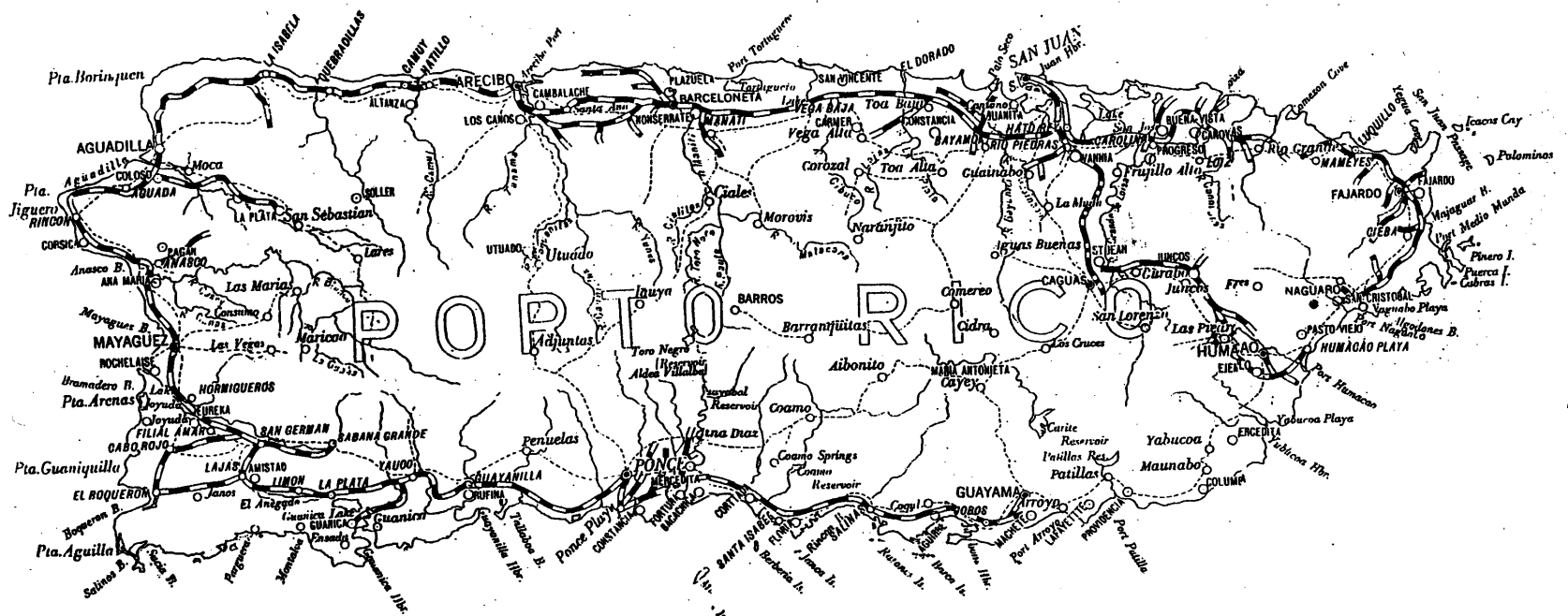
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<sup>3</sup> Efrain Gonzalez Tejera, *Transportation in Puerto Rico: A Search for a New Regulatory Philosophy* (San Juan: Universidad de Puerto Rico, 1971) p. 13.

<sup>4</sup> P. 11.

<sup>5</sup> P. 11.





**Map 6:** Railroad map of Puerto Rico, 1919.  
 Source: J. William Vigrass.

### **3.2. Planning the Next Generation of Rail Transit for San Juan (1960's-1980's)**

Less than a decade after the last railroad tracks were ripped up, interest in rail transit in Puerto Rico was revived again in the 1960's. In 1967, the *San Juan Metropolitan Plan* produced by Wilbur Smith Associates<sup>6</sup> recommends construction of a 43.4 kilometer heavy rail system composed of two routes. One route follows the old streetcar corridor from Old San Juan to Río Piedras, extended south to Centro Medico and Cupey Alto. The second route follows the old railroad corridor from Bayamón to Hato Rey, where a transfer station was planned, and then extended east to Carolina. The proposed routes would follow mixed alignments that included subway, elevated, and travel within the medians of expressways.

A 1979 report, *Transit Alternative for Metropolitan San Juan*, produced by Consultores Technicos Asociados/Alan M. Voorhees & Associates<sup>7</sup>, recommends a revised, 24-kilometer one-line heavy rail system beginning in Mirimar, at the western edge of Santurce, running south through Hato Rey to Río Piedras and then swinging west to Bayamón. The basic alignment of the proposed route, which was referred to as the "Bayamón Crescent," was mostly retained in the plans for Tren Urbano Phase I and IA. The recommendation for the Bayamón Crescent was incorporated by the Puerto Rico Planning Board into its *1981 Plan for the San Juan Region*.

### **3.3. Tren Urbano (1990's)**

In 1993, a modified version of the Bayamón Crescent, this time utilizing some components characteristic of light rail technology, such as articulated light rail vehicles (LRVs) and an overhead catenary electric power system, was included in the *San Juan Regional Plan*.<sup>8</sup> The 1993 proposal was the first to be dubbed "Tren Urbano," emphasizing the project's stated goals of improving the quality of urban life in Puerto Rico and revitalizing the island's historic urban centers. Tren Urbano was a federal

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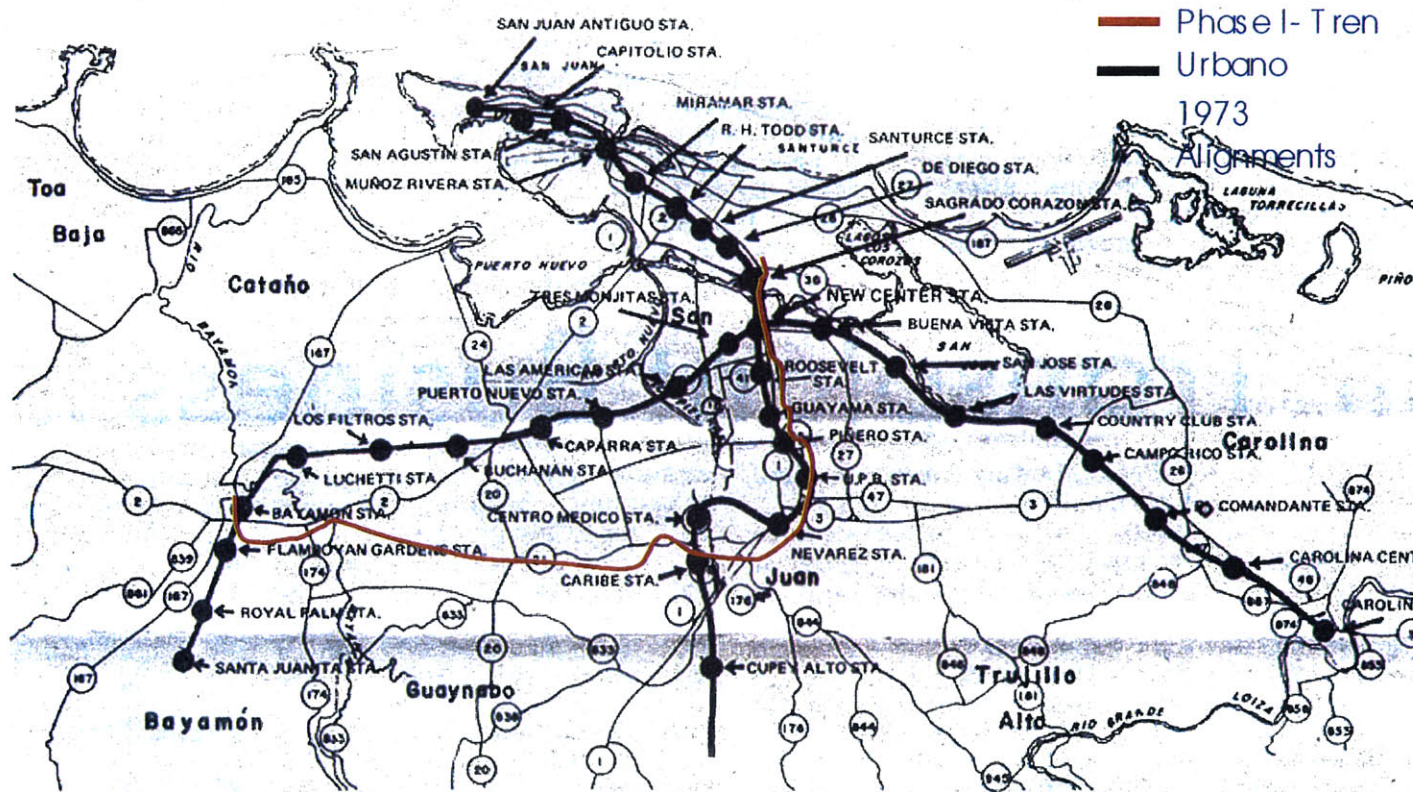
<sup>6</sup> Wilbur Smith Associates/Padilla Garcia, *San Juan Metropolitan Area Transportation Study: Transportation Plan*, June 1967.

<sup>7</sup> Consultores Technicos Asociados/Alan M. Voorhees & Associates, *Transit Alternative for Metropolitan San Juan*, June 1979.

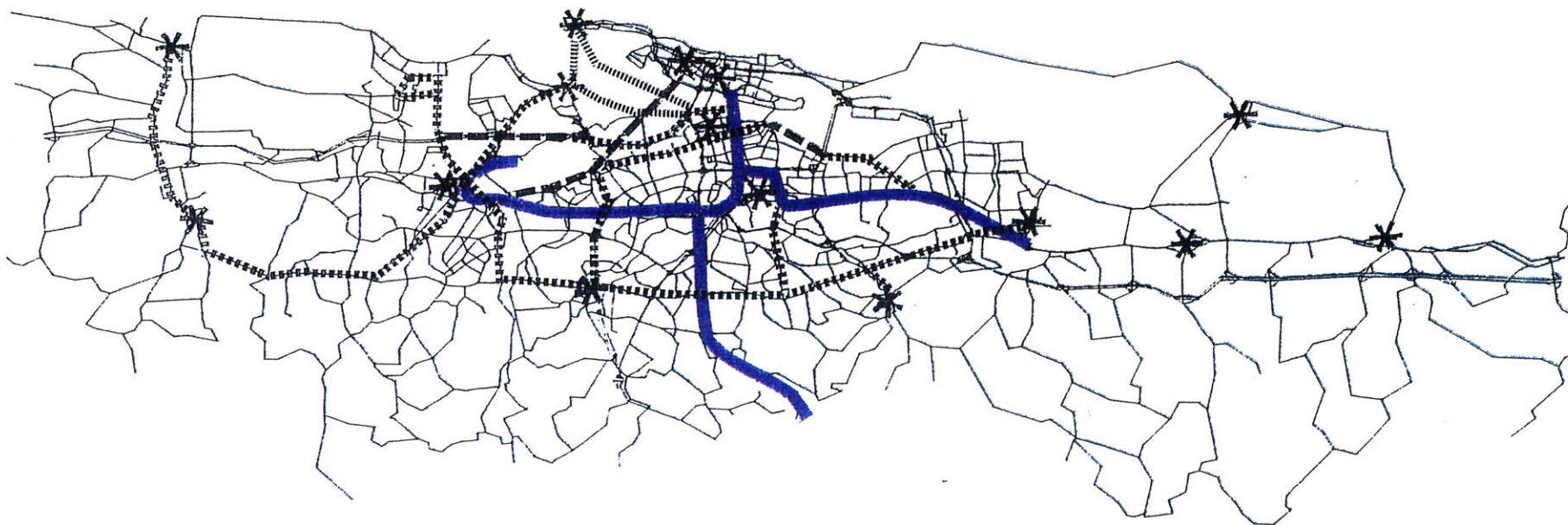
<sup>8</sup> Barton-Aschman Associates, *San Juan Regional Plan*, March 1993.



# SJMA Rapid Transit 1973 Public Hearing Notice








KEY:

 Tren Urbano

 HOV/Bus Lane(s)  
(with express bus service)

 New Bus Service

 Principal Intermodal Terminals

 Acuaexpreso

**Map 8:** Recommended transit plan from March, 1993 *San Juan Regional Transportation Plan*.  
Source: Puerto Rico Department of Transportation and Public Works.

“turnkey”<sup>9</sup> demonstration project, whereby the Puerto Rico Highway and Transportation Authority (PRHTA) would contract with a single consortia for design, construction, and system operation for the first five to ten years of service. By the time the 1995-DEIS was submitted, Tren Urbano was reconfigured as heavy rail, using third rail, fully separated rights of way.

### 3.4. Station and alignment changes following DEIS

Pictured on the following pages are three proposed Tren Urbano alignments and station sitings, planned over a two year period. The first map (**Map 9**) is from the 1995 Draft Environmental Impact Statement (DEIS), the second map (**Map 10**) is from the 1995 Final Environmental Impact Statement (FEIS), and the third map (**Map 11**) is the most recent proposal (January 1999). The following stations were added, deleted or relocated over this period:

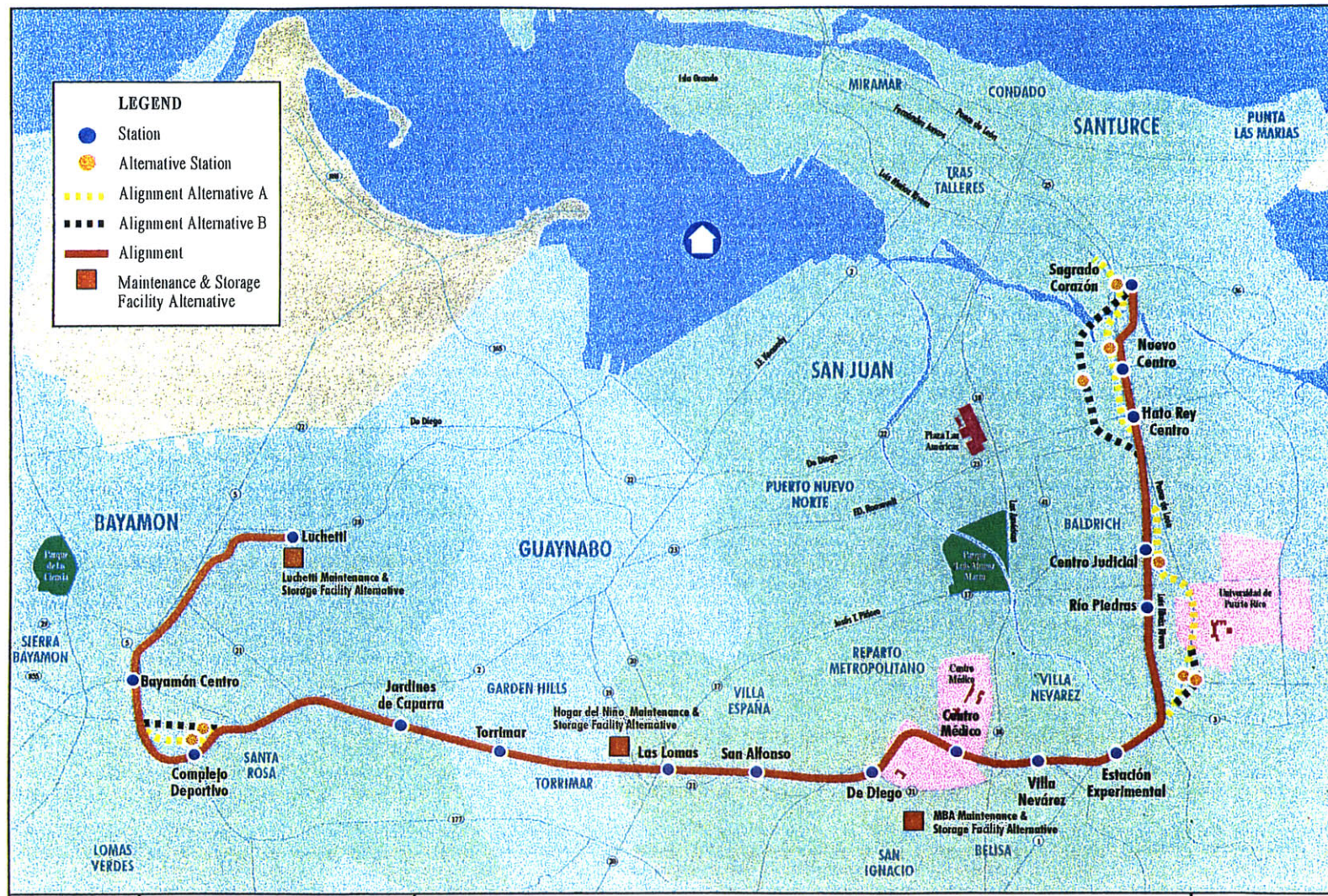
**Table 1—Station Location Changes Following DEIS**

Station	Change	Time Frame
<b>Luchetti</b>	<b>Eliminated</b>	<b>Between DEIS and FEIS</b>
Bayamón Centro	Relocated	Between DEIS and FEIS
Complejo Deportivo	Relocated	Between DEIS and FEIS
Los Lomas (Martínez Nadal)	Relocated	Between DEIS and FEIS
Estacion Experimental	Eliminated	Between DEIS and FEIS
Villa Nevarez (Cupey)	Relocated	Subsequent to FEIS
<b>Río Piedras</b>	<b>Relocated</b>	<b>Between DEIS and FEIS</b>
<b>UPR (Universidad)</b>	<b>Added</b>	<b>Subsequent to FEIS</b>
Centro Judico (Piñero)	Relocated	Between DEIS and FEIS
<b>Domenech</b>	<b>Added</b>	<b>Subsequent to FEIS</b>
Hato Rey Centro (Roosevelt)	Relocated	Between DEIS and FEIS
Nuevo Centro (Hato Rey)	Relocated	Between DEIS and FEIS
Segrado Corazón	Relocated	Between DEIS and FEIS

Bolded station changes indicate revisions that are of particular interest to this study. These changes are examined in greater detail in the following sections of this chapter.

<sup>9</sup> The term “turnkey” refers to the expectation that when the contractor turns the project over, all the new operator (perhaps, but not necessarily a government agency) should have to do is turn the start keys on the trains to get the system to function.





**Map 9:** *Tren Urbano* base alignment as proposed in Draft Environmental Impact Statement, March, 1995.  
Source: *Tren Urbano* FEIS, November, 1995.





Map 10: Tren Urbano alignment and stations recommended in FEIS, November, 1995.  
Source: Tren Urbano.





**Map 11:** *Tren Urbano* alignment and stations reflecting changes subsequent to FEIS, January, 1999.  
Source: *Tren Urbano*.

### 3.5. Elimination of Luchetti Station

The terminal station—Luchetti—proposed in the DEIS lies just south of the sparsely developed Luchetti Industrial Park in Bayamón. As illustrated, in the station area map on the following page, the proposed terminal station area has little to offer in terms of residential or commercial activity. The station was included in the original alignment because the area was identified in the DEIS as the locally preferred alternative location for Tren Urbano’s yards and shops, so track would have to be extended to the area anyway.

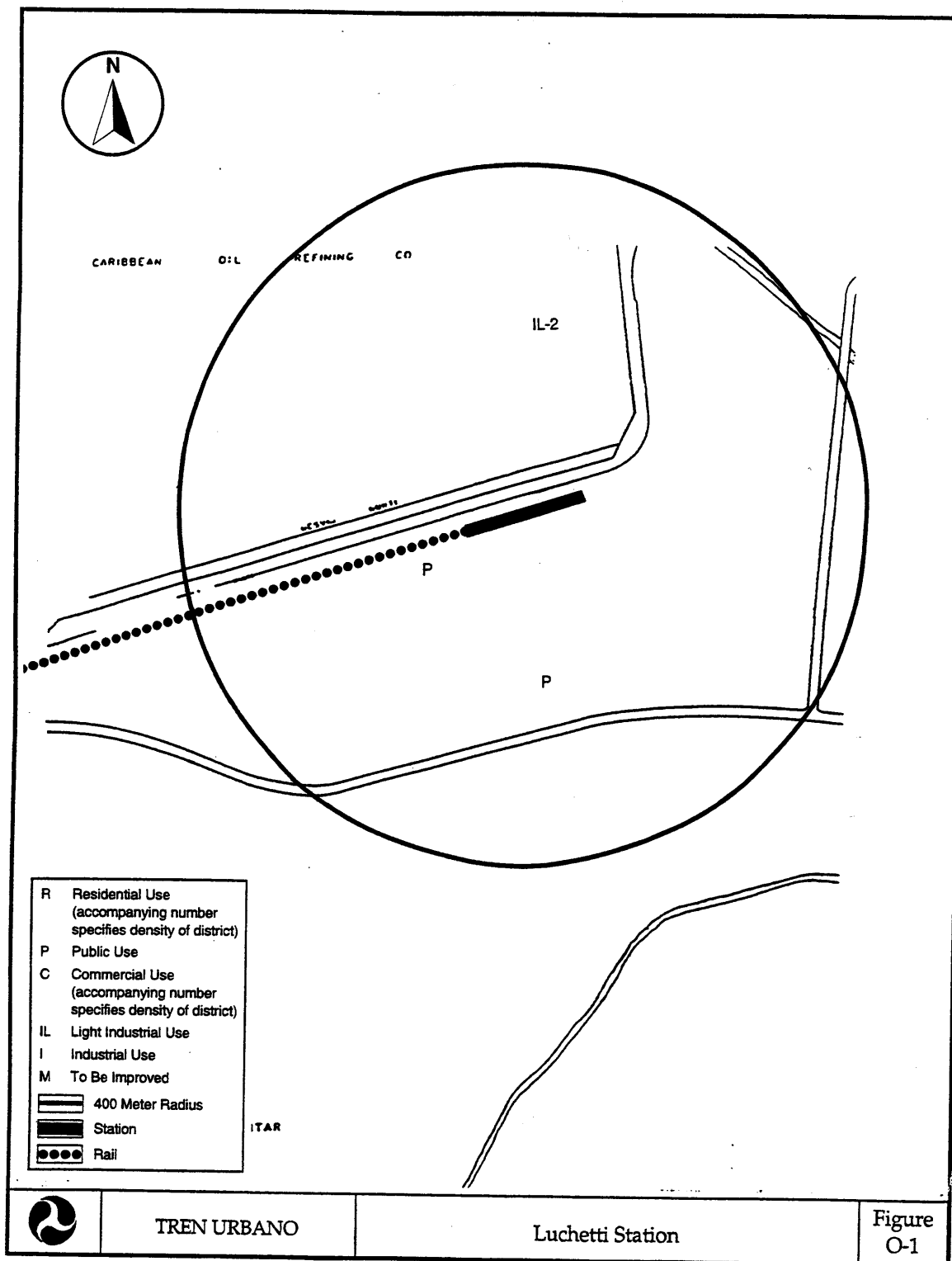
Along with the 2.3 kilometers of track leading to the station, Luchetti was eliminated prior to submission of the FEIS. The decision to remove the Luchetti station came consequent to the decision to shift Tren Urbano’s yards and shops from Luchetti to an area near the Las Lomos Station (now Martínez Nadal). Based on ridership demand, the Luchetti area never warranted a station in its own right, and was only proposed as a terminal because of the decision to locate the yards and shops at the site. Once the proposed maintenance facility was relocated away from Luchetti, there was no longer any justification for the station or line extension. It is also significant that elimination of the Luchetti Station and track saved Tren Urbano \$34 million (1992 dollars).<sup>10</sup>

What is particularly interesting from the standpoint of this research is that the main reason that the DEIS proposed locating the yards and shops at the Luchetti facility in the first place was local politics. Because of its distance from the line’s natural terminal in the center of Bayamón, the Luchetti site was an inefficient location for Tren Urbano’s maintenance facility. The site later advanced as the preferred location in the FEIS, was not chosen initially, due to resistance from residents from the more affluent Torimar neighborhood, which abutted earlier proposals for yards and shops in the vicinity. In a letter from the Torimar Residents’ Association, it states that: “The location of the maintenance shops next to the Hogar del Niño will produce unnecessary noise, additional traffic, environmental pollution, and the general wear and tear of the area due to intensive industrial use.”<sup>11</sup> The neighborhoods around Torimar are more upscale, gated communities that tended to be less supportive of public transit in general and Tren

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<sup>10</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Draft Environmental Impact Statement*, San Juan, PR, March 1995, p. 2-26.

<sup>11</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement: Response to Comments Appendix*, San Juan, PR, CL 3-1.



**Map 12: Luchetti Station area.**  
 Source: DEIS, March, 1995.

Urbano in particular. As Ariel Felix of the municipality of San Juan notes, “Torimar is a low density, suburban, car-oriented neighborhood. People there said ‘we’re not going to ride the train. Maybe our maids will, but we won’t.’”<sup>12</sup>

In the end, Tren Urbano was able to overcome much of this opposition by relocating the proposed maintenance facility to a site east of the Hogar del Niño location, further removed from the residential communities antagonistic to placing the facility in their “backyards.” In part, Tren Urbano was able to quell opposition from Torimar residents by employing special mitigation measures through the neighborhood, including landscaped screening along the alignment, and noise barrier wall at the yards and shops. In addition, prior to locating the yards and shops in the area, PRHTA will relocate highway PR-20 (Expresso Martínez Nadal) so as to better accommodate the facility and improve the roadway in accordance with residents’ wishes, and to reconstruct the main access road to the Torimar Station, Ramirez de Arellano Street, from a four-lane arterial to a two-lane boulevard. This will discourage through traffic on the roadway and emphasize the neighborhood quality of the Station. In a similar vein, Tren Urbano also agreed to effectively limit parking at the Torimar Station to passengers living in the station area.

### **3.6. Río Piedras Realignment and Station**

#### **3.6.1. Río Piedras: a Historic Transportation Center**

Río Piedras’ history as a region is a history shaped by transportation. It was founded in 1714 as an important staging area between San Juan and the rest of the island. It was initially established as a settlement in virtue of its location at what was at the time a day’s haul from Old San Juan via that era’s state of the art transportation: horse carriage or oxcart. Geographically, it lay on a natural travel corridor—a thin strip of dry land, which later became Avenida Ponce de León, surrounded by marsh on either side. As discussed earlier in this chapter, by the end of the nineteenth century, this same corridor between Río Piedras and Old San Juan was later reinforced by a steam railroad route and a steam trolley line, which was later electrified. Even after the removal of the streetcar tracks from Avenida Ponce de León, the corridor remains the region’s transportation spine, both for private autos and buses. In the future, it will again be transversed by the rails of Tren Urbano.

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<sup>12</sup> Interview, conducted January, 1999.



As the closest point to San Juan where marshland did not prevent travel to the west and east of the island, Río Piedras also represented a logical transfer point. Once the tracks were laid, Río Piedras served as the junction between service to Old San Juan, Caguas, or Carolina and points east. Today, it continues to serve as an important transfer point for transit, hosting the island's largest public bus station and a separate "público" (jitney) terminal.<sup>13</sup> Likewise, it now lies at the confluence of several highways. As a consequence, Route 1 to the west, Route 3 to the south, Route 17 to the north, and Route 27 to the east surround the neighborhood, boxing the region in and isolating it from the rest of San Juan.

### **3.6.2. Río Piedras' Spatial and Cultural Identity**

Spatially and culturally, Río Piedras has a unique charm. Like Old San Juan, the original settlement was laid out according to the Spanish *Laws of the Indies*, which centered towns on a church and plaza, sitting at the intersection of a gridded network of roads. Río Piedras' historic function as layover and transfer site led to the natural development of a mercantile center. Centered around the pedestrian shopping street Calle de Diego, the area remains a busy and bustling commercial hub that retains much of its historic flavor, without giving way to quaintness. Architecturally, many Río Piedras buildings are characterized by a distinguishing Art Deco style.

Culturally, Río Piedras is defined to no small degree by its relationship to the largest university on the island—the University of Puerto Rico, Río Piedras campus. Parallel to its role as host to the University and its students, Río Piedras also hosts many of the island's most recent immigrants. In recent years, Río Piedras has experienced a considerable growth in its Dominican Community. Although many of the immigrants from the Dominican Republic are undocumented and therefore difficult to count, it is estimated that Dominicans now make up between 15 and 20% of Río Piedras' population.<sup>14</sup>

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<sup>13</sup> See Theodore Caplow, Sheldon Strycker and Samuel Wallace, *The Urban Ambience: A Study of San Juan Puerto Rico* (Totowa, NJ: Bedminster Press, 1964) pp. 18-19; Ruth Hernandez Torres, *Río Piedras: ida y vuelta* (San Juan: Viral de la Ingesia Nuestra Señora del Pilar, 1995) p.6; M.I.T Department of Architecture, *Proyecto de Río Piedras: Making Livable Cities* (Cambridge, MA: M.I.T Department of Architecture, 1993) p. 14; Efrain Gonzalez Tejera, *Transportation in Puerto Rico: A Search for a New Regulatory Philosophy* (San Juan: Universidad de Puerto Rico, 1971) pp. 86-88.

<sup>14</sup> Jorge Rivera Jiménez, Asesor en Infraestructura, City of San Juan.

Despite a growing immigrant population, Río Piedras has lost about 50% of its population since 1950, when it was 143,897<sup>15</sup>—the result of a flight to the suburbs, characteristic of many urban centers across North America. The population loss had contributed to a disinvestment in the area. As a consequence, Río Piedras has become pock marked with vacant and underutilized lots, as well as a perception of high crime.

### **3.6.3. Tangency: Tren Urbano's Preliminary Relationship to Río Piedras**

Initially, Tren Urbano was planned to skirt the heart of Río Piedras. The locally preferred alignment and station sitings for Tren Urbano, as listed in the 1995 Draft Environmental Impact Statement (DEIS), shows the route traveling in elevated alignment down the median of Muñoz Rivera Avenue—well to the west of Río Piedras' center. The only station in Río Piedras proper was to be located at the intersection of Muñoz Rivera and Universidad Ave. The Universidad Station would be approximately a half kilometer from the main entrance to UPR and a full kilometer from the heart of the Río Piedras commercial center.

### **3.6.4. Opposition to Muñoz Rivera Alignment**

#### **3.6.4.1. Negative Impact on Avenida Muñoz Rivera**

The proposed alignment faced opposition on two accounts. First, there was concern that Tren Urbano would have negative visual impacts on the area. The elevated structure was planned to run in the median of the six-lane Avenida Muñoz Rivera, potentially degrading the environment of the street below, shrouding the roadway in shadow and inhibiting tree growth. As one Avenida Muñoz Rivera resident stated in a public hearing, "The quality of life will deteriorate in this area, ...[which] will feel like a cave because the distance between the platform and the building façade will be thirty feet"<sup>16</sup> The visual impacts would only be exacerbated if a flying junction were later built for a future Tren Urbano extension to Carolina.

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<sup>15</sup> M.I.T Department of Architecture, *Proecto de Río Piedras: Making Livable Cities* (Cambridge, MA: M.I.T Department of Architecture, 1993) p. 14

<sup>16</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement: Response to Comments Appendix*, San Juan, PR, PH 3-4.

#### **3.6.4.2. Failure to Serve Río Piedras' Historic Center**

The second, and arguably more serious concern was that the Muñoz Rivera routing was viewed as being too far from Río Piedras. As a result, it was argued, not only would Tren Urbano fail to revitalize the Río Piedras historic center, it threatened to destroy the area, as it would nurture a competing commercial district surrounding the station that would enjoy better access via Tren Urbano than the historic district. Groups as divergent as the City of San Juan, UPR, Río Piedras residents and merchants, and the Societies of Architects and Engineers all made public statements supporting relocation of the station closer to the heart of Río Piedras.

Antonio de la Cruz, President of the Association of Merchants, Professionals, and Residents of Río Piedras wrote that:

The projected elevated alignment through the median of Muñoz Rivera Avenue is too far to adequately serve the needs of the island's largest university community, the University of Puerto Rico, and of the commercial district...The association wishes to obtain the best service for Río Piedras and the University of Puerto Rico and therefore requests that the train's trajectory be moved closer to the center of Río Piedras.<sup>17</sup>

UPR President Norman Maldonado added that:

The Muñoz Rivera alignment is too distant from both the UPR and the Río Piedras center. Its impact on the development of either will be marginal. It will neither promote the usage ratio needed to make it profitable, nor will it do much to alter the "automobile mentality" of the community...The Muñoz Rivera alignment [should] be moved to the east, toward Ponce de León Avenue, to better serve both Río Piedras and the University.<sup>18</sup>

San Juan Mayor Hector Luis Acevedo stated that:

Under no circumstance this Municipality supports the Railway alignment through the Muñoz Rivera Ave. on the segment between PR-3 and PR-17 roads because it is considered highly detrimental to downtown Río Piedras and barely useful in serving the University of Puerto Rico, Río Piedras Campus, as well as Capetillo and Juan Palerm's Mass Transportation Terminals.

And Jose Izquierdo Encarnacion, President of the Puerto Rico Society of Engineers and Surveyors noted that: "The proposed route passes through the Muñoz Rivera Avenue—definitely quite removed from two vital Río Piedras life centers, which are the University of Puerto Rico and what we affectionately call the "casco" or downtown Río Piedras."<sup>19</sup>

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<sup>17</sup> PRHTA, *FEIS: Response to Comments Appendix*, San Juan, PR, CL 3-18.

<sup>18</sup> CL-5-1.

<sup>19</sup> WS-3-7.

Many of the residents and business people in Río Piedras felt that the proposed alignment was a personal snub. As Alijita Firpi, current president of the *Asociacion de Residentes de Río Piedras* (Río Piedras Residents Association) recalls: “When we first read that Tren Urbano would bypass us and run along Muñoz Rivera, we all came together—home owners, business, all—it would have killed our neighborhood and our businesses. We were moved to protest.”<sup>20</sup>

Much of the initial leadership surrounding the issue of the lack of a station in the center of Río Piedras came from Ruth Hernandez—a local activist, resident of Río Piedras’ Santa Rita neighborhood, and UPR professor. Hernandez served as president of the *Asociacion de Residentes de Río Piedras* until her death this past summer (1988). Her activism is legendary in the community. In an article in the *San Juan Star*, she is described as “emulating the Biblical David, regularly fac[ing] the Goliaths of government and commercial interests that very often sought to displace people for stores and cars.” The article goes on to credit Hernandez with “spring[ing] to action anytime there was any mention of a project involving Río Piedras, seeking information and making sure the residents were informed.”<sup>21</sup>

At the risk of paining the objective soul of my social scientist advisor by stepping unabashedly into the first person, I feel compelled to note that while I never met Ruth, I feel privileged to have talked about her with people who knew and worked with her, and was honored to attend a service in honor of her contribution to the community this past January. What is extraordinary to me in piecing together a picture of who Ruth Hernandez was, is that she appears to have been universally respected and liked by people who agree on nothing else. Although she served as the proverbial thorn in the side of Tren Urbano planners, administrators, and policy makers, scrutinizing every decision of Tren Urbano, her rigor and attention to detail was respected and appreciated. Upon her death, the Tren Urbano office offered this simple eulogy:

*Gracias por enseñarnos a caminar por tu Río Piedras amado;  
detenernos un momento, mirar hacia arriba y  
descubrir la belleza que habita en la ciudad.  
Descansa en Paz, amiga Ruth*

(Thank you for teaching us to walk through your beloved Río Piedras;  
to stop for a moment, to look around us, and  
to discover the beauty that lives in this city.

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<sup>20</sup> Interview, conducted January, 1999.

<sup>21</sup> *San Juan Star*, July 26, 1998.

Rest in Peace, friend Ruth).<sup>22</sup>

Hernandez was able to forge a coalition around the issue of placing a station in the heart of Río Piedras that included residents, UPR, the city of San Juan, and several professional associations. Motivated by Hernandez' leadership, Río Piedras stakeholders argued that Tren Urbano needed to have a station further east than the proposed Muñoz Rivera alignment, closer to both the residential and commercial sections of Río Piedras. Arguments centered on three overlapping themes: (1) economics, (2) quality of life, and (3) fairness and equity.

As already noted, the economic argument centered on the concern that by skirting the commercial heart of Río Piedras, Tren Urbano would deny the area the accessibility that would be key to its economic recovery. Tied to the economic argument, however, is a quality of life argument. Accordingly, Puerto Rico's historic centers such as Río Piedras are spaces that should be supported economically, because they foster a positive, yet threatened form of social interaction: pedestrian-friendliness, community-oriented, attractive architecture, historically-connected. Also, Río Piedras, unlike the strip malls along Avenida Roosevelt or Route 3, is uniquely Puerto Rican in culture and feel. It is not insignificant either that for all of these reasons, Río Piedras also has a density that will better support Tren Urbano via greater ridership than the Muñoz Rivera alignment would have generated, and is better connected to other transit modes, such as local bus and público, both of which have terminals in the eastern sector of the neighborhood.

The quality of life argument bleeds into an ethical argument. Because the historic centers so embody a valued Puerto Rican tradition, it is argued, they ought to be preserved. As Aníbal Sepúlveda notes, "San Juan has a moral obligation to take care of its historic districts. Not just in Río Piedras, but everywhere on the island." For others, it is a matter of fairness to Río Piedras residents and merchants, who have suffered from neglectful policies favoring suburbanization following World War II. In his recollection of the process during a public hearing on the extension of Tren Urbano to Minillas, Society of Engineers President Jose Izquierdo stresses the fairness argument:

It was our understanding at the time that it would not be fair to the people of Río Piedras, for the quality of the town and its people, that Tren Urbano Pass so close to the town but not into the town itself. In terms of planning, it could appear that Muñoz Rivera Avenue is part of Río Piedras, but from the perspective of the people of Río Piedras, Muñoz

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<sup>22</sup> Special thanks are owed to Jessica Andors for translating this piece from the original Spanish.

Rivera Avenue is not part of Río Piedras. And thus accompanied by other endorsements for that alternative, the Department opted, despite higher costs, for the option of Río Piedras.<sup>23</sup>

### **3.6.5. Obstacles & Resolutions: Overcoming Tunneling Cost**

The greatest obstacle to meeting the community's request for a relocation of the line to Río Piedras was that an elevated or at grade alignment, which was characteristic of the entire proposed route at the time, would not have been possible in the densely built and historically significant Río Piedras center. As a result, the only suitable option was to build the Río Piedras segment of the line in subway. This, however, would be significantly more expensive to build than an elevated. As estimated in the DEIS, the total cost for the underground alignment through Río Piedras would be \$183.6 million (1992 dollars), compared to \$87.3 million for the aerial alignment. Construction of the underground Río Piedras Station would cost \$43.0 million, compared to only \$9.3 million for the elevated station.<sup>24</sup>

A second cost was the property damage and temporary disruption to the community during construction. This later concern was minimized somewhat by a decision to employ less disruptive tunneling technologies. Following submission of the DEIS, Tren Urbano concluded that much of the Río Piedras tunnel could prudently be built without using the more invasive cut-and-cover techniques, which would have required excavation of the entire street. Instead, the tunnel could be mined using a shield tunneling technique known as the "New Austrian Tunneling Method," or NATM.

In the end, it was concluded that: "Given the viability of these alternative construction methods and based on the potential to attract additional ridership, improve intermodal connections, and reinforce the traditional town center of Río Piedras," the alignment and Río Piedras station will be relocated to the commercial center.<sup>25</sup> Although not stated publicly, some within Tren Urbano were eager to see the route diverted into this small segment of tunnel, for this would make Tren Urbano an official subway, putting San Juan in a class with the world's great cities, such as New York, London, Paris, or Tokyo.

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<sup>23</sup> PRHTA, *Transcript: Minillas Extension Public*, 4-1-2, p. 14.

<sup>24</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Draft Environmental Impact Statement*, San Juan, PR, March 1995, p. 2-28.

<sup>25</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement*, San Juan, PR, October 1995, p. 2-31.

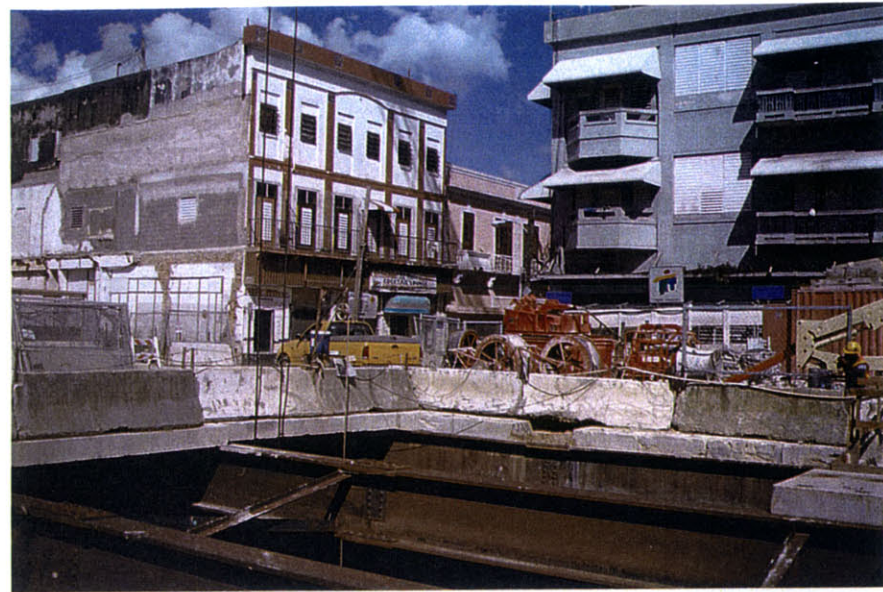




**Top:** Aijita Firpi, community leader and president of the *Association de Residentes de Río Piedras*.  
**Top Right:** Río Piedras Construction.  
**Bottom Right:** *Tren Urbano* mural, painted by Río Piedras school children.

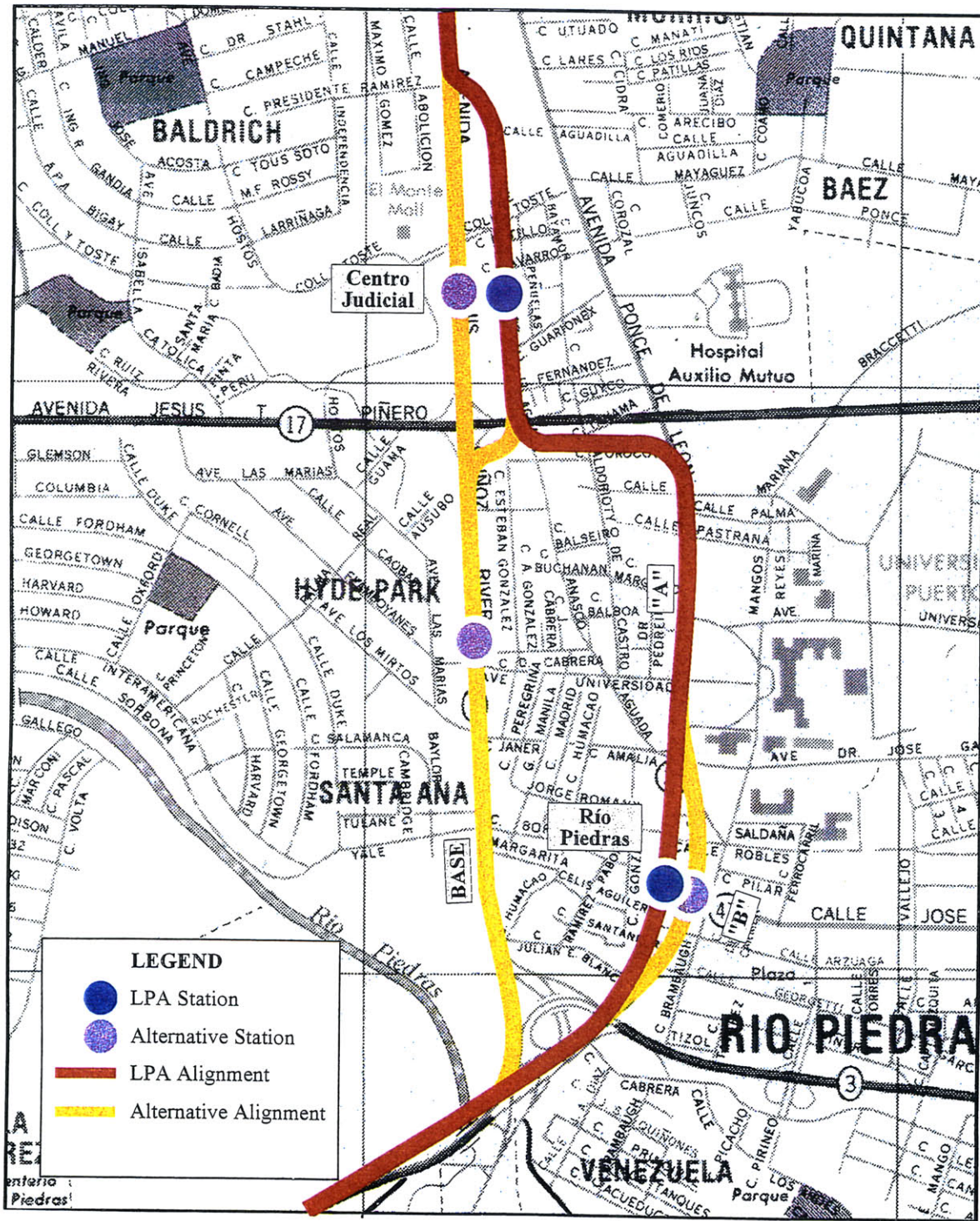






**Top:** Construction of Río Piedras tunnel.  
**Top Right:** Construction impacts along Avenida Ponce de León.  
**Bottom Right:** Río Piedras' central plaza (*Plaza de Recreo*).





### **3.7. Addition of the UPR Station**

The relocation of Tren Urbano to an underground alignment through the heart of Río Piedras effected the University of Puerto Rico in two significant ways: (1) It meant that construction would more directly impact the University via tunneling under Avenida Ponce de León, including plans for an airshaft directly in front of the museum, and (2) Since plans included just one station in Río Piedras, UPR would not be directly served by a station of its own—despite the fact that the revised alignment would tunnel immediately beneath the University’s main gate.

The question of whether the two proximal activity centers of the UPR campus and the Río Piedras commercial core should be served with two stations or one joint station has been addressed differently in different plans. The old streetcar line had frequent stops, customary of that technology, and thus served both. The 1967 rail proposal had one station called “UPR” serving both centers, with a proposed location at Avenida Gándara in between the commercial center of Río Piedras and UPR’s main gate. The original 1993 Tren Urbano light rail proposal included a stop at both Río Piedras and UPR—but again, that was using a different technology, with shorter stop-spacing requirements. When Tren Urbano was reconfigured as a heavy rail line, the UPR Station was removed.

Although it has not been addressed explicitly, this is, to some degree, as much a question of nomenclature as it is location. After all, a station centered on Avenida Gándara might just as legitimately be named “UPR Station” as “Río Piedras Station. However, which name is chosen carries symbolic value as to whom the system is being designed for. For example, in order to cultivate a relationship with residents, the Ruggles Station on Boston’s Southwest Corridor Orange Line was deliberately not named “Northeastern,” even though the station is adjacent to Northeastern University campus. Needless to say, Boston’s Red Line Harvard Station avoids this problem, as the station name refers both to the university and the neighborhood.

#### **3.7.1. History of Town/Gown Conflict**

Like many communities hosting universities, Río Piedras has long had an ambivalent, friction-filled relationship with UPR and its students. While the neighborhood is in many ways connected to, even partially defined by, the University, a sharp divide

still exists between the two. When the University was first built at the turn of the century it was, as Aníbal Sepúlveda notes, “literally on the other side of the tracks from the town.”<sup>26</sup> Today, many residents report that Avenida Gándara, which was built in the right-of-way of the old railroad to Carolina and points east, serves as a de facto moat dividing the two centers. Students, scared away by often exaggerated stories of crime keep to the campus, while residents, feeling unwelcome and discriminated against by virtue of class, remain south of Avenida Gándara. According to UPR urban planning professor, Dr. Aníbal Sepúlveda-Rivera, himself a UPR graduate, lack of interaction between students and community has been continually exacerbating over the years. In large part, Sepúlveda attributes this isolation to a growing reliance on private cars on the part of the students. As a consequence, students now drive to campus to attend classes and then drive home, without ever venturing into Río Piedras.

### **3.7.2. Arguments for Adding a Station at UPR:**

#### **3.7.2.1. Cultivating Students as Riders**

The chief advocate for the station was the University. The administration strongly argued that despite the short distance between the University and the Río Piedras Station, placing a station at the main entrance to UPR was critical. The strongest stance came from then Chancellor Efraín González Tejera. González Tejera is a law professor who had served two years on the Public Service Commission of Puerto Rico—the agency responsible for regulation of the transport industry on the island. He had also published a book on Puerto Rican transportation.<sup>27</sup> As a result, he was able to speak on the issue with the backing of both his title and his expertise in the field of transportation. As Chancellor González Tejera recounts his advocacy for a station at UPR:

When I saw the initial plans, which called for a ventilator shaft in front of the museum, heavy disruption of University property, but no station, I was scandalized...I called up Carlos Colón [at PRHTA] and told him that if the train was built in this way, I'd be the first in the picket line, even if I had to resign, (which was easy for me to say, because I knew I'd have to resign anyway for other reasons). At the public hearing, I stated for the record that I would not approve of the plan because Tren Urbano was not willing to build a station at the University. I told them that the University would

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<sup>26</sup> Interview, conducted January, 1999.

<sup>27</sup> Efraín González Tejera, *Transportation in Puerto Rico: A Search for a New Regulatory Philosophy* (San Juan: Universidad de Puerto Rico, 1971).

not cooperate—they could not move historic fences, or use gases in front of the museum, or touch University property without a fight.<sup>28</sup>

As a result of his prior research, Gonzalez Tejera had quickly latched onto the importance both of Tren Urbano to the University and the University to Tren Urbano. Tren Urbano will help make the University a more attractive and accessible place to work and study. But also, as Gonzalez Tejera calculates, “with a Tren Urbano station right in front of the University, the initial cost of the station will be made up tenfold. The university has 2,900 administrative employees, 1,400 teaching employees and 21,000 students. That is a considerable market for the train.”

University President Norman Maldonado used an extension of this argument in a comment letter to Tren Urbano, arguing specifically that Tren Urbano would be wise to do everything in its power to cultivate students as future riders of the system. According to Maldonado, “University students, by their very youth, and not being irreversibly tied to the automobile mentality, will probably be more willing to accept and adopt the rapid transit transportation mode, away from private automobiles.”<sup>29</sup>

Maldonado also fell back on a class argument for a station at the University. In Puerto Rico, perhaps even more than the mainland, a stigma is attached to public transit. Reliance on buses and público vans are viewed as a sign of failure, as that is clear indication of not being able to afford a car. Consequentially, people with means generally shy away from transit, because it is associated with a lower class status. Even Fred Salvucci, who as Secretary of Transportation in Massachusetts championed the needs of Boston’s lower income transit riders has stated that “the worst thing that can happen to Tren Urbano is that it will be perceived as a giant público.”<sup>30</sup> In light of this concern, Maldonado also noted that, “the intense use by University professors, visitors and students, will give a good cosmetic appeal and broaden the usage base of the Tren Urbano.” That is, according to Maldonado, Tren Urbano needs to do everything it can, including strategically choosing its station locations, to best generate University ridership, because there lie the riders that Tren Urbano most covets.

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<sup>28</sup> Interview, conducted January, 1999. Unless otherwise noted, all subsequent quotations from Gonzalez Tejera are taken from this interview.

<sup>29</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement: Response to Comments Appendix*, San Juan, PR, CL-5-1.

<sup>30</sup> Interview, conducted September, 1998.

The prestige and clout of the University itself becomes a justification for the station—presumably, rapid transit systems that service universities possess a grandeur in virtue of their relationships to higher learner. As Jose Izquierdo argued on behalf of the *Colegio de Ingenieros y Agrimensores* (Society of Engineers and Surveyors), the *Colegio* “would like for Río Piedras to have a station in the university like other cities have.”<sup>31</sup> Unfortunately, this argument is not supported by any documentation or evidence. As an example, for historic political reasons, Washington D.C.’s Metro does not have a stop at Georgetown University. While many identify this omission as problematic, it is not clear that Metro’s failure to have a Georgetown Station reduces the overall respectability of the system.

### **3.7.2.2. Congestion/Parking Argument**

The number of potential University-based riders are also used to justify arguments founded on relieving traffic congestion. Here the argument is that since the University generates a considerable amount of traffic, all headed to a single destination, a station at that destination will help alleviate traffic if it encourages people to ride the train and leave their cars at home. Again quoting President Maldonado:

There are over 13,00 parking permits issued yearly to University students and personnel, and there are some other 5-6,000 vehicle trips made daily to the University, all competing for a mere 3,500 parking spaces. Driving and parking is clearly a tortuous alternative for students, administrators and visitors. The Tren Urbano, with a station at the University, would certainly present an attractive alternative for these potential users. Under these circumstances, capturing a good portion of this traffic volume is not only feasible, but should be an economic priority for the Tren Urbano.

Accordingly, the University, as both a locus and source of traffic should be explicitly targeted by Tren Urbano as a matter of policy in order to encourage University employees and students not to use their cars.

As a corollary to the congestion relief argument, there is also a parking relief argument that is also contained in Maldonado’s statement above. Currently, UPR suffers from an over abundance of parking space. As a consequence, the University grounds look more like an industrial park than a campus. For Gonzalez Tejera, Tren Urbano presents an occasion to reverse this condition:

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<sup>31</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement: Response to Comments Appendix*, San Juan, PR, PH 3-10.

I felt that if we got the station, Tren Urbano would provide the University with an opportunity to review its parking policy, to make it more expensive for each student to dump two tons of steel onto the campus every day...Of course, not all students will be happy with a change in policy, but we are entering a new millenium and cannot continue subsidizing the parking of students.

Jorge Rivera Jiménez of the city of San Juan echoes the University's argument here: "A UPR Station Really makes sense. The University is a great traffic generator. It is currently devoting more and more space to parking—this cannot continue and a Tren Urbano station can help reverse this trend."<sup>32</sup>

### **3.7.2.3. Development Argument: Plaza Universitaria**

In reviewing the University's role in advocating for the inclusion of a UPR Station, it cannot go unnoticed that UPR is operating not just as educational institution, but also as developer, with a significant financial stake in Tren Urbano's station location decisions. Concurrent to the planning and design of Tren Urbano, the University had been planning to develop a 12.3 acre site immediately across Avenida Ponce de León from UPR's main gate for commercial use. Clearly, Plaza Universitaria's value and viability increases significantly with a Tren Urbano station at its front door.

For this reason, critics of the UPR station argue that the University's advocacy for an added station has been driven first and foremost by its economic interests with respect to Plaza Universitaria. Gonzalez Tejera concedes this point. "Yes," he acknowledges, "the University has development plans for the area around the station—as such, its own interests are very much served by having a station at the University. But," he adds, "this is positive, because this is exactly the kind of development that works best in conjunction with transit—it will be built around pedestrians and young people." According to Gonzalez Tejera, serving the future Plaza Universitaria with a Tren Urbano station will be a win-win situation, as both new projects will mutually support each other. In his letter to Tren Urbano, President Maldonado reinforces the argument of mutual beneficence:

The University Position with respect to the Tren Urbano must be viewed in the light of its own development plans and the impact that the Tren Urbano and the University's development program have upon each other,

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<sup>32</sup> Interview, conducted January, 1999.



and the synergies that can result from the coordination, phasing and development of both projects.<sup>33</sup>

The development argument rests on the stated goal of Tren Urbano to “support economic growth in the San Juan Metropolitan Area.”<sup>34</sup> In this vein, the potential development benefit is cited as a justification for the inclusion of a station at UPR serving the Plaza Universitaria. Using this logic, Ricardo Medina of Siemens notes that the Plaza Universitaria area is the only place in Río Piedras with new development potential and therefore a UPR Station is the only opportunity to foster development in Río Piedras. According to Medina, “Río Piedras Station is located in the center of town—thus, there is no room for new development to support the station. The only area in Río Piedras is to the north, the area of the planned Plaza Universitaria—that is what the UPR Station affords—densification and development which could not happen at the town center.”<sup>35</sup>

#### **3.7.2.4. Operations Impact Would be Minimal**

Typically, some of the strongest arguments against station additions tend to rely on operational considerations. In this case, however, the operator supported the addition, and downplayed the potential operational impact of the station. As Joe Ferretti, Siemens’ Operations Manager for Tren Urbano explains:

As the operator—from a purely technical, nonsociological pursuit—I want station spacings to be determined algorithmically so as to optimize trip time. But what is the purpose of building the system in the first place? It is my primary objective that Tren Urbano not become a transit museum upon opening—that is, I want to make sure that the people of San Juan actually ride the thing. It is worth it to me to add 45 seconds onto the trip from one end of the line to the other if as a result I gain a significant customer base of students at UPR. Bear in mind that the technology we will be using has superior acceleration rates. The additional station imposes a minimal trip time increase—when it currently takes over an hour by car to get from Bayamón to Hato Rey, what’s the difference between 21 or 22 minutes by train?

As both operator and vehicle builder, Ferretti makes a perhaps boastful point of flagging the relatively high acceleration and deceleration rates of Tren Urbano

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<sup>33</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement: Response to Comments Appendix*, San Juan, PR, CL-5-1.

<sup>34</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement*, San Juan, PR, p. 1-33.

vehicles as a factor. Indeed, while normal acceleration/deceleration rates tend to be approximately  $1\text{m/s}^2$ , Tren Urbano vehicles will accelerate and decelerate at  $1.35\text{m/s}^2$ . While this would seem to indicate that the time lost at each station would be decreased, it is important to recognize that in regular operation, trains will not be able to accelerate/decelerate at top performance. After all, other factors, such as the goal of not knocking passengers down whenever the train starts or stops, impose practical limitations to acceleration/deceleration rates.

Of course the argument from technology is a double-edged sword. For instance, it is noteworthy that due to short stop spacings throughout the alignment, vehicles will only be able to accelerate to maximum velocity (100km/h) at two points along the line—between Deportivo and Jardines, and between Cupey (formerly Villa Nevarez) and Río Piedras. As a result, there is a cumulative system-wide travel time cost to the short spacings, based on the capabilities of the technology. Looking at the system level, if each additional station imposes a 45 second delay, that may not seem prohibitive for one station analyzed in isolation, but the cumulative time cost will be great if several stations are added.

### **3.7.3. Arguments Opposed to Adding a Station at UPR**

The addition of the UPR Station was not the result of consensus. While the University, the city, and several professional organizations supported the station addition, Río Piedras residents and merchants opposed it. They argued that the short distance between the two centers did not warrant an additional station at UPR and that the Río Piedras Station was adequate to serve the needs of the University. In this vein, Río Piedras residents and merchants advanced both cultural and economic arguments.

#### **3.7.3.1. Redundancy Argument**

As has already been noted, the distance between the Río Piedras and UPR Stations will be very short for a heavy rail system—only 400 m. As a result, even in Puerto Rico, where due to the hot climate and an automobile dependency, people are averse to walking more than 500m<sup>36</sup>, there will be considerable overlap in each station's

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<sup>35</sup> Interview, conducted January, 1999.

<sup>36</sup> Although it was generally accepted by most professionals working on the Tren Urbano project that Puerto Ricans are averse to walking, this assumption is invariably based on anecdotal evidence. In an interesting qualification to this vantage point, former Colegio de Arquitectos de



catchment areas. Looking at each station as a resource, this redundancy indicates a failure to efficiently or comprehensively allocate resources. Why, it is argued, stop at the University if most users of that station would have used the Río Piedras Station were the UPR Station not built?

Chancellor Gonzalez Tejera counters this argument by noting that students are a special case. “The proximity to the Río Piedras Station,” he acknowledges, “is one of the arguments against a UPR Station. But you cannot expect students to leave cars in Bayamón and walk from Río Piedras. It is much easier to stop right in front of the campus.” Another counter argument is that students will not walk to Río Piedras because of a perceived crime problem. Accordingly, despite the short distance, UPR and Río Piedras might as well be on different planets, and most students will only use Tren Urbano if there is a station on their turf—that is, on campus.

### **3.7.3.2. Cultural Argument**

Many expressed concern that having two stations in Río Piedras would exacerbate the divide between the campus and the community. The fear was that each station would symbolize an area divided into separate enclaves; whereas a single station serving both activity centers would represent a greater unity between campus and neighborhood. As Tren Urbano urban designer Elmo Ortiz notes, “the two station plan is consistent with the mythology of the sacred campus—it is not consistent with the public discourse of the unity of the two areas.” Sylvia Santiago of the Tren Urbano community outreach office in Río Piedras adds her concern that, “the UPR Station will further the feeling of a barrier along Avenida Gándara between the town and the university—the two stations will add to the notion that here is one area and there is another.”

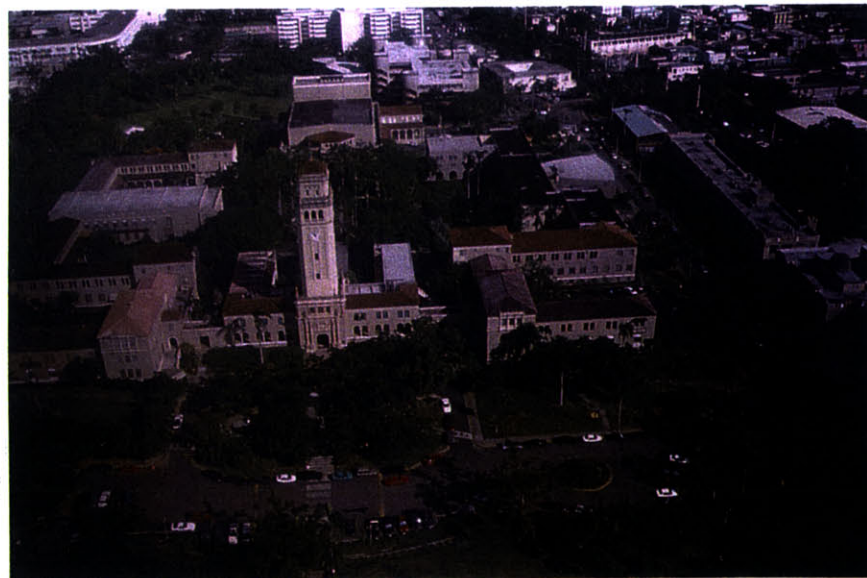
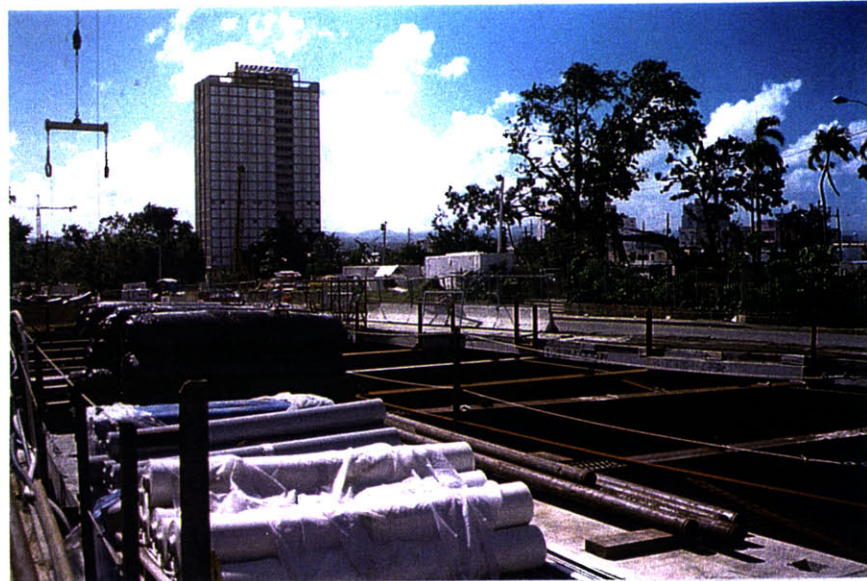
There had been a long history in Río Piedras of disagreement between residents, whose first priority was maintaining a safe, quiet living environment; and merchants, whose first priority was the commercial dynamism of the area. Nevertheless, both groups stood united in their opposition to the station. Speaking on behalf of Río Piedras businesses, Maria Isabel Vicente Mestre, President of the *Asociacion Comerciantes Centro Río Piedras* (Association of Merchants of Central Río Piedras), notes that: “The UPR Station runs counter to the goal of bringing the two communities together. Sure,

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Puerto Rico President Gloria Gonzalez noted that until very recently, there is a strong tradition of walking long distances in Puerto Rico in virtue of its agrarian origins.



**Top:** Construction in front of UPR's *Hogar Masonica*.  
**Top Right:** Cut and cover construction opposite future site of *Plaza Universitaria*.  
**Bottom Right:** Aerial view of UPR.



the students want a station at the campus—the students would want to be able to park their cars in the classroom if they could, but that doesn't mean they should be able to.” Likewise, speaking on behalf of the residents, Alijita Firpi, president of the *Asociacion de Residentes de Río Piedras*, adds that: “We opposed the station at UPR—we wanted better integration between Río Piedras and the University. But with the UPR Station, students will have even less reason to come into Río Piedras.” Both groups realized that the University and its students are an important part of what makes Río Piedras both livable and vital. As Vicente Mestre adds: “What it comes down to is that we need the students in town—what would Harvard Square be without the students?”

### **3.7.3.3. Economic Argument**

Paralleling the cultural argument is an underlying economic argument. Río Piedras merchants were particularly concerned that a UPR Station would cut into the demand for their business. The proposed station, coupled with the University's Plaza Universitaria development, led to fear that a new, competing commercial center would emerge around the UPR Station. In particular, the new center would be targeted towards students, which represent an important market niche for Río Piedras businesses. In the worst case scenario, all the gains that were made by relocating the Río Piedras Station from Avenida Muñoz Rivera to the center of Río Piedras would be lost.

This economic argument, however, goes beyond the economic arguments that were made to advocate relocating the Río Piedras Station towards the center. In that case, merchants and residents objected that the omission of a station in the heart of Río Piedras would hurt the economic viability of the district. In the case of the UPR Station, the argument is that now that the commercial Center of Río Piedras has a station, it must be the exclusive point of access to the system in the neighborhood. In the new argument, stakeholders are not advocating for services to be extended to their community—they are also advocating for the denial of services to an abutting community. This, then, is a more difficult argument to sustain. As Siemens' Joe Ferretti describes it:

The premise of public transportation is that each individual community has its own parochial interests, yet the system must serve the entire metropolitan area. The Río Piedras merchants are just expressing their parochial interests. If I own a department store, I want the station entrances to funnel all passengers into my store—but that would not be

good for the metropolitan area. We must separate the business desires of the Río Piedras merchants from the needs of the metropolitan area.

PRHTA's Deputy Executive Director Carlos Colón is more succinct: "Merchants in Río Piedras want to avoid competition—but that is not what's best for Río Piedras."

#### **3.7.3.4. Non-Continuous Use Argument**

The non-continuous use argument holds that since almost all riders using a UPR Station will be affiliated with the University, and most classes occur only during daylight hours, the station will be all but abandoned during off hours. In contrast, a station such as the Río Piedras Station serves a more diverse group of riders and trip types, and can thus anticipate more continuous use. As Aníbal Sepúlveda Rivera warned, while looking over the future site of the UPR station: "This station will be a wasteland after 5:00pm."

This, Chancellor Gonzalez Tejera acknowledges, is a potentially a problem.

"Many are concerned," he says,

that a UPR Station will only be used during daylight hours—this is a valid concern. But, like with parking, the University has an opportunity and obligation to radically alter how it operates: We need to rearrange our offerings, holding classes at night and on Saturdays. There is too much empty capacity in terms of University facilities. Despite what they may think, professors do not have the inalienable right to teach only from 9 to 2 on Mondays and Wednesdays only."

#### **3.7.4. Outcome**

In the end, Tren Urbano agreed to include the additional station at the main entrance to UPR. To many, this represented a solid coalition between Tren Urbano and the University. As Siemens' Amirilas Viera explains it,

The University was looking for services and incentives for students to stay on campus—that's why they're building Plaza Universitaria. The station was an opportunity for us to work together. We need to balance the pure operations cost of the station with the larger benefits of making the campus area more attractive as well as gaining the support of students and the University.

Chancellor Gonzalez Tejera too stresses the mutual coordination between Tren Urbano and the University:

Ultimately, the only solution was to build a full scale station at the University so students could leave their cars at home and come to campus by train, if they could. In exchange, Tren Urbano received full support and cooperation from the University. In the

long run, this decision will be applauded by Tren Urbano and the University community both.

Others offer a more cynical interpretation of the arrangement between the Tren Urbano and the University and the benefits of the added station. Sylvia Santiago of Tren Urbano's Río Piedras Community Relations office maintains that "the UPR Station was a political compromise between the University and Tren Urbano." Tren Urbano urban designer Elmo Ortiz' reports that "in the end, adding the UPR Station was a decision to please a power center. Sometimes in life you can't control everything. But this may turn out to be a blessing, particularly if it leads to the revitalization of the area opposite the campus."

Community Relations Director Carmen Canino has a simpler explanation. "I get nervous when you talk about history," she says, "there is no history. Fred Salvucci wanted a station at UPR as did the Society of Architects, the Society of Engineers, the University. So now we have a station there—that's it."

### **3.8. Addition of the Domenech Station**

Like the UPR Station, the Domenech was officially added subsequent to submission of the FEIS—in Domenech's case, in June, 1997. The new station will be located just east and south of the large five-corner intersection of Avenida Muñoz Rivera, Calle Domenech, Calle Guayama, and Calle Betances. In many ways, the area suffers from an identity crisis, overshadowed by the more distinctive neighborhoods that surround it. It is just south of the new, glistening financial center in Hato Rey, and just north of the large *Centro Judico* (Judicial Center) Complex. To the east and west lie residential neighborhoods—the more upscale Baldrich neighborhood on the western side and the lower income Quintana neighborhood on the eastern side. The area is home to several professional offices, including medical, dental and legal, as well as small educational institutions, such as EDP College and the Commercial Institute of Puerto Rico Junior College, government offices, such as the Puerto Rico Department of Labor and Human Resources Tower. Other uses include car dealerships, light industrial sites, and bars.

In sharp contrast to the situation described above regarding the addition of the UPR Station, the Domenech station was added with little fanfare or conflict. It was neither advocated for nor opposed as vehemently as the UPR Station. In fact, even its

proponents are muted in their celebration of the benefits of a station at Domenech. Gloria Gonzalez-Ortega, then President of the *Colegio de Arquitectos de Puerto Rico* (Society of Architects) and one of the chief supporters of the station, concedes that “although Domenech was a good decision because of all the people living around the station, it was not so important either way.”<sup>37</sup>

### **3.8.1. Technical Argument**

Jorge Rivera, of the City of San Juan, reports that: “Domenech was not included in initial plans for technical reasons.” The technical reasons that Rivera is referring to concern the alignment proposed in the FEIS, which called for Tren Urbano to travel as an elevated down the median of Avenida Muñoz Rivera in this section of the route. Due to the street geography, were a station to have been placed in the vicinity of Domenech, it would require a massive structure that would be very disruptive visually to the streetscape below, impeding traffic, and requiring significant utility relocations. It would also require two separate, non-connecting headhouses—one for each direction of travel. As this would be the only station on the line with this characteristic, it could be potentially confusing for passengers who might enter the wrong headhouse.

Given these obstacles, it was decided that a station at Domenech should not be included in Phase 1. However, due in large measure to concern regarding the negative impact on Avenida Muñoz Rivera—even without a station—of an aerial guideway, the alignment in this section was later moved to a less intrusive midblock right of way, just east of Muñoz Rivera. As PRHTA’s Carlos Colón recounts:

Domenech is a station that in all fairness was not studied enough in the planning process. Initially, when aligned in the median of Muñoz Rivera, having a station there would have been destructive to the area, so the station was not looked at seriously—when the alignment was shifted to midblock, the option of a station at Domenech became more attractive.

In the end, whether the shift in alignment facilitated the station or the station facilitated the shift in alignment is subject to interpretation. Fred Salvucci, recalls having different motivations: “I advocated for Domenech more because I wanted to realign the line than because I valued having a station there.” Salvucci made the tactical calculation that since a station at Domenech was not feasible with the Muñoz Rivera argument, if he

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<sup>37</sup> Interview, conducted January, 1999.

made the argument for a station at Domenech, it would support moving the alignment as well.

### **3.8.2. Development Argument**

Many speculators are forecasting that San Juan's financial center, the so-called "*Mila de Oro*" (Golden Mile) in Hato Rey, will soon expand well beyond the first mile. With the right infrastructure, the Domenech area is likely to benefit from the expansion of San Juan's financial center. In this vein, placing a station there represents visionary thinking. According to Siemens' Joe Farretti, "Domenech falls into the category of build it and they will come—it is the logical area of growth for the financial district as it expands outward from the golden mile."

Of course the risk of relying on potential development to justify adding a station is that the station may not be viable in the near term, prior to the anticipated development. As Sylvia Santiago of the Río Piedras Community Relations Office worries: "We argued that the density warranted a station. In reality, I'm not so sure—right now, it's in the middle of nowhere." Likewise, Tren Urbano's Elmo Ortiz observes that "while the Domenech Station way well be a good idea in terms of development, it is not as clear in terms of ridership—at least not yet." In the worst case scenario, if the development forecasts turn out to be off, then the station may never be viable.

### **3.8.3. Existing Activity Center**

Others argue that the demand for a station at Domenech is not just driven by future development potential. Rather, it is argued that it is right now an existing activity center that is as capable of supporting a station as several other proposed station areas in Phase 1. Siemens' Ricardo Medina argues that:

the Domenech station will not just serve future uses. That area is currently a destination point because it hosts a large number of professional offices—doctors and lawyers, as well as the department of labor offices. It also lies at a node of connection between the dense residential neighborhoods along Avenida Barbosa and Plaza Las Americas.

Others made similar observations at public hearing, including architect, Carlos Lopez Atienza, who submitted a letter stating:

I suggest that another station be added between the Judicial Center and Roosevelt Ave. stations. In that area there is a great commercial and service industry density and activity, which could greatly benefit from the



Tren Urbano's service. The area of the intersection of Domenech Street and Muñoz Rivera Ave. is a possible area [for the station].<sup>38</sup>

It is important to note that it is not just for the commercial and professional uses that the area is cited as a good location for a station—as alluded to in some of the quotations above, a Domenech Station may also serve the several residential areas that are within relatively easy walking distance of the proposed station. For stations along this subset of the alignment, this proximity to residential areas is a characteristic that is unique to Domenech. Zayda Santos, Coordinator of the Hato Rey Community Relations Office for Tren Urbano, observes that: “of the four Hato Rey stations, Domenech is the one closest to residential neighborhoods.”<sup>39</sup>

What remains uncertain is how invested these residential communities will be in the added station. Given the general lack of enthusiasm on the part of the community, either for or against the station, this is a real concern: As Zayda Santos observes, “to date, the residents from the neighborhoods have not really been involved in the decision to add the Domenech station. Sylvia Santiago is even more guarded: “There is no active community around Domenech like there is in Río Piedras. For the station to work, we need to get residents from surrounding neighborhoods to use it. It is not clear to me that that will happen.”

A final corollary to the argument for the station-appropriateness of the area as an existing activity center concerns the physical geometry of the area. As the intersection of four major roads, it is a natural urban node—if it were in Massachusetts, it would be known as Domenech Square, Circle, or Corner. As Gloria Gonzalez observes, “At least from the standpoint of street layout, it looks more like an intersection in London or Paris than most San Juan intersections.” Accordingly, it is a natural crossroads, a configuration that has historically been more supportive of transit.

#### **3.8.4. Current Stop Spacing in Hato Rey too Long**

This argument returns to the old question of stop spacing. Without the Domenech Station, the distance between Piñero and Roosevelt would be 1,500 m. As PRHTA Engineer for the Hato Rey contract Luis Cruz Rosa comments “1,500 m is just

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<sup>38</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement: Response to Comments Appendix*, San Juan, PR, WS-4-5.

<sup>39</sup> Interview, conducted January, 1999.





**Top:** Aerial view of future site of Domenech Station.  
**Bottom:** Looking east along Calle Domenech toward Avenida Muñoz Rivera.





**Top:** View from lower income residential neighborhood (*Quintana*) immediately east of future Domenech Station.

**Bottom:** View from more affluent residential neighborhood (*Baldrich*) immediately west of Domenech Station.





Building demolition in preparation for construction of midblock elevated alignment and Domenech Station.



too far to walk in this climate.” This position had the support of then San Juan mayor Hector Luis Acevodo, who wrote that:

[The] spreading of stations should be evaluated very carefully, because it could have a direct effect on the patronage of this project. As a matter of public policy, we think it preferable to sacrifice travel time over the number of stations, in order to better serve the city. Thus, we suggest that you include the Domenech Avenue Station in Hato Rey.<sup>40</sup>

Part of the motivating force behind this argument is that it does not make sense for the Hato Rey section of the route, which is characterized by more urban, pedestrian oriented land uses and greater anticipated pedestrian access to stations, to have greater interstation spacings than the more suburban, car-oriented sections of the line.

As was the case with the UPR Station, others countered the resulting spacing was too short. According to Ariel Felix of the municipality of San Juan: “The Domenech Station does not make sense with respect to the efficiency of the system. It’s very close to Piñero—some 300m. That’s way too much overlap.”

### **3.8.5. Minimizing Future Construction Impacts**

The final argument concerns the future ramifications to the area of not building the station now and then later, after identifying the demand, going back and adding it to the existing system. Because of the relative permanence of urban rail stations, such a tactic presents engineering and architectural difficulties—obviously it is easier to build the station at the beginning. Likewise, when the line is being built, construction-related impacts are subjected on the community, whether or not the station is built. As a result, if it is later decided that a station should be added, the community will be disrupted a second time. As Luis Cruz Rosa points out, “If we construct Domenech Station now, we only impact the community once.”

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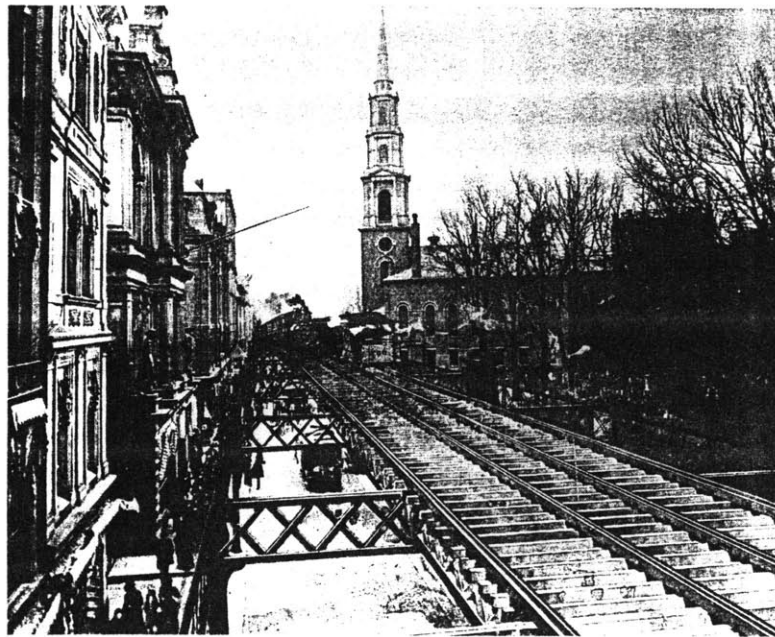
<sup>40</sup> Puerto Rico Department of Transportation and Public Works Highway and Transportation Authority (PRHTA), *Final Environmental Impact Statement: Response to Comments Appendix*, San Juan, PR, PH 1-2, p. 53.

# Chapter 4

## Boston: Lessons from a Transportation Pioneer

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### 4.1. Introduction: The First Subway



*Source: Brian Cudahy, Change at Park Street Under: The Story of Boston's Subways (Brattleboro, VT: The Stephen Greene Press, 1972) p. 12.*

At the end of the nineteenth century, the state authorized Massachusetts Transit Commission prepared a thorough analysis of ways to relieve the congestion of horses and trolleys in downtown Boston and to improve regional mobility. One proposed option

was to employ a technology already used in New York and Chicago: elevated railways, or 'els'. Many local residents were outraged at the thought of Boston's sacred landmarks, as well as the Boston Common, defiled by dirty, steam driven trains and obstructed by a lattice work of obtrusive steel girders. In response (pictured above), is the work of group of stakeholders, who created and distributed a double print photo—a nineteenth century version of Photoshop—that superimposed a picture of elevated tracks and trains over a picture of historic Tremont Street. The doctored photo juxtaposing the el with the venerated Park Street Church was enough to squelch the idea and was one of the forces driving the construction of what at the time was the largest public investment in urban mass transit in America: the construction of a short subway tunnel under Tremont Street. The subway, which opened in 1897, is the first subway in continuous use built outside of Europe.<sup>1</sup> This example is just one in a long history of public involvement—both formal and informal—in shaping decisions regarding rapid transit in Boston that continues today.

#### **4.1.1. Importance of Boston as Transportation Pioneer**

For a combination of political, geographical, and historical reasons, as well as a little bit of luck, the greater Boston Metropolitan Area has been a transportation pioneer in this country. Boston was the first city to fully embrace electric trolleys at the system level, forgoing the conventional cable car. In the nineteenth century, it was the first city to build and, perhaps more importantly, publicly finance a subway. When in 1949 the circumferential Route 128 was built, ringing the city's urban fringe, it was the first belt line in the country. In 1970, when then governor Sargent responded to strong public resistance to a massive planned highway building program by declaring a moratorium on highway construction within Route 128, it was a first. When Massachusetts politicians later engineered a transfer of federal highway funding that had been secured for the road projects killed by Sargent's decision to mass transit projects, that too was a first. Always relevant to each of these firsts is the role played by the public in affecting and shaping transportation decisions in the region, in many cases establishing new models for public participation.

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<sup>1</sup> The first subway tunnel built in North America was actually a short two-station demonstration line under Broadway in New York City—a pneumatic tube built without the support or knowledge of the City or State government. The line opened in 1870, but was closed for financial and political reasons by 1872 and was all but forgotten until discovered by workers building the BRT (now BMT) subway line in 1912.



Beginning before World War II, the construction of the Sumner Tunnel (1936) under Boston Harbor gutted whole neighborhoods in the mostly immigrant North End and East End of the city. Following World War II, Bostonians, like citizens of many American cities, watched as their neighborhoods were vivisected and then patched with highways that served as blighting, physical barriers. The Tobin Bridge, opened in 1943, cut through the heart of Charlestown; the Central Artery, opened in 1955, ripped out much of the North End; the Massachusetts Turnpike, opened in 1959, tore through Chinatown, the South End, Alston and Brighton. In none of these cases was there a relocation process for displaced residents, or any forum for input from the affected communities or other stakeholders.

Following the Federal Highway Act, plans were drawn and, in some cases, land was cleared to make way for a vast new network of freeways. Included in the plans were an Inner Belt highway, which would ring inner city neighborhoods of Boston, Cambridge and Somerville, and a new Southwest Corridor alignment for Interstate-95, cutting through the South End, Roxbury and Jamaica Plain. But by the late 1960s, many citizens had had enough. As former Massachusetts Secretary of Transportation Fred Salvucci explains it, after years of being subjected to grotesquely invasive highway construction and displacement, people began to develop the sociological equivalent of antibodies.

The results were innovative for the time, befitting Boston's status as transportation pioneer. By 1970, pressure from a diverse coalition of residents from Somerville to Cambridge, to the South End, to Roxbury, to Jamaica Plain, to Mattapan ultimately led then governor Sargent to declare a moratorium on highway construction within Route 128. Later, due in large part to the standing of Massachusetts' legislative delegation, a new arrangement called "Interstate Transfer" was worked out, whereby funds that had been secured for the blocked highway projects could be transferred to fund mass transit instead. Interstate transfer funds were used to finance the Southwest Corridor Orange Line and Northwest Corridor Red Line projects, which will be described in greater detail below.

#### 4.1.2. Boston Case Studies

As a transportation pioneer, at least in this country, examples from Boston can offer valuable guidance for what worked and what failed in making transit decisions, such as the decision to add a station to a transit alignment. By studying cases of station additions that have since resulted in actual stations—an option that is obviously not yet possible in San Juan—we can help gauge the ultimate value of certain types of additions. In this vein, the remainder of this chapter will focus on the brief analyses of three stations that were added to planned Boston area transit alignments, due in large part to input from the community:

- ***Davis Square Station*** (Somerville) on the Northwest Corridor Red Line Extension;
- ***Stony Brook Station*** (Jamaica Plain) on the Southwest Corridor Orange Line Relocation; and
- ***Uphams Corner Station*** (Dorchester) on the Fairmont Branch Commuter Rail Line.

All three stations were added within the last thirty years. In the case of the Red and Orange Line stations, the additions took place within the context of a long-standing planning process for the corridors in question. In both cases, community input was solicited as part of that process. In the case of Davis Square, the result was a reevaluation of the alignment in order to serve a key node. The primary argument favoring the addition focused on economic development and revitalization of a historic center. In the case of Stony Brook, a station was added along an existing, relatively immutable alignment. The station was located not at a single, isolated node, but along a linear node. In this case, the primary argument for the station's addition focused on comprehensiveness of service. Like the Davis Square Station, the Uphams Corner Station was focused on a key node or center. Unlike the other two, the Uphams Corner Station was not added within the context of an existing planning process. Rather, it was the direct result of unsolicited activism on the part of a key neighborhood group, Dudley Street Neighborhood Initiative (DSNI), who objected to a perceived willful lack of service. The primary argument for inclusion of the station focused on issues of social justice and the obligation to serve an area that was systematically denied adequate service.

The Northwest Red Line extension and Southwest Corridor Orange Line extensions both came into being during the second generation of recent rail transit expansion in Boston. The first generation of recent extensions, built in the 1960s and

70s, followed the BART model of long station spacings, emphasizing speeding access between the CBD and the suburbs, with little attention to the inner city. These extensions include the Haymarket North Orange Line relocation to Malden along the Reading Branch of the Boston and Maine Railroad and the South Shore Red Line extension to Quincy and later Braintree along the Old Colony Railroad right-of-way. Both are built almost exclusively in elevated or at grade alignments, with long station spacings—an average of 1.08 miles on the Orange Line<sup>2</sup> and 1.92 miles on the Red Line.<sup>3</sup> The South Shore Red Line extension includes what was originally a 4.33 mile station spacing from Andrew Square in South Boston to North Quincy. The train does not stop in the inner city neighborhood of Dorchester in large measure because when the extension was designed, then Quincy State Senator McIntyre would not give legislative approval without non-stop service through Dorchester. Both of these Red and Orange Line extensions are characterized by suburban stations and were designed to be fed by auto traffic, and so were located in veritable no-man's lands, isolated by vast parking lots. Both extensions were built without any significant public input.

In contrast to the first generation of recent rail expansion, the second generation Northwest and Southwest extensions, both of which went into revenue service in the 1980s, had a more urban, inner city focus. Interstation spacings are smaller—an average of 0.55 miles on the Orange Line<sup>4</sup> and 0.93 miles on the Red Line.<sup>5</sup> While the Red Line Northwest extension terminates in the edge-city Alewife district of Cambridge, it gets there via an underground alignment through very urban, dense and historic centers: Harvard and Porter Squares in Cambridge and later Davis Square in Somerville. Likewise, the Southwest Corridor Orange Line runs entirely within the city of Boston, traveling through inner city areas of the Back Bay, South End, Roxbury, and Jamaica Plain. Interestingly, both were originally planned with a more suburban focus in mind—the Red Line was initially envisioned as running through Arlington and Lexington all the way to Route 128, while the Orange Line was envisioned as reaching Route 128 via Needham or Dedham. When both extensions were scaled back, the inner city segments remained. It is also significant that both extensions became models for

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<sup>2</sup> North Station to Oak Grove Station—source: MBTA, *1997 Ridership and Service Statistics*, Boston, MA 1997, p. 7-4.

<sup>3</sup> Andrew Station to Braintree Station—source: MBTA, *1997 Ridership and Service Statistics*, Boston, MA 1997, p. 7-2.

<sup>4</sup> Forest Hills Station to New England Medical Center Station—source: MBTA, *1997 Ridership and Service Statistics*, Boston, MA 1997, p. 7-4.

community involvement in a transportation project that was perceived as innovative for the time.

## **4.2. Addition of Davis Square Station: A Cornerstone in the Building of a New Somerville**

### **4.2.1. History of Davis Square**

At the intersection of Highland Avenue, Elm Street, College Avenue, Dover Street and Day Street, lies Davis Square—Somerville’s preeminent commercial center. While the area flourished through the 1950s, following the post war surge in automobile ownership, the dense, pedestrian oriented square experienced economic and physical decline, as the historic center was passed over economically for the more auto accessible suburban shopping centers and job centers. In a 1980 planning report on the area, it states that:

Like most older downtown centers, Davis Square has not succeeded in keeping pace with changing trade area needs or perceptions. Continued losses, combined with a shifting trade area, a lack of competitiveness among merchants, and problems including traffic congestion, inadequate parking, and deteriorating appearance have contributed to the decline of Davis Square.<sup>6</sup>

In the ten years preceding release of that report, the city of Somerville also experienced a loss of 29% of its jobs and 13% of its population.<sup>7</sup>

### **4.2.2. History of Northwest Corridor Extension Proposals**

As early as the 1950s, proposals were in place for an extension of the Cambridge-Dorchester Line (since renamed the Red Line) from its Harvard Square terminus through North Cambridge and then continuing along a freight railway cutoff to Alewife Brook Parkway. As indicated in the **Map 14** below, the alignment skirts the Cambridge/Somerville border without actually venturing into Somerville.

In 1967, the MBTA produced a report recommending a Northwest extension of the Red Line from Harvard to Alewife, with possible later extensions into Arlington and

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<sup>5</sup> Alewife Station to Harvard Station—source: MBTA, *1997 Ridership and Service Statistics*, Boston, MA 1997, p. 7-2.

<sup>6</sup> City of Somerville Office of Planning and Community Development, *Davis Square Planning Study, Working Paper No. 4—Market Analysis*, October, 1980, p. 3. <sup>6</sup> Central Transportation Planning Staff (CTPS), *Red Line Extension to Alewife: Before/After Study—Appendices*, December, 1987, p. 37.

Lexington. The 1967 report recommended a tunnel under Massachusetts Avenue from Harvard to Porter, and then a surface alignment along the right-of-way of the Fitchburg Division of what was then the Boston and Maine Railroad. As shown in **Map 15** below, there was no recommendation for the line to enter Somerville.

#### **4.2.3. The BTPR and the Addition of the Davis Sq. Station**

Following governor Sargent's highway moratorium, the newly established Boston Transportation Planning Review (BTPR) again put forth the possibility of a Northwest Red Line extension. As the BTPR was established as a response to community pressure that had coalesced around blocking the highway proposals, the BTPR prioritized public involvement in a fashion that was unprecedented at the time. Many Somerville residents and business people took advantage of the BTPR's openness to community input and pushed for the route to divert north into Davis Square on its route between Porter Square and Alewife Brook Parkway.

As Donald Graham, Manager of Development for the MBTA at the time, explains it:

Out of the BTPR came the extensive studies about the northwest including the idea that the Red Line should not only go to Porter Square, but also should come into Somerville to Davis Square. And this concept was introduced by the citizens, the residents of Somerville, who indicated that since Somerville was fairly transit oriented, that in itself deserved direct rapid transit service.

As a result of this kind of input from Somerville, the consensus that came out of the BTPR was that the Red Line Extension should include service directly to Davis Square.<sup>8</sup>

The role that the public played in grafting the Davis Square Station onto the plans was a first. According to MBTA historian and head reference librarian at the State Transportation Library George Sandborn: "Davis Square went from afterthought to critical piece in the plan because the people of Somerville made it happen. This was the first time, really, that you had community input in a transportation project. Prior to Davis Square, everyone just did what they pleased—the public be damned."<sup>9</sup> As Somerville resident Carla Johnson stated in public hearing:

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<sup>7</sup> Central Transportation Planning Staff (CTPS), *Red Line Extension to Alewife: Before/After Study—Appendices*, December, 1987, p. 37.

<sup>8</sup> Massachusetts Bay Transportation Authority, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, pp. 2-12—2-13.

<sup>9</sup> Interview...



**Map 14:** Proposed northwest subway extension, May 1953.

Note: Route does not enter Somerville.

Source: MTA, Report Regarding Extension of Rapid Transit Facilities in Cambridge and Arlington, June, 1953.

METROPOLITAN TRANSIT AUTHORITY  
BOSTON, MASS.  
EXTENSION OF CAMBRIDGE SUBWAY TO ARLINGTON

# EXISTING & PROPOSED RAPID TRANSIT LINES

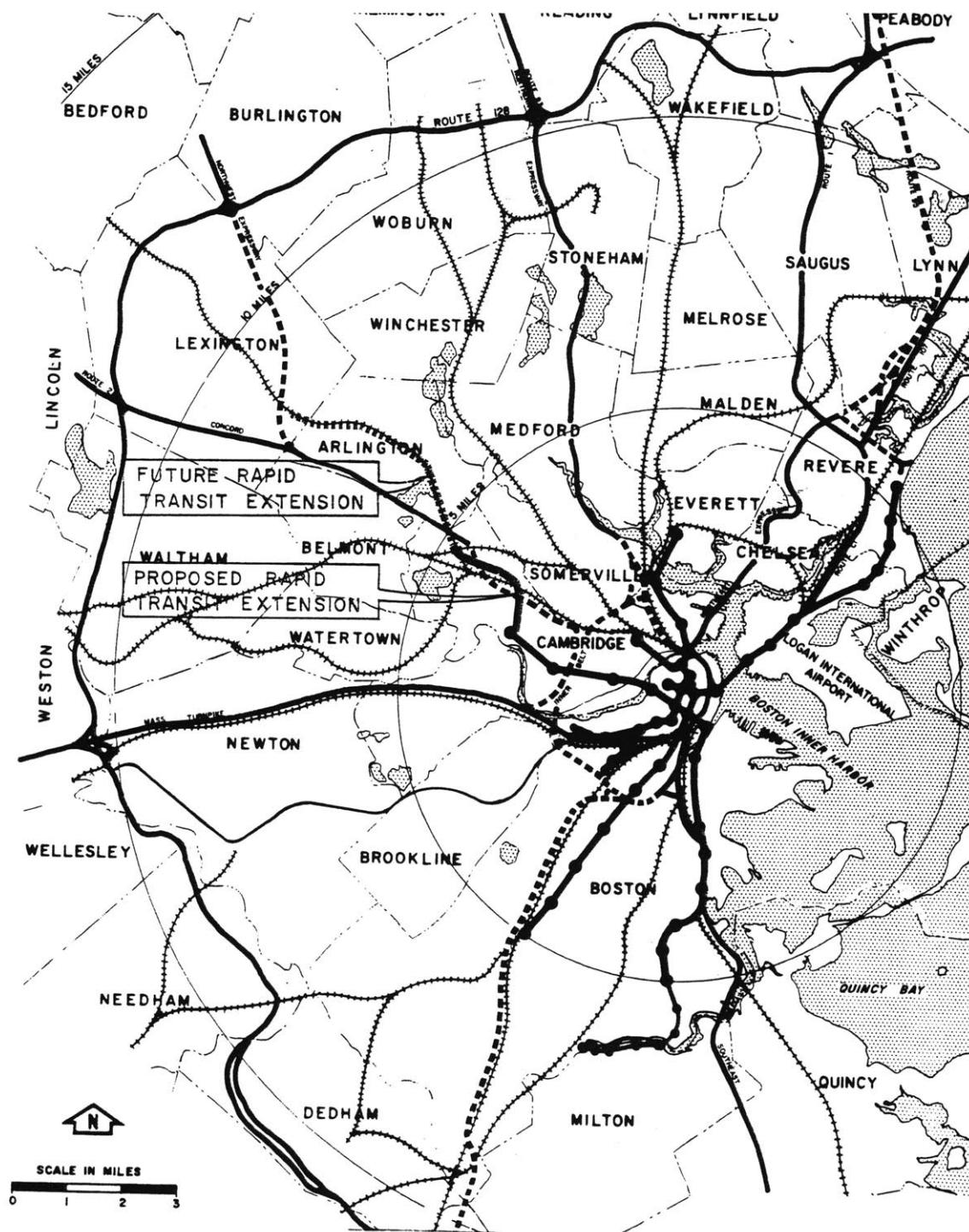
SCALE - 1"=1/4" MILE

DATE: MAY 1, 1953.

APPROVED \_\_\_\_\_  
Supt. of Engineering and Maint.

PLAN NO.  
15122



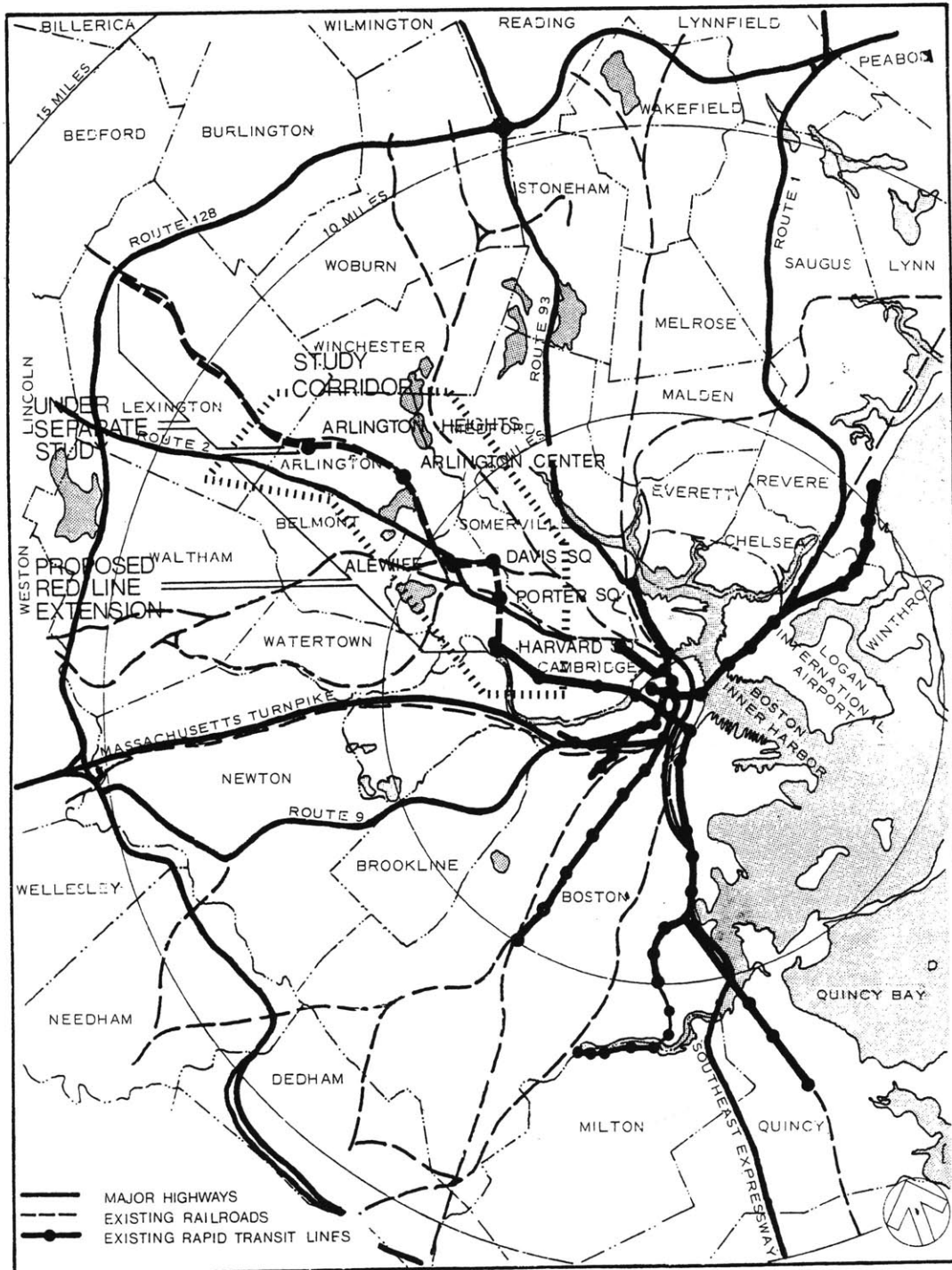


**LEGEND**

- Existing Rapid Transit Lines
- Existing Expressways
- Proposed Expressways
- Existing Railroads

**Map 15:** Proposed northwest Red Line extension, February 1968. Alignment follows Fitchburg Division ROW from Porter to Alewife and does not enter Somerville.

Source: Sverdrup & Parcel and Associates/MBTA, Preliminary Engineering Report: Rapid Transit Extension—Harvard to Alewife Brook, February, 1968.



**Map 16:** Red Line extension as proposed in FEIS, including Davis Sq. Station, August 1977.  
Source: MBTA, FEIS: Red Line Extension to Arlington Heights, August 1977.

**RED LINE EXTENSION  
STUDY CORRIDOR**  
FIG. 1-1

Sometimes Government agencies just don't listen and citizens groups just don't know how to bring about constructive results. But I can say quite emphatically that the subway will not only be good for Davis Square but that the people of Davis Square have spent 1973, 1974, and 1975 to guarantee that neighborhood interests are respected and to set an example for the entire region...The MBTA, the planners and consultants working with them have demonstrated that participation works.<sup>10</sup>

Local advocates had gained the support of the municipal government.

Somerville's Mayor, Lester Ralph in part owed his mayoral accession to a reformist campaign agenda which included the promise to reverse the pro-Inner Belt stance of the previous administration. Given his background in the anti-highway movement, Mayor Ralph was eager to be an activist for gaining transit accessibility for Somerville. As he stated in a letter to the MBTA:

For the last years, we have been forced to fight the battle against disruptive highways. We fought the Inner Belt; we fought the Route 2 extension, we fought the widening of College Avenue—and we won. Many have joined our efforts and declared that mass transportation is best for the future of the Boston region. A subway stop in Davis Square will be Somerville's link to that future. It can be a cornerstone in the building of a new Somerville.<sup>11</sup>

By May, 1972 the City of Somerville was on record supporting the Davis Square diversion and passed a resolution stating:

That the Somerville Board of Aldermen in session assembled do hereby express our deep concern and wish to impress upon the Massachusetts Bay Transportation Authority that we are all in favor of having a rapid transit station in Somerville and of having the Red Line, when it is constructed from Harvard Square to Alewife Brook Parkway, extend into the Davis Square area.<sup>12</sup>

Advocates for a Davis Square Station also took advantage of key, well-timed opportunities. The 1967 plan called for cut and cover construction along Massachusetts Avenue between Harvard and Porter and a surface alignment from Porter to Alewife through North Cambridge. Massachusetts Avenue merchants objected, due to the disruptive nature of cut and cover construction, which requires full excavation of the

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<sup>10</sup> Massachusetts Bay Transportation Authority, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, pp. 2-37 to 2-38.

<sup>11</sup> MBTA, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, pp. 2-28—2-29.

street, while North Cambridge residents and merchants complained that the surface alignment would result in significant disutility once service became operational. This opened the door for reevaluation of the proposed route. Proponents of a station at Davis took advantage of this opportunity and began lobbying for a deviation in the route to facilitate service to Davis Square.

Starting in 1973, a coalition of residents, merchants, and local public officials launched a petition and letter writing campaign to the MBTA in support of the Davis Square detour. By the time the Final Environmental Impact Statement for the extension was submitted in 1977, the locally preferred alternative varied the 1967 proposal, such that the route would travel north from Porter Square to Davis and then head out to Alewife under a freight railway cutoff right-of-way. (See **Map16** above).

#### **4.2.4. Arguments for Adding a Station at Davis Square**

##### **4.2.4.1. Funding Equity Argument**

At the time, Somerville paid the third highest MBTA assessment, following Boston and Cambridge, yet had no rapid transit station within its borders. As Mayor Ralph noted:

I am strongly in favor of an intermediate station in Davis Square. It is time that the citizens of Somerville, who pay the third highest portion of the MBTA deficit, receive some first class service... A station in Davis Square would be a major asset to the City of Somerville by providing improved access to jobs and other activities in Boston, Cambridge, the South Shore, and possibly Arlington and Route 128; cheaper fares for many Somerville residents (\$0.25 instead of \$0.45) and shortened bus trips for many others; faster service, cutting travel times to Boston and Cambridge by as much as half; [and providing] an opportunity to reorganize the bus system and get better service for less money.<sup>13</sup>

Speaking as a Somerville property owner, Carla Johnston presented a more personal argument at public hearing: "The subway should serve the people who pay for it in their taxes...I pay a lot of taxes for the MBTA and in return I expect the best public

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<sup>12</sup> US Urban Mass Transportation Administration, *Final Environmental Impact Statement: Red Line Extension Harvard Square to Arlington Heights* (Boston, August 1977) Vol. II, pp. IX-23—IX-26.

<sup>13</sup> MBTA, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, p. 2-27.

transportation available.”<sup>14</sup> Simply put, the feeling was that Somerville was not getting what it was paying for and deserved rapid rail service.

#### **4.2.4.2. Transit Orientation Argument**

Davis Square is a dense, pedestrian-oriented district with low rates of car ownership. As a result, many argued that siting a station there would not only benefit the Square, it would benefit the MBTA as well by supporting the system via ridership. Since people living, shopping, or working in dense activity centers such as Davis are more likely to use transit, a Davis Square Station should be expected to generate a sizable ridership that would support and justify the station. Quoting Bruce Glabe, former Chair of the Somerville Planning Board: “Subways provide the most efficient transportation service to densely populated areas. Somerville is the most densely populated area in the State and ranks with the first five in the nation. Since 30% of the households in Somerville do not have cars, they are dependent upon public transportation.”<sup>15</sup>

It was also argued that Davis Square’s sizable elderly community represents a population that is more likely to use transit. Likewise, it was noted that Davis’ proximity to Tufts University would also generate a large number of riders from students—another group less likely to own private cars and more likely to use transit.

#### **4.2.4.3. Economic Revitalization Argument**

As noted earlier on, the economic and ensuing physical deterioration of Davis Square dating back to the 1960s was a major concern. Many argued that a direct subway link via a Red Line Station in Davis Square could help reverse this negative trend. As Mayor Ralph stated in public hearing, a Red Line station would be “a ‘shot in the arm’ to the Davis Square business community by stemming the loss of stores, jobs, and tax base which has been occurring in that area over the past several years.”<sup>16</sup> Subway access could help Davis Square compete with the suburban shopping centers’ convenience of auto access. As Carla Johnson argued in public hearing, “With the competition of large suburban shopping malls only one thing can revitalize Davis Square

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<sup>14</sup> MBTA, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, p. 2-36.

<sup>15</sup> MBTA, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, p. 2-33, 2-34.

business and prevent continued deterioration—the walk in business of a mass transportation station and transfer point.”<sup>17</sup>

#### **4.2.5. Results of Adding the Davis Square Station**

##### **4.2.5.1. Ridership**

Based on ridership data at the station level, Davis can be considered a success. In 1995, 9,544 passengers per day, or 5.9% of boardings at all 22 Red Line stations, were at Davis Station. It had the eighth highest ridership on the line in 1995. These ridership numbers actually exceed the ridership projections in the FEIS of 8,100 passengers boarding at Davis per day.<sup>18</sup> Interestingly, the only station on the Northwest extension that had 1995 daily ridership levels below what was projected in the FEIS is the terminal station Alewife (11,700 projected, 9,425 actual). As Davis is the line’s penultimate station, the lower than projected ridership figures at Alewife indicate that even fewer riders were inconvenienced by the time penalty of stopping at the additional station at Davis Square.

The difference between the two stations in terms of living up to expectations also speaks to a greater likelihood of success for stations geared towards pedestrian access, such as Davis, than stations geared towards auto access, such as Alewife. As noted above, dense, pedestrian-oriented urban centers such as Davis have a history of supporting transit and are more likely to do so in the future. Likewise, they do not require massive parking structures, such as was built at Alewife, which detracts from the physical ambiance of the area and discourages non-auto access to the station.

##### **4.2.5.2. Revitalization of Davis Square**

Following the opening of the MBTA station at Davis, the Square’s renaissance has been legendary, if not oversold. The *Utne Reader* put Davis Square on its list of the hippest places in America and *The Nation* termed it “the Paris of the 90s.” In a recent editorial, Boston Globe columnist Adrian Walker writes that “after years as a lower-rent

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<sup>16</sup> MBTA, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, p. 2-27.

<sup>17</sup> MBTA, *Red Line Extension Public Hearing—Stenographic Record*, Somerville High School, March 24, 1976, p. 2-37.

<sup>18</sup> U.S. Department of Transportation/Urban Mass Transportation Administration, *Final Environmental Impact Statement—Red Line Extension Harvard Square to Arlington Heights*, Boston, MA, August, 1977, p. IX-25.



neighbor to both Harvard Square and Tufts, Somerville's Davis Square is hot."<sup>19</sup> Even back in 1987—a scant two years after the Davis Square Station opened—a CTPS report notes that “almost everyone with memories of the Davis Square of fifteen years ago is stuck by the remarkable difference in the appearance of Davis Square today.”<sup>20</sup> The report also notes that businesses in the vicinity of the new station showed increased sales as soon as the station opened, although this increase did not extend beyond the immediate station area. Garen Daly, owner of the Somerville Theater next to the station, told the *Boston Globe* that his business was up 15% the first year the Station opened and 25% the year after that.<sup>21</sup> Likewise, the amount of commercial land uses increased by 10 percentage points between 1978 and 1986.

A more recent TCRP report further documents the neighborhood's revival: “Today, Davis Square flourishes and has recently experienced an influx of new restaurants, theaters, and entertainment-related businesses.” The TCRP report also notes that since release of the CTPS study, Davis Square has also been the site of new commercial office development, including two office buildings totaling 170,000 sq. ft. “Taken together,” the report notes, “these activities add vitality to the square, both during and after traditional business hours. Undoubtedly, the transit improvements have contributed significantly to the square's overall health.”<sup>22</sup>

Former MBTA chairman Bob Wood told a *Boston Globe* reporter: “Because of the Red Line extension, we got Davis Square as we know it. That's why Tufts is blossoming and why Somerville is where grad students from Harvard and elsewhere settle.”<sup>23</sup> The concern is that the cost of economic recovery is the negative effects of gentrification, whereby Davis Square's long time, mostly working class residents can no longer afford the area. Speaking on the changing fortunes of Davis Square, US Representative and former Somerville Mayor Michael Capuano says that “You work hard to make it a better place to live and do business, and the risk is that you price out the people you were trying to help.”<sup>24</sup> Here, the effects of the station are inconclusive. The

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<sup>19</sup> *Boston Globe*, “Davis Square's Mixed Blessings,” March 11, 1999, p. B1.

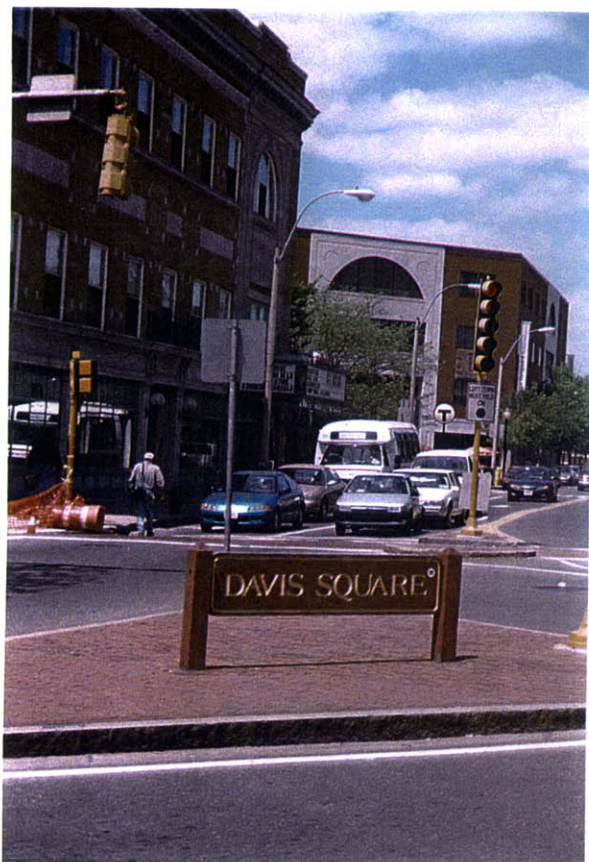
<sup>20</sup> Central Transportation Planning Staff (CTPS), *Red Line Extension to Alewife: Before/After Study—Appendices*, December, 1987, p. 38.

<sup>21</sup> *Boston Globe*, “Study to Gauge Red Line Stations' Role in Area Growth,” December 7, 1986, pp. 33, 42.

<sup>22</sup> Transit Cooperative Research Program (TCRP), *The Role of Transit in Creating Livable Metropolitan Communities—TCRP Report 22* (New York: National Academy Press, 1997), pp. 41-42.

<sup>23</sup> *Boston Globe*, “A Thinker and a Doer on America's Cities,” Wednesday, May 5, 1999, p. A27.

<sup>24</sup> *Boston Globe*, “Davis Square's Mixed Blessings,” March 11, 1999, p. B1.



**Top:** Looking north from Davis Sq. along Holland Ave., past Somerville Theater and MBTA Red Line Station.

**Top Right:** Reconstruction of Davis Sq. Plaza, over former freight railway cutoff.

**Bottom Right:** Looking south along Holland Ave. from Davis Sq. Station Headhouse.



1987 CTPS Report notes that while the median sales prices for one to three family homes increased almost 200% between 1980 and 1985, this is commensurate with housing price increases throughout the city of Somerville. The report concludes that:

Whether the Red Line is considered by homebuyers as a benefit in terms of transportation time and cost is not yet clear. Either homebuyers are not factoring in the Red Line to any great extent (the opinion of several brokers interviewed for this study), or an insufficient amount of time has passed for a noticeable change to have occurred.<sup>25</sup>

More recently, rental costs around Davis Square have increased, but it is not clear how much of that increase can be attributed to the abolition of rent control in neighboring Cambridge and Boston.

#### **4.2.5.3. Institutional Revitalization**

It was not just the direct economic benefits of the station that led to the revival of Davis Square. Motivated by the anticipated Red Line extension and the Davis Square Station, a local consortium of public and private interests took proactive measures to improve the area, beginning as far back as eight years before the station actually opened. As stated in the TCRP report:

Davis Square has been revitalized and is a thriving downtown area, not just because of the transit investment and improved access, but because of the energy and commitment of the city, businesses, the MBTA, and residents. Working together, the transit station served as a catalyst for a range of cooperative programs that have breathed new life into the district and made the city of Somerville more livable.<sup>26</sup>

In 1977, in preparation for the coming subway, the City initiated the first in a series of Davis Square Urban Design and Business studies, and formed the Davis Square Task Force, a group consisting of merchants, residents and other stakeholders to serve as a citizen's advisory committee charged with guiding future growth in the Square.

The City and the Task Force worked together to initiate and, perhaps most importantly, find resources for streetscape improvements, storefront and façade improvements, construction of a bikepath along the old freight railway right-of-way, and construction of a central plaza in the heart of the square. Funding came from such diverse sources as the Federal Highway Administration's Urban Streets Program,

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<sup>25</sup> Central Transportation Planning Staff (CTPS), *Red Line Extension to Alewife: Before/After Study—Appendices*, December, 1987, pp. 47-48.

Community Development Block Grants, as well as the MBTA, the City of Somerville, and the Commonwealth of Massachusetts. As part of this effort, Davis Square was designated as a commercial area revitalization district (CARD), which made commercial developments in the area eligible for Industrial Revenue Bond financing through the Massachusetts Industrial Finance Administration.

Much of the improvements are physical—new brick and granite paving, distinctive street lamps, and a central plaza designed with welcoming benches and public art. Yet all of these improvements were made without making the area seem overdone or artificially quaint. As the TCRP report observes:

The tremendous community effort to preserve the neighborhood's character paid off: Davis Square is remarkable in its coherence and urban texture. As the residents had hoped, the area still had the narrow streets, the small scale and the densely built fabric that made it unique and now contribute to its success.<sup>27</sup>

### **4.3. Addition of Stony Brook Orange Line Station**

#### **4.3.1. History of Southwest Corridor Project**

The original route of the MBTA's Orange Line ran elevated over Washington Street in the South End, Roxbury, and Jamaica Plain. By the 1960s, elevated trains had lost favor, becoming increasingly viewed as obsolete, nineteenth century monstrosities that blighted the neighborhoods they traveled above with noise, dirt, and shadow. In this spirit, plans were drawn up calling for the Orange Line to be relocated to the median of a new eight lane interstate highway (I-95) to run along the Penn Central right of way—about a half mile to a mile west of the elevated tracks.

The Penn Central railway alignment ran along a raised embankment that abutters called “The Chinese Wall.” The raised embankment was the result of an earlier upgrade of a historic railway right-of-way built in the valley of the Stony Brook. Tracks were first laid in the corridor in 1834. As recently as the 1950s, the line stopped at inner-city stations in Jamaica Plain and Roxbury, including Jamaica Plain—site of the current Green Street Station, Boylston—site of the current Stony Brook Station, Health Street—site of the Jackson Square Station, and Roxbury—site of the current Roxbury Crossing Station (See **Map 17** below). These stations were later abandoned following a trend on the part of the private commuter rail providers to withdraw service from the inner city.

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<sup>26</sup> Transit Cooperative Research Program (TCRP), *The Role of Transit in Creating Livable Metropolitan Communities—TCRP Report 22* (New York: National Academy Press, 1997), p. 42.

At the time, the new Orange Line was projected to run past its present Forest Hills location towards route 128 in the suburbs. At the time the focus was very much on serving the suburban commuter. Some alleged that this included the deliberate attempt to utilize a corridor that better avoided neighborhoods composed of people of color than the Washington Street Corridor. In order to speed travel times between suburb and city, the earlier plans included fewer stations than were eventually constructed. As indicated in the map from the 1970 plan shown below, there was no station planned for Boylston Street in Jamaica Plain—the site of the Stony Brook Station.

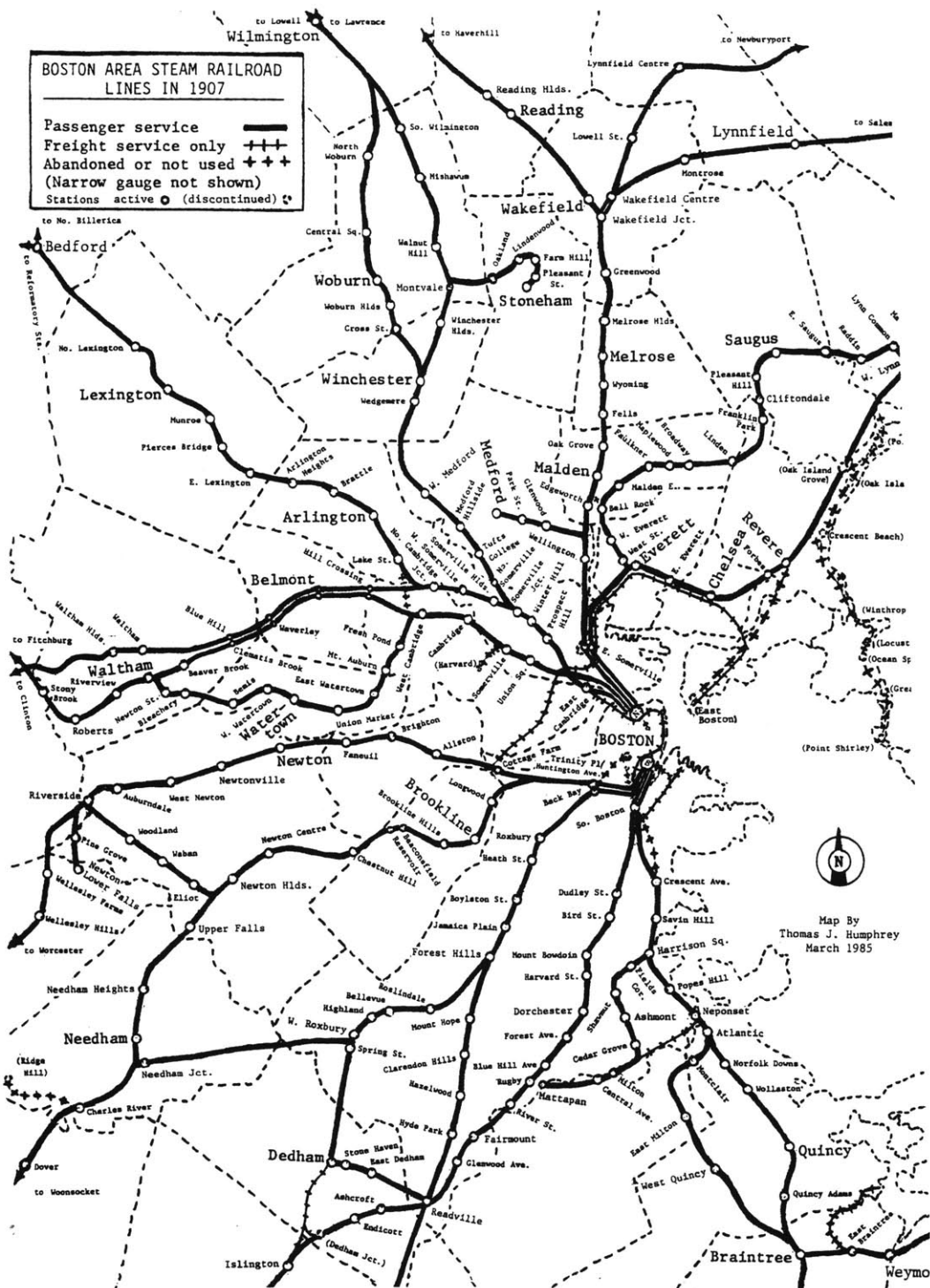
Although the highway was stopped when Governor Sargent declared the moratorium on highway construction inside Route 128, that was after over 100 acres of land—homes and businesses—had already been cleared for the highway. The subsequently convened Boston Transportation Planning Review (BTPR) recommended that even without the highway, the Orange Line should be relocated to the Southwest Corridor right-of-way. The routing spelled out in the 1978 Final Environmental Impact Statement (FEIS) for the relocated Orange Line is a scaled-back version of the previously-planned full extension to Route 128. Due in part to the decreased suburban emphasis of the truncated line, there was less incentive for the MBTA to follow a policy of planning for fewer stations with longer spacings. In this vein, the FEIS calls for a Boylston Street Station. As documented in the FEIS, “the station site is located in an area of small-scale mixed residential and commercial districts with occasional manufacturing and industrial districts on the east side of the tracks.”<sup>28</sup> Following submission of the FEIS, Boylston Street Station was renamed Stony Brook, to avoid confusion with the Boylston Station on the Green Line. Interestingly, the site of the station has no particular attachment to the Stony Brook—a now culverted and buried waterway over which the entire Southwest Corridor was built. In fact, no contemporary map will even show the Stony Brook for which the station is named—from the standpoint of a typical resident, it has no reference.

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<sup>27</sup> Transit Cooperative Research Program (TCRP), *The Role of Transit in Creating Livable Metropolitan Communities—TCRP Report 22* (New York: National Academy Press, 1997), p. 42.

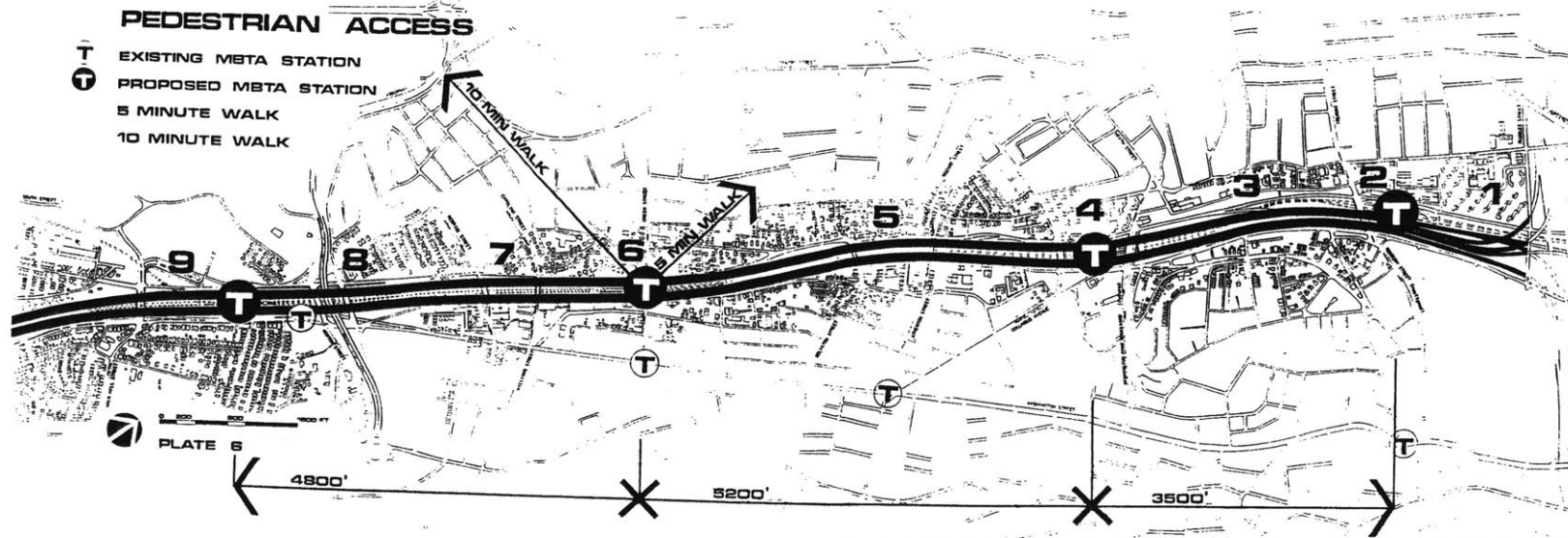
<sup>28</sup> U.S. Department of Transportation/Urban Mass Transportation Administration, *Final Environmental Impact Statement—Orange Line Relocation (Southwest Corridor Project): South Cove to Forest Hills*, Boston, MA, March, 1978, p. IV-47.





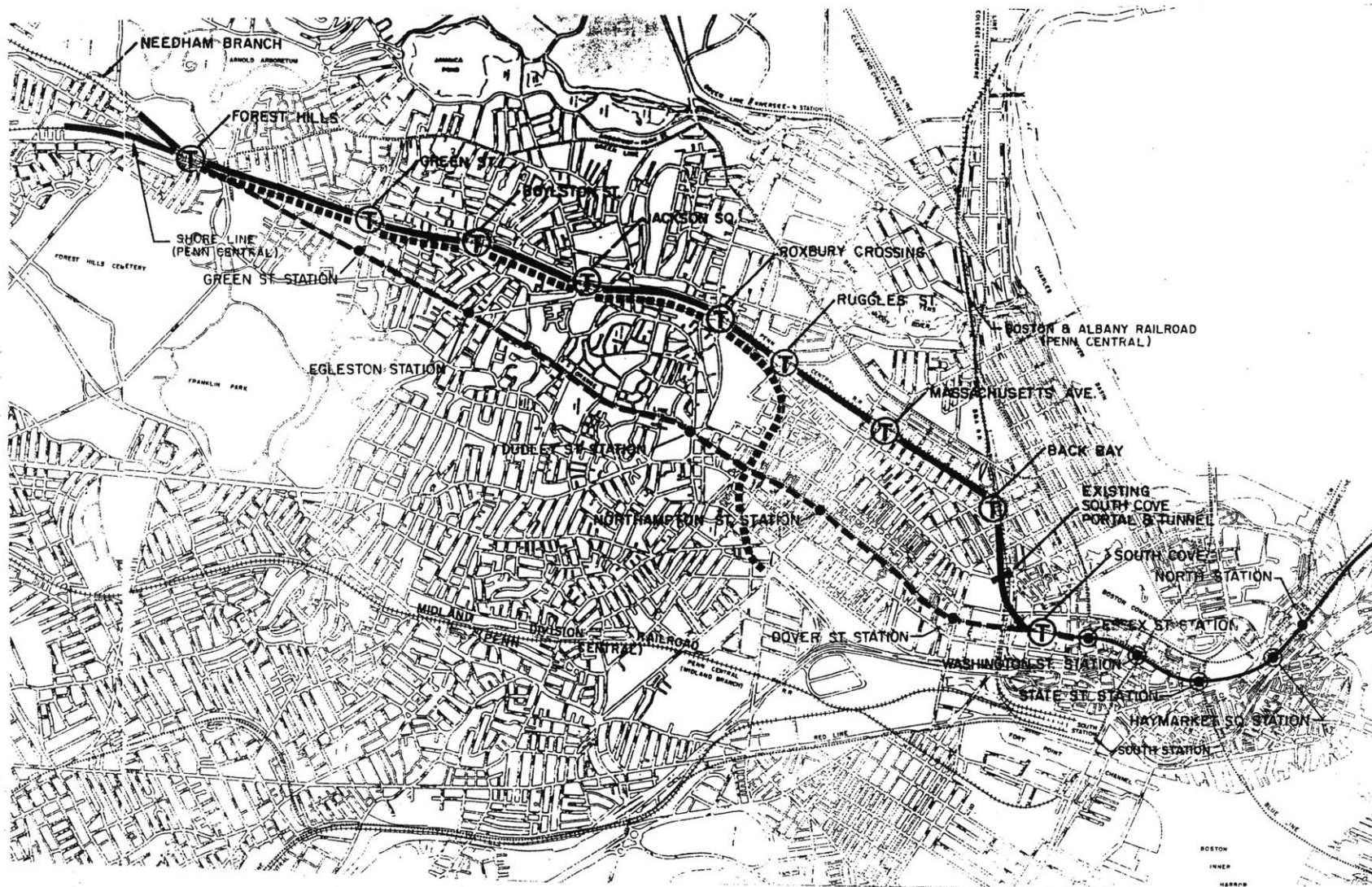
**Map 17:** Boston steam railroad lines, 1907. Note: All MBTA Stations studied in this report exist here as railroad stations (Davis is W. Somerville, Stony Brook is Boylston St., Uphams Corner is Dudley St.).  
 Source: Thomas Humphrey & Norton Clark, *Boston's Commuter Rail: The First 150 Years*, (Boston: Boston Street Railway Association, 1985).





**Map 18:** Proposed Jamaica Plain Stations for relocated Orange Line in median of new I-95, March 1970.

Source: The Architects Collaborative, Inc./Southwest Corridor Technical Committee, *Southwest Corridor Study* (Boston, March 1970).



**Map 19: Orange Line relocation as proposed in FEIS, March 1978.**  
 Source: MBTA, FEIS: Orange Line Relocation, March 1978.

### **4.3.2. Arguments for Addition of Stony Brook Station**

#### **4.3.2.1. Neighborhood Investment in the Project**

The Southwest Corridor project was not just a transit initiative, but an attempt at righting the devastating effects of clearing land for an out-of-scale highway through Boston's inner-city. As Peter Welch of the City of Boston tells Neil Pierce and Robert Guskind in *Boston's Southwest Corridor: People Power Makes History*, "The theme of this project is 'healing the scar.' The scar is physical, social, economic."<sup>29</sup> As Pierce and Guskind report:

When work began, the area was an inner-city wasteland, an ugly no-man's land overrun with ailanthus that had been created in a rush to clear the way for a new interstate...The long gash cleared for the highway...looked as though someone wielding a giant machete had gouged out the city's heart.<sup>30</sup>

The disregard for the effected neighborhoods bred considerable distrust in the communities. In an article in the *Boston Globe*, it is reported that one resident whose childhood home was unceremoniously taken for the highway feels "his temper still flare as he remembers right-of-way officials blowing through the streets where he grew up, displacing elderly residents in the name of progress."<sup>31</sup> In an attempt to help redress this history, a conscious effort was made to be more inclusive—to get the abutting neighborhoods to feel that the new Orange Line was theirs. As noted throughout this text, stations are a neighborhood's gateways to a transit system. A greater comprehensiveness of service via more stations was viewed as a way of getting more people invested in the project. As noted in an article in *Progressive Architecture*, they aimed at making every 'T' stop a literal 't,' crossing over the sunken line with parks and new buildings that cover adjacent land once blighted by demolition,"<sup>32</sup> Thus, while the catchment area of a station at Boylston Street might overlap with stations at Green Street or Jackson Square, it also adds to the places of interface between system and neighborhood.

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<sup>29</sup> Neal Pierce and Robert Guskind, *Boston's Southwest Corridor: People Power Makes History in Breakthroughs the American City* (New Brunswick, NJ: Rutgers University Press, 1990) p. 111.

<sup>30</sup> P. 86.

<sup>31</sup> *Boston Globe*, "Southwest Corridor: Setting a New Course," Sunday, November 2, 1986.

<sup>32</sup> *Progressive Architecture*, "The Orange Line Opens to Acclaim," September, 1987, p. 54.

#### **4.3.2.2. Reconnecting a Divide**

Even before land was cleared for the highway, the raised railroad tracks atop a massive granite embankment divided neighborhoods. This physical division bred a legacy of a social division based on class and race. Around the proposed Stony Brook Station, the western side of the tracks was mostly White and more affluent, while the eastern side—the “other side of the tracks”—was mostly Black, Latino and lower income. “The touchiest issue arousing neighborhood passions during the planning phase,” according to Pierce and Guskind,

was access across the corridor. Since 18[34], the railroad corridor, which ran across an elevated embankment, had divided the neighborhoods. In many areas, the population on one side of the tracks was white, on the other black...in the early days of development, people didn't want anyone to be able to come across the border.<sup>33</sup>

Given this context, some argued that stations were points of integration, and thus should be as plentiful as was operationally possible. As Peter Welch reports: The new rail system represents a conscious effort to link the people on opposite sides of the tracks.”<sup>34</sup>

#### **4.3.2.3. Historical Argument**

Fed Salvucci tells the story of an elderly woman who attended every BTPR meeting in Jamaica Plain. She had one agenda—making sure that the new Orange Line had a station near her home on Boylston Street. “She held up a ratty old train ticket at every meeting,” recalls Salvucci, holding up his own hand, as if clasping an imaginary ticket. “The ticket was to the old Boylston Street Station on the old Shore Line and she’d yell out: ‘see, the train stopped at Boylston, it stopped at Boylston.’” A giant photo of that ticket now adorns the new Stony Brook Station. (See photo of ticket below, and Map 17 showing former Boston area railway stations, above).

### **4.3.3. Results of Adding the Stony Brook Station**

#### **4.3.3.1. Ridership**

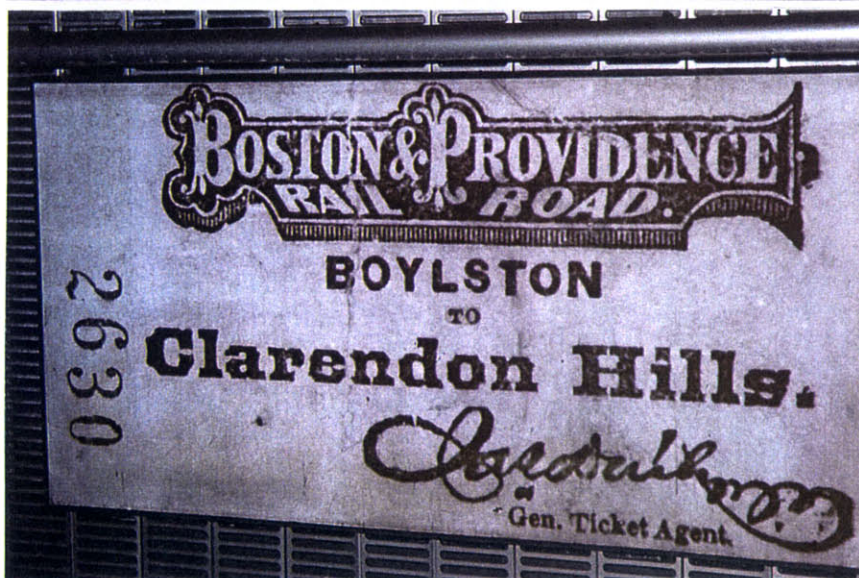
Based on ridership data, Stony Brook is a poor performing station. In 1995, an average of only 1,886 passengers per day, or 1.6% of boardings at all 18 Orange Line stations, were at Stony Brook. It had the second lowest ridership on the line in 1995, and the lowest ridership average for the seven year period between 1988 and 1995.

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<sup>33</sup> Neal Pierce and Robert Guskind, p. 104.

<sup>34</sup> Neal Pierce and Robert Guskind, p. 111.





**Top Left:** View of Stony Brook Orange Line Station, looking north along Southwest Corridor Park.

**Bottom Left:** Poster of historic railroad ticket from old Boylston Station adorning present Stony Brook Station, outbound track.

**Top:** Employee of Metropolitan District Commission (MDC) maintaining Southwest Corridor Park.

Despite being a full service station, it had lower ridership than twelve street-level Green Line stops, all of which have minimal infrastructure and are served by branch service only—that is, only one out of the four Green Line branches stop at these stations.<sup>35</sup>

#### **4.3.3.2. Neighborhood/Institutional Revitalization**

Those who champion the success of the Southwest Corridor, in sharp contrast to Davis Square, look less to the station area impacts, as to the impacts of the entire corridor planning process. To a large degree, this is by design. As Peter Welch notes: “Another important example of balance is the decision to spend less money on the stations and more on parkland.”<sup>36</sup> Thus, while the station areas did show signs of revitalization, so did the areas between the stations, because the benefits of the parks, playgrounds, and overall beautification are mostly continuous throughout the alignment. As the station itself served as the catalyst for the renaissance of Davis Square, the whole corridor served that role for the Orange Line Project, stimulated considerable public, private and community support that extended well beyond the narrowly defined transit components of the project.

Given this caveat, as reported in *Progressive Architecture*, the new Orange Line Stations

are appropriately sited and try to make restrained gestures to the houses and communities that surround them. And when combined with new parks and playgrounds, basketball courts, bike paths, and other amenities, the new stops should encourage new development in these severed sections of the city.<sup>37</sup>

Station-specific improvements around Stony Brook include the development of 42 new residential units. Also, as noted in the *Southwest Corridor Development Plan*,

The residents of the Boylston Street Station [Stony Brook] area have a strong commitment to keep and strengthen their family neighborhood. To this end, the staff of the Southwest Corridor has worked closely with these residents to insure that parkland and new development provide adequate facilities for both children and adults.<sup>38</sup>

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<sup>35</sup> Green Line Stations with higher average daily boarding numbers include: Harvard Ave., B.U. Central, B.U. East, and Blandford St on the B-Line; Coolidge Corner and St. Mary's St. on the C-Line; Reservoir, Brookline Hills, Brookline Village, and Longwood on the D-Line, and Longwood Medical Area and Northeastern on the E-Line

<sup>36</sup> Neal Pierce and Robert Guskind, p. 110.

<sup>37</sup> *Progressive Architecture*, “The Orange Line Opens to Acclaim,” September, 1987, p. 54.

<sup>38</sup> Charles G. Hilgenhurst and Associates (for MBTA), *Southwest Corridor Development Plan*, Boston: Fall, 1979, p. 13.



This park was specifically designed to serve as a front lawn to the station and its impact on the area is tied to the station itself. It is also relevant here that the Metropolitan District Commission (MDC) took over maintenance responsibilities for the Southwest Corridor Park—part of the Corridor Project’s supportive institutional framework.

#### **4.3.3.3. Neighborhood Integration**

As noted above, prior to the Southwest Corridor Project, the old Penn-Central tracks served as a social barrier between a mostly white, more affluent population centered around Centre Street on the west side of the tracks and a mostly minority, lower income population centered on Washington Street on the east. Despite a geometric proximity, the two neighborhoods rarely interacted. One stated goal of the Project was to slowly stitch the two neighborhoods together.

The two neighborhoods still embody a degree of racial and class segregation. Anecdotal evidence suggests that when an outbound Orange Line train leaves the Stony Brook Station, the passengers departing the train leave the station together and then separate into two groups—White passengers go right towards Centre Street and Black and Latino passengers go left towards Washington Street. The station, then, is the point of integration—the place at which the two communities come together.

### **4.4. Addition of Uphams Corner Commuter Rail Station**

#### **4.4.1. History**

During construction of the Southwest Corridor, commuter rail service from the south was rerouted along the Midlands Branch rail corridor, first built in 1850, through lower income neighborhoods of Dorchester, without actually serving those areas. This was the first time since 1944 that these tracks carried passenger trains. Prior to cessation of service, the route included a stop near Uphams Corner called Dudley Street Station (See **Map 17** above).

#### **4.4.2. Grass-roots Advocacy and the Issue of Equity**

With the planned relocation of the Orange Line from Washington Street to the new Southwest Corridor, the area lost direct rail access to downtown. Championing the cause of transportation equity, the local Dudley Street Neighborhood Initiative (DSNI) of Roxbury and Dorchester, with the support of other local Dorchester groups as well as the City of Boston, advocated for the addition of a Commuter Rail stop near Uphams

Corner. As noted by Peter Medoff and Holly Sklar in *Streets of Hope*, the Midlands rail corridor

was used by trains carrying suburban commuters into downtown Boston. But Dudley residents could only see the trains shoot by at high speeds without ever stopping. With the elimination of Roxbury's elevated Orange Line, taken down in May 1987, the Dudley Street neighborhood was left with only limited bus service to downtown. Many in Dudley believed that the Massachusetts Transportation Authority (MBTA) didn't want the trains to stop in neighborhood where people of color were in the majority because that would lessen ridership from the mostly White suburbs. In 1987, however, after a series of meetings with the MBTA, and with the strong backing of the city's Transportation Department, transit officials agreed to open a station on Dudley Street [Uphams Corner]...DSNI had done door knocking and held several meetings on the issue.<sup>39</sup>

The equity argument was pushed on three fronts: (1) Residents of the Uphams Corner Area felt they deserved a station compensation for the loss of service following the relocation of the Orange Line; (2) Residents of the Uphams Corner area felt they deserved a station in compensation for bearing the negative externalities of hosting commuter rail service during the Southwest Corridor construction; and (3) Residents of the Uphams Corner Area felt they ought to be given a station because, due to a disproportionately high poverty rate and low rate of auto ownership, they are more likely to need service. As noted by William Warren, chair of the Codman Square Community Development Corp, "the line passes through an area that depends heavily on public transit to get into Boston."<sup>40</sup>

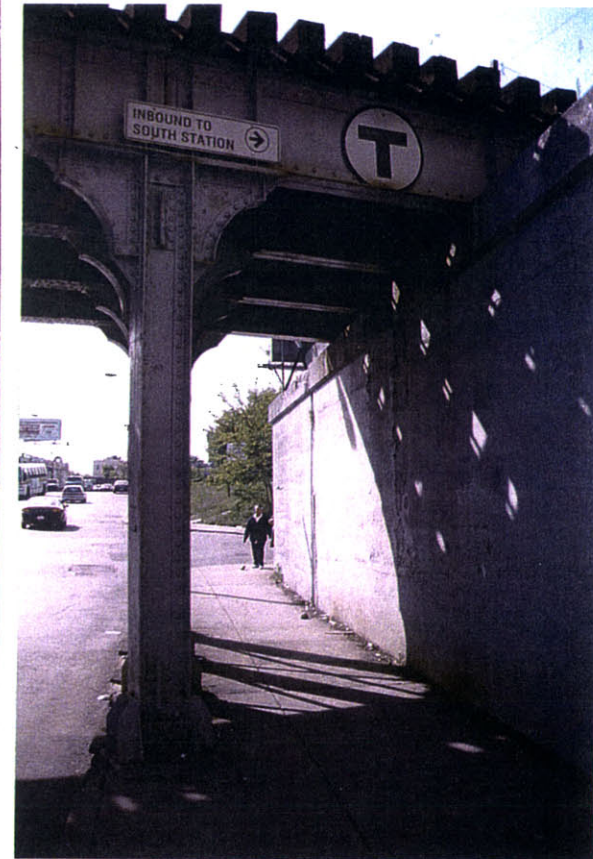
Buttressing the equity argument is a practical consideration: adding the station would be cheap. \$17 million had already been spent to upgrade the tracks to handle the temporary rerouting of service to the Midlands branch during the Southwest Corridor construction—these were sunk costs, dollars already spend. Quoting Warren again: "It's a great unused resource for western Dorchester...All of the infrastructure they would need for rail service is there except for some stations."<sup>41</sup>

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<sup>39</sup> Peter Medoff and Holly Sklar, *Streets of Hope: The Fall and Rise of an Urban Neighborhood*, (Boston: South End Press, 1994) p. 75.

<sup>40</sup> *Boston Globe*, "Rapid Transit Service Sought," May 6, 1987.

<sup>41</sup> *Boston Globe*, "Rapid Transit Service Sought," May 6, 1987.



**Top Left:** Commuter train leaving Uphams Corner Station heading towards South Station.

**Bottom Left:** Minimal amenities at Uphams Corner Station.

**Top:** View of Uphams Corner Station signage from Dudley St.





**Top:** Looking east along Dudley St. to Uphams Corner business district from elevated track at Uphams Corner Station.

**Bottom:** Looking west from Uphams Corner business district along Dudley St. Note elevated train stopped at Uphams Corner Station in background.

#### **4.4.3. Results of Adding the Uphams Corner Station**

Ridership at the Uphams Corner Station has been exceedingly low. A 1996 train audit showed an average of only 153 riders boarding at Uphams per day. This number represents an improvement the estimated 42 riders boarding at Uphams in 1992. A 1998 intercept survey conducted by Uphams Corner Main Streets reports that only 0.52% of pedestrians in Uphams Corner arrived via commuter rail.<sup>42</sup> Looking at ridership alone, Uphams Corner is a poor performing station. However, the low ridership numbers may be more a direct consequence of the low level of service (LOS) of the line stopping at the station. Unlike subway and streetcar service in Boston, service on the commuter rail line stopping at Uphams Corner is minimal, running on 30 minute headways during rush hours and 60 minute headways during the midday, with no service on Saturdays, Sundays, or holidays.

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<sup>42</sup> Uphams Corner Main Streets, *Uphams Corner Main Street Intercept Survey*, December, 1988. Special thanks are owed to Andy Waxman for providing survey results.

# **Chapter 5**

## **So What?**

### **Analysis and Implications**

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#### **5.1. Comparison of Station Additions in Boston and San Juan**

Clearly, the San Juan and Boston cases are not perfect parallels. In San Juan, the UPR and Domenech Stations were added after submission of the FEIS, and the Río Piedras alignment and station relocation and Luchetti Station elimination occurred between submission of the DEIS and FEIS. In Boston, the Davis and Stony Brook Stations were added much earlier in the process, while the Uphams Corner Commuter Rail Station was added to an already operational route. Likewise, San Juan's Tren Urbano will be an entirely new system, while Boston's is an old system, although the extensions studied are new. It is also important that San Juan's Tren Urbano is a Design-Build project, meaning that the construction and design of the system is contracted out as needed; Boston's MBTA is a traditional public authority.

It is a unique characteristic of Boston that the drive for greater public participation in the planning of the Red and Orange Line extensions came out of a context of public activism to block the building of the Inner Belt and I-95. The Boston Transportation Planning Review (BTPR) was formed as a direct result of such public protest, creating an ideal forum for citizens to have input on the project. While San Juan does not share this history, Tren Urbano has been planned, like the Red and Orange Line extensions in Boston, during a time of unprecedented public involvement for the area. Prior to the BTPR in Boston, citizens were not used to being asked for their input in transportation projects. Likewise, planners, politicians and transit properties operated without any expectation that input from the public should be solicited. Twenty years later in Puerto



Rico, Tren Urbano is in a comparable situation, with citizen participation an issue that is taken seriously in a major infrastructure project for the first time.

Another crucial parallel is that in both cases, a partially established alignment delimitates how much the community can actually change. Also, both the expansion of the MBTA system in Boston and the building of Tren Urbano in San Juan follow demands forged as much by a long and storied history as new growth and development patterns. Finally, both the San Juan and Boston projects take place within a highly charged political environment.

The remainder of this chapter will serve as an analysis of the San Juan and Boston station additions (relocations and eliminations) discussed in Chapters 3 and 4 above. Looking at the processes, justifications, and realities of the station additions under study from all three of the perspectives outlined in Chapter 2—Operational Efficiency, Urban Design and Development, and Social Policy and Politics—as well as from hybrid perspectives, the aim will be to distill out problem areas as well as positive models for how stations may best be added to partially defined transit alignments.

## **5.2. Station Spacing and Location**

The question is: Where were priorities placed in determining the spacings between stations and the placement of those stations? That is, was it first determined that the line in question should have x number of stations, which would ideally be placed y meters apart? Or was it first determined that the train needed to stop at nodes a, b, c, and d because they are key activity centers within the corridor? This question is important because it establishes what the station locating philosophy and context was prior to adding the stations in question.

### **5.2.1. Tren Urbano Station Spacings**

Professionals working on Tren Urbano from the inside universally argue that station spacing and location decisions for the line were motivated first and foremost by where the key activity centers are, not by some *a priori* analysis of the optimal distance between stations. As Siemens Operations and Maintenance Manager Joe Ferretti observes: “There was never a conscious decision to have short spacings. Rather, we were responding to the historical pattern of development.” PRHTA Deputy Executive Director Carlos Colón adds that:

The decisions we made as to spacings were driven by where the points of interest along the alignment were. Bear in mind that the area we will be serving is an historic area with specific nodes already in place. I can't recall anyone calculating that station spacings needed to be x—we just looked at where we thought people most wanted to go.

Ferretti also claims that the high acceleration/deceleration rates of Tren Urbano vehicles have given added flexibility with respect to being able to perform close to the optimal at varying station spacings.

Despite the sincere insistence on the part of those working on the project, looking at the line itself presents a different picture of the approach actually taken. First, particularly prior to the adding of the UPR and Domenech Stations, Tren Urbano stop spacings were fairly uniform—approximately 1,245 m. Furthermore, there was little difference in spacings between the more suburban sections of the line (along the 65<sup>th</sup> Infantry right-of-way), where nodes are more sparsely spread, and the denser, more urban sections through Río Piedras and Hato Rey—the average spacings were 1,224 m for the suburban section, and 1,278 m for the urban section. Following addition of the UPR and Domenech Stations, the average spacings for the urban section dropped to 913 m.

Second, the argument that Tren Urbano enjoys a greater flexibility to locate stations according to geographic nodes due to the superior acceleration/deceleration of its vehicles must be evaluated in light of the fact that vehicles will only be able to accelerate to maximum velocity (100km/h) at two points along the line—between Deportivo and Jardines, and between Cupey (formerly Villa Nevarez) and Río Piedras. This indicates that Tren Urbano's interstation spacings are too short to run the vehicles optimally.

### **5.2.2. MBTA Station Spacings**

As noted in the previous chapter, both the Northwest Corridor Red Line extension and the Southwest Corridor Orange Line extension both came into being during the second generation of recent rail transit expansion in Boston. The first generation of recent extensions—the Orange Line extension northward to Malden and the Red Line South Shore extension to Quincy and later Braintree—like other systems built during the 1960s and 70s, consciously utilized long interstation spacings, emphasizing auto rather than pedestrian access to stations. In contrast, the more urban-focused second

generation extensions showed a redirection away from the long interstation spacing policy of the earlier lines.

The Northwest Red Line extension is nodally focused, running beneath key commercial centers in Cambridge. The diversion to Davis Square Station follows this pattern, as the line literally goes out of its way to serve Somerville's main retail district.

**Table 2**

<b>Red Line Distances &amp; Travel Times Between Stations: Cambridge Section</b>				
<b>Alewife-Davis</b>	<b>Davis-Porter</b>	<b>Porter-Harvard</b>	<b>Harvard-Central</b>	<b>Central-Kendall</b>
0.96 mi	0.66 mi	0.99 mi	1.08 mi	0.95 mi
2 min10 sec	2:12	3:29	3:56	2:25

*Source: MBTA, 1997 Ridership and Service Statistics, Boston, MA 1997, p. 7-3.*

**Table 3**

<b>Red Line Distances &amp; Travel Times Between Stations: Dorchester Section</b>				
<b>Andrew-JFK</b>	<b>JFK-Savin Hill</b>	<b>Savin Hill-Fields</b>	<b>Fields-Shawmut</b>	<b>Shawmut-Ashmont</b>
0.74 mi	0.70 mi	1.00 mi	0.59 mi	0.62 mi
2 min 19 sec	1:59	2:45	2:40	2:13

*Source: MBTA, 1997 Ridership and Service Statistics, Boston, MA 1997, p. 7-3.*

With the addition of the Davis Square Station, an anomalous spacing is created between Davis and Porter when compared to other spacings in the Cambridge segment of the line. The Davis-Porter spacing is consistent, however, with the Dorchester segment of the line (average spacing 0.73 miles). Interestingly, the 1967 MBTA plan, which recommends direct routing from Porter to Alewife with no intermediate station via the Fitchburg Division right-of-way calls for an interstation spacing of 1.55 miles between Porter and Alewife, which is more consistent with the spacings on the earlier South Shore Red Line extension (average spacing 1.92 miles).

In contrast to the Northwest Red Line extension, the Southwest Orange Line extension is not nodally focused. It follows a mid-block alignment and does not bisect key commercial nodes. Three of the stops—Roxbury Crossing, Jackson Square, and Forest Hills—lie close to large intersections; but they do not have the centering quality of a Harvard or Porter Square. Spacings are short—some even complain that they are too

**Table 4**

Orange Line Distances & Travel Times Between Stations: SW Corridor							
First Hills-Green	Green-Stony Brk	Stony Brk-Jackson	Jackson-Roxbury X	Roxbury X-Ruggles	Ruggles-Mass Ave	Mass Ave-Back Bay	Back Bay-NE Med
0.69 mi	0.51 mi	0.51 mi	0.55 mi	0.52 mi	0.41 mi	0.69 mi	0.55 mi
1min45sec	1:35	1:36	1:42	1:42	1:33	2:16	2:10

Source: MBTA, 1997 Ridership and Service Statistics, Boston, MA 1997, p. 7-4.

short. Too many stops mean slower service. As rider Joann McMillin told the *Boston Globe* soon after the new service opened, “To me it seems slower...because the new line has nine stops between Forest Hills and Downtown Crossing instead of six [as the old line did], it takes longer to get downtown.”<sup>1</sup>

The short station spacings is in part the result of deliberate strategy—an attempt to get residents along the line invested in it. It is what Fred Salvucci, who was Transportation Secretary at the time the line was built, calls the “McDonald’s theory of transit.” As Salvucci explains, “If they could, McDonald’s will put a franchise on all four corners of an intersection to maximize customers, regardless of overlap. Likewise with transit—you’ll maximize customers if you have numerous stops along the line, even if there is overlap of service.” While residential and commercial densities are lower at the southern end of the line, the spacings preceding and following Stony Brook are consistent with spacings along the entire Southwest Corridor segment of the alignment.

### **5.2.3. Priority of Alignment**

One factor circumscribing both San Juan and Boston projects is the preeminence, to greater or lesser amounts depending on the case, of the alignments. Given the limiting factor of cost, there has been a push in both regions (as there is anywhere) towards using alignments with cheaper acquisition and construction costs—often in a railway right-of-way or in land already cleared for a highway. In Boston’s Southwest Corridor, the land along the Penn Central right-of-way and area cleared for the proposed I-95 highway was presented as a given for the alignment. Community input regarding station location for the corridor, then, was limited to where stations should be located along that alignment. It was not within the community’s purview to advocate for shifts in the alignment itself. A similar situation exists with the use of the corridor cleared for the 65<sup>th</sup>

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<sup>1</sup> *Boston Globe*, “Orange Line Gets Mixed Review,” July 21, 1987.

Infantry highway right-of-way for Tren Urbano, although this section of the route does not effect the station additions studied here.

A little more flexibility allowed for the Northwest Red Line extension to divert to Davis Square. However, this may only have been possible due to the existence of the freight railway cutoff running between Davis and Alewife, thereby facilitating relatively inexpensive acquisition and construction. There was also some flexibility with respect to the north-south section of the Tren Urbano alignment, which was shifted away from its original alignment above the wide median of Avenida Muñoz Rivera. The most expensive of these was the subway alignment through Río Piedras, however the shift to the midblock alignment around Domenech was also more costly, at least in the short term. Even in these cases, however, the basic alignment was preserved, which parallels the historic trolley and railway alignments of generations past. Finally, the argument for the addition of the Uphams Corner Station was based in large part on the low cost of adding a station to an existing capacity—in this case, an existing commuter railroad line. Moving the alignment was not an issue.

#### **5.2.4. Role of Ridership**

One curious thing about both the UPR and Domenech Station additions in San Juan is that in neither case is ridership used in the *Environmental Assessments* which offer the final justification for the added stations. In both cases, ridership is secondary to the physical, economic and political benefits of the stations. Speaking from his position as consultant to the project, Fred Salvucci concedes that for both stations, “we tried to get the ridership numbers to support us, but the numbers inside the model are useless.”<sup>2</sup> Likewise, the justification for the Stony Brook and Uphams Corner additions in Boston were not based on ridership projections. Of all of the station additions analyzed in this study, only the Davis Square MBTA addition and the Río Piedras Tren Urbano Station relocation cite modeled ridership projections to support adding the stations—both of which serve denser, urban centers. Interestingly, as noted in the previous chapter, station specific ridership data indicates that Davis is the only one of the three Boston station additions that has been justified by ridership.

### **5.3. Relationship of Stations to Neighborhoods**

#### **5.3.1. Institutional Support**

The success of the Davis Square Station is attributed as much to the institutional support that the station facilitated as it is to the direct transportation benefits of the station. The station leveraged financial investments from both the public and private sectors as well as community investment in the form of social capital. The Stony Brook Station too has enjoyed institutional support—however, unlike Davis, the support is corridor-wide and not station specific. On the Southwest Corridor Orange Line, there has been a strong prioritization on generating community investment in the project, resulting in a continuous, neighborhood-oriented linear park stretching the entire length of the corridor. As a result, it is not clear that any one station, particularly the less heavily used Stony Brook Station, has been pivotal in generating that support.

The Uphams Corner Station stands as an illustration of the consequences of not having adequate support. At the station level, the Uphams Corner Station gives the appearance of a makeshift operation—two slabs of concrete, hardly recognizable as a station and minimally visible from the street. No physical amenities link the station to the commercial heart of Uphams Corner, which is about 3 to 4 blocks from the commercial center. Unlike Davis, no attempt has been made to use the station to leverage investment in the area. Likewise, the MBTA does not support the station with quality transit. Service on the line is minimal, running on 30 minute headways during rush hours and 60 minute headways during the midday, with no service on Saturdays, Sundays, or holidays.

As evidenced by the Boston cases, institutional support for station areas needs to be developed well before the service begins running. It is unclear to what degree the desired institutional support for the San Juan stations has been put in place. The Tren Urbano office has been preparing *Opening Day Action Plans* for the station areas, yet who possesses the power to implement them remains untested. Tren Urbano's Elmo Ortiz, who also worked on the Southwest Corridor Orange Line, worries that "we are already behind in terms of coordinating the station areas." Still, in Río Piedras Tren Urbano has forged a strong connection between the project and the community's peak associations, which has already resulted in a complete façade redesign of the station

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<sup>2</sup> Interview conducted January, 1999.



exterior. And in all of the stations, attention has already been given to physical amenities and beautification of the immediate station areas.

### **5.3.2. Linear v. Nodal**

Urban designer Elmo Ortiz makes a distinction between nodal stations and linear stations. A nodal station is the single center of the local area, while a linear station is one link in a central chain. Nodal stations imply less service duplication than linear station, because they do not have as much overlap in their catchment areas. The consequences, then, of not including a nodal station will be that almost all of that station's potential ridership will not have a reasonable alternative station; if a linear station is not included, many potential riders will be able to use an adjacent station within the linear node.

According to Ortiz, UPR and Río Piedras combine to form a single linear node, while Domenech is part of a four station Hato Rey linear node. Although the same analysis was not applied to the Boston stations, an argument could be made that the Uphams Corner is a nodal station, while Stony Brook is part of a Jamaica Plain linear node extending from Forest Hills to Jackson Square. Davis may either be categorized as a nodal station or part of a linear node with Porter.

### **5.3.3. Value of Serving Historic Areas**

In San Juan, the Río Piedras Station in particular, and the UPR and Domenech Stations to a lesser degree, all serve historic centers. This has both cultural as well as practical implications. Culturally, as discussed more extensively in Chapter 3, the stations help support a valued form of urban space that is uniquely Puerto Rican. Also, as the centers have generally followed a pattern of urban decline and in many cases house lower income, more transit dependent populations, there are often equity reasons to support these areas with stations.

Interestingly, PRHTA's Carlos Colón rejects this concern: "We were not trying to be equitable," he says bluntly, "economic development or equity came after the decision to locate stations. Personally, I have an aversion to government trying to determine economic conditions—but that is me talking, not Tren Urbano."

Regardless of any squeamishness one might have to using transit to achieve a social mission, there are also practical motivations for serving historic centers. Siting stations in urban centers takes advantage of a development pattern that is more likely to support and be supported by transit. Because the historic centers have a greater

pedestrian-orientation and denser settlement pattern, there are more people who are both likely to be within easy walking distance of the station and are already used to walking. Likewise, there is less of a reliance on auto access to the station, meaning there is less need for parking, which often isolates and degrades areas immediately surrounding stations with excess asphalt. In a similar vein, the tight street pattern of historic centers means that a greater percentage of the station's catchment area, as determined by drawing a circle x feet around the station, is really within a reasonable walk to station.

Jorge Rivera of the municipality of San Juan observes that:

It is much easier to plan around the existing center—they are already there, they are developed, people live in them—all they need is a little jump start to go. That is not the case in the undeveloped areas. It is better if there is already development or a trend for development before the station opens.

In the centers, there already exists a ridership base and supportive land uses—there is less of a need for faith in the *Field of Dreams* prospect of “build it and they will come.”

Amongst the Boston cases, the Davis Square Station is the most connected to a historic urban center—and like Río Piedras, revitalization of a valued urban spatial pattern was one of the primary motivations for placement of the station. Uphams Corner lies proximal to an historic center, but unlike Davis, it is on the very outer periphery of the center's commercial district—so much so that it is almost inappropriate to name the station after an intersection four blocks to the east. As a result of its marginal location, as well as equally marginal service, the station has not had the same resuscitating affects on the neighborhood as the Davis Station.

#### **5.3.4. Relationship to Historic Corridors**

In both the San Juan and Boston cases, the added stations and alignments serving them follow historic rail corridors. The Río Piedras Station lies at a former junction between railway and streetcar lines. Likewise, the UPR Station lies at a former streetcar stop and the Domenech Station is half a block to the east of one. As noted previously, all three stations lie along an alignment that follows the old streetcar corridor. Likewise, all three Boston stations studied lie at the sites of former railway stations (see map in Chapter 4). Davis Square is at the site of the former West Somerville Station, Stony Brook is at the site of the former Boylston Station, and Uphams Corner is at the site of the former Dudley Street Station.

It would be a legitimate criticism to say that it shows a lack of vision or forward thinking to make station placement decisions based where a station was fifty or seventy-five years ago. However, it is not just a sentimental attachment to the past that makes former transit nodes attractive locations for future stations. As champions of T.O.D.s are slowly learning, it takes time to develop a close symbiosis between transit and the corridors it serves. Even where the historic rail lines no longer exist, it is significant that the spatial patterns around historic corridors were built in connection to the transit link. In this regard, much of the capacity is already in place.

#### **5.4. Process: Who Participates**

Both San Juan and Boston projects emphasize the importance of including the public in the decision making process. As noted earlier, this marked a departure from an earlier practice whereby people with policy control made decisions behind closed doors and imposed it on the community. However, the community participation process is not a perfectly democratic system in which every person's voice is given equal weight. The bulk of the analysis to follow will look at the San Juan cases, where the process results are fresher.

##### **5.4.1. Power & Influence: Role of Professional Elite & Large Institutions**

Much of the public taking advantage of the public participation process in San Juan were professional elite, such as members of the Society of Architects and the Society of Engineers and Surveyors. In many cases, these professionals do not live or work in the areas they are taking stands on. This, according to Gloria Gonzalez-Ortega, then president of the Society of Architects, is wholly appropriate: "Architects," she says, "think in terms of people, not economics or technical aspects—we think in terms of the urban environment and character, and can back that vision up with our professional experience—that perspective is needed."<sup>3</sup> Maria Isabel Vicente Mestre, president of the Merchants Association of Central Río Piedras, agrees that the professionals' input is valuable, but adds that "we resent it that the professionals' opinions are given preference over people who live and work in the area—but we know we don't have the political or economic power to change things by ourselves."<sup>4</sup>

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<sup>3</sup> Interview conducted, January, 1999

<sup>4</sup> Interview conducted, January, 1999

Likewise, large institutions seem to have disproportionate influence in the process. As noted in Chapter 3, the primary advocate for the addition of the station at UPR was the University of Puerto Rico. The University's positions are buttressed by large financial and political resources. As testified by many of the players involved, Tren Urbano's decision to accommodate UPR's request was in large measure a political one in that it was calculated that building an alliance with the University would be strategic. As Jorge Rivera of the Municipality of San Juan characterizes it: "The process is weighted against people without bargaining power. To better balance the process, you must really believe in citizen participation—and I'm not sure the folks at Tren Urbano do."

#### **5.4.2. Who is the "Public" in Public Participation?**

Even in cases where community-based organizations are playing a greater role in the process, it is not always clear that they represent the full community. For example, Maria Isabel Vicente Mestre estimates that up to 30% of the businesses in Río Piedras are owned by people from the Dominican Republic. However, none are active in the merchants association she presides over. As she concedes, "We haven't put enough effort into including Dominican merchants—but," she adds, "they tend to own the smaller stores—the cafes, the beauty salons, the bars." Likewise, none of the estimated 15-20% of the Río Piedras population that is of Dominicans origin is represented in the Río Piedras Redisidents' Association.

Tren Urbano's Sylvia Santiago notes that part of the reason for the lack of Dominican inclusion is prejudice:

Ironically, just as we Puerto Ricans are treated unfairly by people in the states who say, wrongly, that we don't care about our communities and only want to make money, over here, we do the same thing to the Dominicans. I tell them [the associations] that they need to work harder to include everyone, but it's not easy...Tren Urbano only works with the associations, so we only end up working with whoever they include—it's a problem, but we as Tren Urbano can't fix the problem without the associations.<sup>5</sup>

In a similar vein, the Merchants Association tends to disproportionately represent larger businesses. According to the owner of a small luggage shop on Calle De Diego, who asked that his name be withheld, smaller businesses like his cannot afford to belong to the Association: "We are not a big store," he says, "and can't afford the dues. Plus

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<sup>5</sup> Interview conducted, January, 1999

they do nothing.”<sup>6</sup> Also, according to Jorge Rivera Jiménez, “the associations tend to be very protectionist, very conservative.”<sup>7</sup>

In Boston, the Somerville Public Hearings that took place at the end of the BTPR study on the Northwest Red Line extension and the detour through Davis Square was dominated by representatives from such peak associations as the Somerville Ward 6 Civic Association, the James A Logan VFW Post, the Somerville Citizens for Participation in Politics, the Greater Boston Committee on the Transportation Crisis, the Somerville Conservation Commission, Tufts University, the Davis Square Businessmen’s Association, and the Somerville Chamber of Commerce. Even the very grassroots campaign to add the Uphams Corner Commuter Rail Stop was also dominated by a peak association—the Dudley Street Neighborhood Initiative (DSNI).

A tangential question concerns whether the public is the public as it is today, or the future public, who may be a very different set of people after the system is built.

According to PRHTA’s Carlos Colón:

Quite frankly, we oversell the importance of including the community in the decision making process. If Tren Urbano is to revitalize and change the face of the city, the people who are there now may not be the people who will be there following revitalization. Improving the city may even require impacting the present community in a negative way, and we shouldn’t be afraid to acknowledge that...I am very critical of planners—we talk about the community this and the community that, but we don’t know what we’re saying. The truth is, the existing community may not be an important stakeholder...I am not against being open and listening to the public—what I am against is making decisions simply because that is what the community, whatever that is, wants...If you fall into the trap of over emphasizing community impact, you end up playing into parochial interests rather than the common good.

Certainly, Colón is correct that sometimes the local interests of a single neighborhood need to be viewed within the context of the needs of the greater society. For instance, the views of a segregated community that opposes the development of housing that will attract people of color should not be the final say—in such a case, the views of the future community as well as conflicting social ideals, need to be championed. However, Colón’s analysis raises concerns. In a variation of Heraclitus’ dictum “You cannot step into the same river twice,” Colón argues that because communities are dynamic, you can never have true community participation, so stop pretending. The problem with this approach is

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<sup>6</sup> Interview conducted, January, 1999

<sup>7</sup> Interview conducted, January, 1999

that its solution sounds too similar to the top-down, urban renewal and highway clearance schemes that failed whole communities in the not too distant past.

#### **5.4.3. Community Representation v. Participation**

Henry Ford is reported to have said that customers can get a Model T Ford in any color they wanted, so long as it was black. Sometimes, community participation for large infrastructure projects seem to follow a similar strategy: The community is told that they can have whatever transit line they design, so long as it follows *this* alignment.

Ariel Felix of the Municipality of San Juan makes the distinction between *community participation* and *community representation*. True community participation, according to Felix, must begin at the initial design of the project. Tren Urbano, Felix says, only offers community representation, whereby more or less final design plans are presented to the community and Tren Urbano makes minor adjustments based on the community's input. In other cases, community support is used as a justification for doing what the people with policy control wanted to do all along.

As an example, Jorge Rivera cites the example of Tren Urbano's Minillas extension (Phase 1A). The community was presented with two alternatives: (1) a subway alignment under Avenida Ponce De León to Minillas with an intermediate station at San Mateo, and (2) a mostly elevated alignment along Expreso Muñoz Rivers with an intermediate station at Calle Los Angeles—the so-called highway alternative. “When you present a plan,” Rivera says with a smile,

You need two options—the stupid option and the one you want. The highway option is the stupid one—it doesn't go where people live or want to go, it's long term impacts would be great, etc. So of course, the community supported the Ponce de León alternative and Tren Urbano pats itself on the back because it has 100% community support. But if the community had chosen the highway alternative, Tren Urbano would have been in real trouble.

Carmen Canino, director of community relations for Tren Urbano, concedes that some of what goes on in the Community Relations Office is in fact what she terms “the illusion of inclusion.” That is, while decisions may have mostly already been made, it is presented to the community as less decided so that they feel a part of it. In some cases, a potentially resistant community may be co-opted into the process by being given authority to decide on secondary issues, such as landscaping or the orientation of station



entrances. On the flip side, as evidenced by the mixed results of Boston's Uphams Corner Station, even when there is true community participation such that an idea is initiated at the community level and then implemented, institutional support and follow through is needed to guarantee success.

Because the construction impacts associated with large infrastructure projects such as Tren Urbano are so great, much of the Community Relations Office's energies must be devoted to damage control—as Joe Farretti characterizes it, “The Community Relations Office are the people who apologize to the community for disruptions in their lives.” “This is reality,” Canino explains, “people are concerned about now, not about future development.” Interestingly, Tren Urbano's organizational chart places the Community Relations Office in the Implementation Team, not in the Planning Team.

Time is another limiting factor. One goal of Tren Urbano is the swift completion of the line—and this is a goal that is on a strong course towards being met, as it is projected to go from initial planning to an operational system in about eight years.

Counterbalancing the desire for swift completion is the cost of delay from an involved community participation process. True community participation, as opposed to community representation, takes time. As Canino observes: “You can't wait for the community to draw up the plans—you have to give them something to react to—otherwise, we'll be there all day.” As Zayda Santos, Tren Urbano's Hato Rey Community Relations Coordinator, notes, “The inclusion of leaders like Ruth Hernandez are not in the best interests of Tren Urbano if it wants to do the project fast—Ruth went over every line of every document—twice. Although my heart is there personally, the Community Relations department is not in the business of developing community leaders.”

Notwithstanding the concerns raised above, even if in the worst case scenario the community participation is mostly a charade, then it is a charade that cannot help but forge a connection between the system and the community through which it will travel. This connection appears most strongly felt at the interface points—the neighborhood offices, such as the Tren Urbano office in Río Piedras, which was modeled after similar offices that were opened up along Boston's Southwest Corridor during construction. As I walked along Avenida Ponce de León with Edwin Ramos, Community Relations Coordinator for the Río Piedras office, people in the shops lining the street greeted and waved to him. “These people all know me now,” he says with a smile, “if Tren Urbano doesn't work out, they'll kill me—I have my own safety as a motivation that there are no disappointments, no surprises.”

#### 5.4.4. Party Politics

There is a saying in Puerto Rico that “Politics is the national sport.” Local elections routinely generate turnouts approaching 90%. Between elections, politics is a primary topic of conversation in the bars, on the street, or on the buses. The three main parties are defined according to the ever-present issue of Puerto Rico’s Status—that is, its relationship to the United States. The *Partido Popular Democrático* (PPD) favors retaining the current commonwealth status, the *Partido Nuevo Progresista* (PNP) favors statehood, and the *Partido Independentista Puertorriqueño* (PIP) favors independence. Animosity between members of opposing parties runs deep and party affiliation determines who is appointed to key appointments, and whose counsel is sought when critical decisions are made.

The current administration at the Commonwealth level is controlled by the PNP, while the Municipality of San Juan is controlled by the PPD. Complicating matters, the current Governor, Pedro Rosello, weakened by a December plebiscite loss, is not expected to run for reelection in 2000. The popular current mayor of San Juan, Sila Calderon, is expected to run for governor; meanwhile the current secretary of Transportation and primary force behind Tren Urbano, Carlos Pesquera, is expected to run for Mayor of San Juan.

Given this context, the role of the political parties can be anticipated to shape who has influence in the project and who does not. At the policy levels, this has resulted in a lack of coordination between City and Commonwealth planners. Even at the community level, political differences have led to a lack of shared community resources. According to Jorge Rivera of the Municipality of San Juan—the man rumored to be the next Secretary of Transportation if Calderon wins the governorship—two years ago, San Juan established a program called *Centros Urbano*, based on the “little city hall” model. Accordingly neighborhood offices are set up in Río Piedras, Santurce, Condado, and Old San Juan. According to Rivera, the Centros Urbanos have been successful, in ways that the Tren Urbano Community Relations Offices have not, in reaching out to all members of the community. For instance, Rivera claims that Dominicans and other marginalized groups are well represented at the Río Piedras Centros Urbano. Rivera attributes the program’s success with respect to the Tren Urbano offices to its longer roots in the community, as well as its not being limited to one single issue. “It would have made much more sense,” Rivera says, “to piggyback off of what we already had in place—but

Tren Urbano wouldn't do that, because of the political situation. Instead, they tried to go at it alone, starting from scratch."

# Chapter 6

## Recommendations & Guideposts for Future Action

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### 6.1. Guideposts for Adding Transit Stations

Based on the preceding analyses and historical accounts, the substance of this chapter shall be the articulation of a set of sixteen guideposts that should be evaluated in making station location decisions—these are first presented in general form, with application to any transit system. Following, there will be a more targeted discussion of how these guideposts might be applied specifically to future extensions of Tren Urbano. In most cases, a “yes” or “no” flowchart approach is not used, nor are thresholds set for establishing when it is appropriate to add stations and when it is not. As has already been shown, the factors and contexts informing any station addition decision are complex and multifaceted—as such, this sort of oversimplification would be neither fitting nor responsible.

The guideposts enumerated below cover the range of scope of vision teased out in Chapter 2—from the narrowest, operational system-level perspective, to the midlevel urban design and development perspective, to the broadest, societal policy and politics perspective. While not listed in order of import or priority, neither are the guideposts listed in random order. The order is temporal—the first three concern the planning process, following which the perspective moves from a look at the area’s history, towards short term implications of adding the station through to longer term implications. This ordering is not meant to imply that either short or long term consequences should be prioritized—only that since transit infrastructure investments are relatively permanent,

decisions regarding station placement need to look both at long and short time horizons, as well as backwards towards the history that has led up to the present decision point.

***i. Where Does the Public Enter the Process?***

Has there been public input starting at the initial planning of the route or has the public's involvement in the project been deferred until later in the process? Is there public participation or merely public representation? Like all of the guideposts concerned with process, the aim here is a self-reflexive and critical look at why it may have taken so long to identify the suggested need for a station. If there have been lapses in the public participation process, they should be acknowledged and addressed so as to avoid repeating the same mistake later on.

Looking at the cases discussed earlier in the thesis, true public participation did not occur at the onset in any of the San Juan cases. The community entered the process well after initial design. In Boston, the Uphams Corner Station was the only true example of public participation, where outside mobilization resulted in the addition of a station. For the other two Boston cases, the public did enter fairly early on in the process—during the Boston Transportation Planning Review (BTPR) study, although the community had minimal say over alignment, particularly with respect to the Southwest Corridor Orange Line relocation.

***ii. What Has Changed? Why Was the Station Not Added at the Onset?***

Something must have occurred between initial design and the addition of the new station to make the added station seem more attractive. The change could have been external to the project, such as a demographic shift, community mobilization, or the emergence of a new development pattern. Or the change could have been internal to the project, such as the adoption of a new outreach philosophy, or a reevaluation of engineering criteria. If a change can be identified, it needs to be asked whether the change was significant enough to warrant the new station. If a change cannot be identified, it needs to be asked why the station was overlooked at the dawning of the process.

In Boston, both the Stony Brook and Davis Stations were added due to a policy change whereby a *status quo* highway building agenda was rejected in favor of a more

transit friendly agenda. These changes were the direct result of community unrest over the proposed highway plan. The BTPR presented an opportunity to do things a new way and the two station additions in part grew out of that new philosophy and opportunity. The addition of Davis was also facilitated by a reevaluation of the direct route from Porter to Alewife, due to opposition based on projected construction-related impacts. The change that facilitated the addition of the Uphams Corner Station was the temporary relocation of Commuter Rail service to the Midlands branch right-of-way and elimination of rapid transit along Washington Street.

In San Juan, it could be contended that the change facilitating the Río Piedras realignment and Station was the engineering reevaluation concluding that it would be possible and affordable to tunnel under Río Piedras using the less invasive New Austrian Tunneling Method (NATM). However, this argument does not take into account the fact that the only reason the NATM was even considered is that mobilization had already begun calling for an underground routing directly into Río Piedras. The Río Piedras realignment, then, was the change that facilitated the UPR Station, as the new alignment required that Tren Urbano would travel directly underneath University property. With respect to Domenech, the change was the shift in the alignment at Domenech to midblock, thereby facilitating the inclusion of the station which had been impractical in the old alignment.

### ***iii. Who is Represented in the Process?***

Do marginalized groups, such as ethnic minorities, seniors, or low income people, have an effective say? Or is the public participation process dominated by professional elite, large institutions, or other sources of political and economic power? If there is a power imbalance, this needs to be identified and attempts must be made to rectify the situation. If it is determined that the proposed station was not initially included because its natural champions do not have a voice in the system, this oversight should be corrected. Likewise, in the event that there is a conflict between stakeholders with influence and resources and stakeholders without, the power imbalance should be accounted for.

In San Juan, the most glaring omission uncovered in this research was the complete exclusion of the Dominican community from the process. In both cities, the process was dominated by peak associations, professional elite and large institutions—most notably, the University of Puerto Rico in San Juan.



Also relevant here is the role of and reliance on a strong community leader. The Río Piedras Community was fortunate to have Ruth Hernandez—however, a Ruth Hernandez does not inhabit every neighborhood. While most transit properties cannot be expected to be in the business of developing community activists, there does need to be sensitivity to hearing from communities that do not have such leadership.

***iv. Is There a History of Supporting Transit in the Area?***

Even where historic transit lines have long since been retracted, identifying old corridors and station sites is important. Areas that grew around transit are more likely to have a spatial layout that supports transit. Granted that it would be unrealistic to assume that because transit may have worked in a given area fifty years ago it will work in an era wholly dominated by the private automobile, However, it is also true that historic patterns die hard—it is significant, for instance, that people in San Juan still refer to neighborhoods by the old streetcar stops. It is no guarantee to say that because transit worked once it will necessarily work again, but it does show that it is possible to integrate transit into the area. All of the station additions and relocations studied here were in part justified by the prior existence of a station or rail corridor at the proposed location.

***v. Does the Proposed Station Help to Right an Historical Injustice?***

In some cases, communities have been denied access, either intentionally or unintentionally. If a systemic denial of service is suspected, a station may help to remedy this oversight. These arguments were made by residents of Somerville, who argued that they were paying a high assessment to the MBTA and deserved better service in return. In Uphams Corner, lower income, minority residents of Roxbury and Dorchester argued for a station at Uphams by flagging service losses in their neighborhoods.

In other cases, particularly when lines are planned along railway rights of way or in areas cleared for a highway, transit stations may be able to stitch a divided area back together. This was one of the arguments supporting the addition of the Stony Brook Station. Interestingly, in San Juan, one of the strongest arguments against adding a station at UPR was that it would exacerbate a social division between students and residents.

**vi.        *Who is in Favor of Adding the Proposed Station?/Who is Opposed?***

Is there support within the community where the proposed station is to be located? Is opposition to the proposed station located within the proposed station area, or is it from outside? Are groups claiming to speak on behalf of the community really representative? Is anybody speaking on behalf of the future community, which may not be the same group of people that live in the area now?

In San Juan, the greatest opposition to a station at UPR came from residents and merchants in nearby Río Piedras—not from within the neighborhoods immediately surrounding the proposed station area. Likewise, much of the advocacy for inclusion of a station at Domenech came from professional elite not living or working in the area. While support or opposition from without should by no means be dismissed, the externality of its source needs to be taken into account.

**vii.        *Would the Area Around the Proposed Be Well-Served by Transit If the Station Were Not Built?***

Would there be a quality alternative to adding the station? Would adding the station lead to service duplication? Is the station nodally or linearly focused? How close is the proposed station to the next nearest station? For riders accessing the station on foot, is it reasonable to assume that they would walk to the next station? For riders accessing the station by car, how well does the road network or traffic conditions allow driving to the next station. What other types of transit serve the corridor? Is there parallel feeder bus service that would provide service to intermediary stops?

In Boston, one of the arguments supporting a station at Davis was that residents of Somerville were unhappy with bus only service, which was viewed as inadequate, although even without a station at Davis the situation would have improved for some in the area once a station was built at Porter. The lack of a viable or quality alternative was even more the case in Uphams Corner, where there was no “next station” on the line, which at the time went express from Hyde Park (Fairmont Station) to Downtown Boston. Many residents of the area around the Stony Brook Station, on the other hand, would still have been within walking distance of another station on the line had Stony Brook not been added.

**viii.        *Would the Added Station Be Appropriate to the technology?***

Given the travel speed and acceleration rate of the vehicles, as well as vehicle or station lengths, would it be appropriate to have a station at the proposed location? This question, which is more technical in nature, cannot be overlooked and should be acknowledged as part of any station addition process. Likewise, it should also be recognized that technology is not static—if acceleration rates, speeds, vehicle lengths were to change, would that alter the viability of the added station in the future? Adding a station now should not block the ability to realistically improve the system later on.

**ix.        *Does the Proposed Station Serve Populations More Dependent on Public Transit?***

The motivation behind this question is bi-directional. On the one hand, people who by choice or circumstance are more dependent on public transit are more likely to use the system and support a station. On the other hand, people who are more dependent on transit are more likely to benefit from having a station in their neighborhood, so the station would better serve the area. For this reason, population density alone is not a fine enough measure of a station's potential demand or benefit. Groups that have historically supported transit, such as minority populations, seniors, youth, students, or people from households without cars should be given greater priority in estimating demand for a proposed station.

In Boston, advocates for a station at Davis flagged the area's high elderly population as a justification; likewise, advocates for a station at Uphams flagged that area's high minority and disproportionately carless population as a justification for that station. In San Juan, the greater likelihood that students would utilize the service was identified as a justification for adding the UPR Station.

**x.        *Will the Proposed Station Benefit Multiple Types of Riders Making Multiple Types of Trips?***

Does the proposed station serve a larger regional benefit or does it only serve parochial interests? Will it serve a diverse ridership, based on demographics and trip purposes? Is the station likely to be used around the clock? In general, a station that serves a diverse ridership base will be more flexible and useful than a station that is narrowly targeted to a single ridership niche.

Advocates for both the Davis and Stony Brook Stations were rightly able to claim a diverse ridership base, as reflected in race, class, trip type and time of travel. The Uphams Corner Station ended up serving a more narrowly targeted type of rider, but this is due less to area demographics (Uphams Corner is in fact a very diverse area) than the inflexibility of the service, which is geared almost exclusively to commuter travel. In San Juan, concern raised in opposition to the UPR Station was that it would not enjoy round the clock service, given that demand would only be there during the hours and days that classes were in session.

***xi. Does the Proposed Station Increase Accessibility to Dense Residential and Employment Areas?***

This point is fairly straightforward—dense residential or employment centers are intuitively more likely to support and benefit from a station. The traditional operations questions such as ridership, trip time, or access time are all relevant here. Accessibility depends not just on the proximity of stations to riders' origins or destinations, but also on the convenience of the system, which includes factors such as travel time, or crowding. Equity is also a consideration here—if the proposed station increases accessibility to jobs for riders who would not be able to reach those jobs otherwise, the benefit of the proposed station is greater.

***xii. Does the Proposed Station Rely on Auto or Pedestrian Access?***

In general, stations added later in the process tend not to be auto-focused, because in most cases, parking facilities will have already been set at the stations previously planned. Also, station location and spacing is less pressing an issue for riders accessing a station by car than for those accessing a station by foot, because pedestrians are less able to easily use another station.

As a general rule, pedestrian-oriented stations are more desirable than auto-oriented stations. Because it is easier to bring pedestrians into stations when not surrounded by a seal casing twenty times their size, pedestrian-oriented stations offer more efficient access. Likewise, if little or no parking is required at the station, the station will not be isolated by parking spaces. In determining the pedestrian orientation of a proposed station, attention needs to be paid to the layout of streets, the percentage of the proposed station area accessible by a reasonable walk (say 500m walk), the availability of

parking, and the pedestrian-oriented of the built environment. This is a strength of all of the stations studied in this research, none of which have parking amenities at the station.

***xiii. Will There Be Institutional Support for the Proposed Station?***

As the Uphams Corner Station clearly illustrates, the success of a station, as measured both in ridership and impact on the community, is closely tied to the institutional support for that station. In contrast to Uphams, the Davis Square Station received considerable support, in terms of station area amenities, and leveraging resources from both the public and private sectors. This question also concerns the degree of community investment in the station.

***xiv. Does the Proposed Station Support Sustainable Growth?***

When evaluating the economic development potential of a proposed station, it is important to recognize that not all economic development is equally beneficial. A station that facilitates leapfrog or sprawl development by making a greenfield site more accessible must be evaluated differently from one that supports a historic center.

The value of supporting historic urban centers was used to justify both the Río Piedras and Davis Square Stations. Interestingly, while Tren Urbano paid considerable lip service to supporting Puerto Rico's historic centers, until the Río Piedras Station was relocated, this priority was not fully reflected in actual station locations.

***xv. Is There Likely to be a Need for a Station in the Proposed Area at a Later Date?***

If yes, will the community be subjected to a more grueling construction process if a two step construction utilized? Due to the relative permanence of heavy rail infrastructure, station location decisions need to take a long range perspective. This is a question of future demand and the benefits of planning for it now, so as to eliminate the potential for awkward retrofits and double construction impacts.

This was one of the primary motivations behind building the Domenech Station now. While demand may not fully justify a station in the short term, long term projections do justify a future station. In terms of maximizing ease of construction and minimizing community disruption, it was decided to build the station concurrent to building the guideway.

**xvi. What is the Cost/Investment?**

Finally, the cost question needs to be addressed. This question has deliberately been placed at the end, in order to emphasize the importance of taking a long term view of costs. As has already been noted, stations are the points of interface between the system and the community. A heavy rail system is built for the long term—as a result long term costs and benefits need to be taken into account, not just the short term expense of adding the station. This was the insight in both the Río Piedras Station relocation and Davis Station addition, whereby both options favored greater short term cost as the payment for increased long term benefit.

**6.2. Future Tren Urbano Extensions**

In fitting conclusion to this thesis, let me peek briefly into the future to what some of the implications of the above discussion might be for prospective Tren Urbano extensions. The FEIS identifies three route extensions for Tren Urbano following Phase 1 from Bayamón to Segrado Corazón and Phase 1A extended to Minillas (See **Map 20**):

- ◆ **Viejo San Juan (Old San Juan)**
- ◆ **Carolina**
- ◆ **Airport**

Since the FEIS, some documents have also listed an additional southern extension to the mid-island Caguas community. Other reports also explore the possibility of combining the Airport and Carolina extensions, whereby Carolina is reached from the north via the Airport. Each of the proposed extensions traverses areas geographically distinct from each other and has the potential to raise interesting issues with respect to how possible requests for future stations may be addressed.

The Viejo San Juan extension extends through the western end of Santurce and the Isleta, terminating in Puerto Rico's preeminent historic center—the 465 year old walled city and sentimental emblem of the entire island. The corridor is densely built and follows the historic route of the old streetcar and railroad lines into Viejo San Juan. Nodes are well established along the proposed route, providing logical station locations. A diverse set of area stakeholders include tourists and tourist-oriented businesses, government offices and government employees located at the Commonwealth's capitol, just east of the old walled city, the Port Authority, private developers, residents and



# Fases de Construcción



**Map 20:** Proposed future phases of *Tren Urbano*, January, 1999.  
Source: *Tren Urbano*.

merchants of the neighborhoods along the alignment, including historic Viejo San Juan, the lower income neighborhoods of Puerta de Tierra, Mirimar, Condado, and Parada 18.

Possible calls for station additions or relocations might be launched by developers seeking improved access to their sites, most of which are proposed for the southern sections of the Isleta. One area to keep an eye on is the proposed Convention Center site on Isla Grande—a public-private venture spearheaded by the Port Authority. Unlike the proposed developments on the southern side of the Isleta, the Convention Center site would not be well served by a Tren Urbano alignment along Avenida Ponce de León.<sup>1</sup> If there is pressure for Tren Urbano to detour south from Mirimar to an added Convention Center Station before tunneling under the Channel to the Isleta, that needs to be evaluated in light of all of the issues raised in the first section of this chapter. Given the close proximity of high stakes development proposals to lower income residential communities, a particular concern in this corridor will be making sure that the economic and political power of the development community does not drown out the voice of the corridor's less powerful constituencies. Also, the viability of a Convention Center Station needs to be looked at realistically, so as to ascertain that the station will serve a diverse ridership, with diverse travel needs throughout the day.

Likewise, if an initial decision is made not to locate stations near the many housing projects in Puerta de Tierra, every effort must be made to include and prioritize the wishes of housing project residents before final station locations are set. Overall, special attention needs to be given to including all segments of the corridor area as soon as possible. The municipality of San Juan has three *Centros Urbanos* offices (little city halls) in neighborhoods along or proximal to the corridor: Viejo San Juan, Condado, and Santurce. As part of the mission of the *Centros Urbanos*, these offices have already performed extensive outreach in those communities. In contrast to Río Piedras, where no coordination was forged between Tren Urbano and the existing *Centros Urbanos*, the existing outreach capacity of these offices should be utilized, regardless of party affiliations of the Municipality and Commonwealth administrations.

The proposed Carolina extension presents very different issues. Unlike the Viejo San Juan Corridor, the Carolina Corridor traverses more suburban, sprawling, auto-dominated land uses. Natural nodes are less straightforward, so station locations are less

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<sup>1</sup> According to Cambridge Systematics' *Draft Environmental Impact Statement: Boston Convention and Exposition Center*, prepared for the Boston Redevelopment Authority (BRA), Fall 1998, transit only achieves significant mode share at national convention centers when an on-site station with physical connection to the convention center is provided.

likely to be predetermined by the existing geography and street layout. As PRHTA's Carlos Colón comments: "If you ask me where the obvious station locations would be on the Carolina extension, I honestly couldn't tell you. Carolina is an entirely different animal—unlike Santurce or Río Piedras, the area was built around the car." Likewise, due to the sparser development patterns, interstation spacings are likely to be longer. The lack of consensus regarding ideal station locations, an uncertainty regarding how the corridor may develop in the future, and initial longer interstation spacings is an indication that there may well be a push for adding stations in the future.

On the other hand, due to a presumed greater reliance on park and ride facilities and auto access to stations, there is less likely to be an urgency pressing for additional stations because riders arriving at stations via auto can more easily drive to the next closest station if no station is added in the optimal location for them. Furthermore, since added stations are less liable to include parking, there is less likely to be demand for adding stations along this alignment. Another factor affecting the potential for adding stations along the Corridor is that most of the alignment is projected to run alongside a highway—PR-3. As a consequence, the highway will make the area less attractive to pedestrians, providing a physical barrier between neighborhoods and stations. As a result, most projected station areas will have a fairly low percentage of their acreage actually within a reasonable walk to the station (approximately 500m), thereby diminishing the potential viability of prospective station additions.

The exceptions to the land use patterns described above include the sections of the route running in subway through the eastern neighborhoods of Río Piedras near Avenida Barbosa, and the historic commercial center of Carolina. Should final design fail to include stations that take advantage of the denser spatial patterns and pedestrian orientations of these areas, Tren Urbano needs to be sensitive to community requests to relocate stations so as to better tie into these centers—including being ultimately open to relocate or add stations in order to better serve these locations. Special attention needs to be paid to giving voice to the considerable minority and low income populations that live in these areas.<sup>2</sup> As noted with respect to the Viejo San Juan extension, it may be helpful to work with the Río Piedras *Centros Urbanos* in order to better identify community needs in that neighborhood, particularly from the growing yet disempowered Dominican community.

Many of the same potential issues addressed with respect to the proposed Carolina Corridor apply to the proposed Airport Corridor. Like the Carolina extension, the Airport extension is projected to run parallel to a highway—PR-26. This will diminish the attractiveness of any potential station additions, limiting the percentage of the station area accessible by a 500m walk. The proposed alignment passes through Puerto Rico's largest public housing project—Llores Torres. As a result, special sensitivity needs to be paid to providing a forum for residents to participate in the planning process, including locating stations in places most useful to this largely transit-dependent population. Tensions may exist between project residents and the economically powerful hotel and tourist-oriented business community in nearby Isla Verde, who may wish to discourage easy access by project residents because of a perceived desire by tourists not to share a vehicle with lower income riders. It will thus be critical that economic and political power not be allowed to quell participation, input, and influence of the less well connected, financed, or organized project residents.

To date, the exact location of the Airport station is unresolved. Some plans call for the train to terminate at (or close to) the Airport itself, while others call for a people mover or shuttle bus connection between the Airport and a station at the nearby Laguna Gardens neighborhood. Stakeholders likely to take an interest in this matter include the Port Authority, as well as Airport employees. Parochial opposition to an Airport Station may come from the politically powerful association of público and taxi drivers, who may be concerned about Tren Urbano cutting into a key market niche. In evaluating the viability of an Airport Station, serious attention will also have to be paid to whether or not the station will be able to serve a diverse ridership base making a diverse set of trip types.

Finally, if the Airport extension is extended south to Carolina, it will travel through the least dense corridor in the system. As a result, the issues of planning for possible station addition demands without well-defined existing nodes, sparse car-oriented development, and longer station spacings addressed in the above discussion of the Carolina Corridor will apply here. Likewise, these issues will be all the more applicable to the even sparser development patterns en route to Caguas.

For all future extensions, Tren Urbano needs to work harder to include all stakeholders in the planning process and begin doing so earlier—this should forestall some of the need to add stations later and lead to better station locations from the onset.

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<sup>2</sup> Although racial information is difficult to document for Puerto Rico because the US Census does not ask native Puerto Ricans to specify race, Carolina is generally recognized as having the



At the same time, a process for evaluating outside requests for stations needs to be formalized. As PRHTA's Carlos Colón acknowledges: "A process for station additions should be provided as part of the extensions—otherwise, we may be discarding options without realizing it. If we are not careful, we may do the same thing we did Domenech."

Finally, one unique characteristic impacting any potential requests for station additions along Tren Urbano's alignment is the system's Design/Build procurement strategy. While the relative costs and benefits of Design/Build are by no means clear, it does allow for a greater flexibility to alter system design midstream. Because all work is contracted out, if a decision is made to add a station, the additional work can be added as an addendum to the current construction contract without requiring reevaluation of the entire project. In this vein, the Domenech addition becomes a double-edged sword. As Fred Salvucci notes: "It would not have been possible to add a station at Domenech without the flexibility of Design/Build."

### **6.3. Concluding Remarks**

What lessons can be drawn from the illustrations of station additions, relocations, and eliminations reviewed and analyzed in the previous pages of this thesis? As noted at the beginning of the Chapter, the complexity of the situation does not yield itself easily to a flowchart type process, whereby planners simply check if key criteria are met for a proposed station addition—if yes add the station, if no do not. In place of hard and fast criteria, I have instead proposed guideposts that planners should acknowledge and be aware of. These guideposts range in temporal order from a review of the process, to a historical look at the area and region, up through to present, the near future, and finally, a prospective glimpse into the more distant future. Likewise, the guideposts cover a range that crosses the three families of literature distilled out in Chapter 2—a narrowly-focused, system-level analysis of operational efficiency; a middle-focused, neighborhood-level examination of urban design and development issues; and a broadly-focused, larger societal-level review of social policy and politics.

These guideposts, discussed earlier in the Chapter, are summarized below:

**Table 5**

<b>Guideposts for Station Additions/Relocations</b>	
1.	<i>Where Does the Public Enter the Process?</i>
2.	<i>What Has Changed? Why Was the Station Not Added at the Onset?</i>
3.	<i>Who is Represented in the Process?</i>
4.	<i>Is There a History of Supporting Transit in the Area?</i>
5.	<i>Does the Proposed Station Help to Right an Historical Injustice?</i>
6.	<i>Who is in Favor of Adding the Proposed Station?/Who is Opposed?</i>
7.	<i>Would the Area Around the Proposed Be Well-Served by Transit If the Station Were Not Built?</i>
8.	<i>Would the Added Station Be Appropriate to the technology?</i>
9.	<i>Does the Proposed Station Serve Populations More Dependent on Public Transit?</i>
10.	<i>Will the Proposed Station Benefit Multiple Types of Riders Making Multiple Types of Trips?</i>
11.	<i>Does the Proposed Station Increase Accessibility to Dense Residential and Employment Areas?</i>
12.	<i>Does the Proposed Station Rely on Auto or Pedestrian Access?</i>
13.	<i>Will There Be Institutional Support for the Proposed Station?</i>
14.	<i>Does the Proposed Station Support Sustainable Growth?</i>
15.	<i>Is There Likely to be a Need for a Station in the Proposed Area at a Later Date?</i>
16.	<i>What is the Cost/Investment?</i>

By way of summary, the above guideposts recommend the following to transit planners and policy makers reviewing proposed station additions, relocations, or eliminations: Pay attention to the public, but at the same time be cognizant of who it is that is representing the public. Obviously, those taking greatest advantage of the public participation process—those who attend meetings and exercise the greatest influence, may not be truly representative of the effected community. Politics and history matter and planners need to be aware of both from the beginning. Also, the importance of long term institutional support cannot be understated—the transit property as well as those advocating for a new station need to demonstrate that they will be prepared to support the station and guarantee integration into the community.



Finally, planners and policy makers need to be explicit as well as realistic about the vision and goals of the proposed station and of the larger project. If the goal is to support certain types of land uses and development patterns, then that vision should be reflected in the station locations that are prioritized. More specifically, it should be recognized that certain types of stations, such as those that are nodally focused, pedestrian oriented, and support historic urban centers are more likely to succeed and be supported by the larger community.

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