Ground Access to Domestic Airports: The Creation of a Federal Program to Streamline Enhancement and Modernization Projects

by

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ABSTRACT

With few exceptions, airport ground access tends to be an issue that is overlooked by airlines, airport operators, and metropolitan planning organizations. Given the current structure of federal aviation and surface transportation funding, little incentive is provided for these organizations to develop a comprehensive intermodal outlook towards airport access projects.

Given the concurrent reauthorization during the next legislative session of several major pieces of authorizing legislation involving domestic transportation projects, including TEA-21 (surface transportation) and AIR-21 (aviation and airports), it would be the ideal time to implement a program for airport ground access projects that bridges these areas.

Under such an intermodal system, a solitary federal office, such as the Office of Intermodalism, would become both a central repository for technical guidance, as well as a central source of regulation and interpretation of federal law. In addition, a mixture of local and federal funds should be used to encourage cooperation between the various entities involved with a ground access project, such as the airport owner/operator, regional transit operator, metropolitan planning organization, and the state highway authority.

The proposed authorizing legislation would allow an airport operator to levy a Passenger Facility Charge (PFC) beyond current regulatory limits, subject to the approval of the Office of Intermodalism. Further, new categorized surface transportation funds would be authorized, which could be used by the Office of Intermodalism as a match to PFC funding. The remaining funding would be provided by local sources.

Thesis Supervisor: Frederick P. Salvucci
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To Mark

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Chapter One

Introduction: The Belief that Airport Ground Access is 'Someone Else's Problem'

> 12 miles on an access road between the terminal and the closest highway.[1] $40 taxi fares to downtown.[2] Waits of up to an hour just to leave the airport property.[3] Promises of enhanced train service that failed to be implemented.[4]

On the surface, these descriptions seem like they might come from an airport dreamed up from a frequent flyer's worst nightmare. Unfortunately, all of these problems came true when the new Denver International Airport opened on February 28, 1995. Although some of these issues have since been mitigated, all of them might have been avoided had the planners of the new Denver airport considered the issues surrounding ground access during the initial planning and construction of the airport. Unfortunately, "[t]he airport planners saw their immediate problem as the airport's costs, and they viewed ground access as a local, regional, or state transportation planning matter."[5] Although some of these problems were unique to the opening of the new Denver airport, as it was the first totally new airport to open in the United States since the 1974 opening of the Dallas-Fort Worth International Airport, ground access is a significant problem at many of today's large airports within the United States.

In this context, ground access is defined as the facilities, infrastructure, and operations required to get passengers, meters/greeters, airport and airline employees, as well as air freight and cargo between their local and regional point of origin/destination

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[1] Paul Stephen Dempsey, Andrew R. Goetz, and Joseph S. Szyliowicz, Denver International Airport: Lessons Learned (New York: McGraw-Hill, 1997), 273.
[2] Ibid., 272.
[3] Ibid., 278.
[4] Ibid., 276-277.
[5] Ibid., 273.

and their respective airport facility (i.e., passengers to airline terminals, and air freight to on-site warehouses/freight receiving facilities). Generally speaking, this infrastructure is either within the control of the airport owner/operator, or can reasonably be inferred as connected to the operations of the airport. However, ground access (in this context) does not focus on intra-airport passenger and freight movements, although these movements may possibly utilize some of the ground access infrastructure defined above.

Historical perspective.

Traditionally, airport owners/operators have considered themselves exactly that: the operator of the airport. They are responsible for all airside operations: for instance, ensuring the airport is successful financially (however that might be defined), that the airlines are happy with the facility and its operation, that the various concession vendors are accommodated, and that at least a minimum level of comfort is provided for the passengers passing through.

How passengers, employees, and cargo[6] reach the airport, however, is a different story altogether. Beyond the roadways that immediately abut the airport facilities and that are on airport property, most airport owner/operators could care less how passengers arrive at the terminal, as long as they keep arriving in a reliable and timely manner. Any problems that might arise over this issue are seen as falling under the jurisdiction of local and regional transportation authorities, and airport owner/operators generally leave such problems to these authorities to work out.

[6] For ease of reference, throughout this paper the use of the term "passengers" should also be read to include airport employees and air freight, unless explicitly stated otherwise. Likewise, any related terminology (e.g., terminal) may be substituted for the analogous concept (e.g., freight facility).

Conversely, local and regional transportation planners generally view airport owner/operators responsible for the traffic they generate. Airports are very heavy traffic demand generators; the new Denver airport handles about 30,000 vehicles per day, based on traffic counts performed on its sole access road.[7] Other airports generate significantly more traffic; Chicago's O'Hare International Airport, for instance, experiences traffic flows of approximately 100,000 vehicles per day, and similar to the Denver, has only one entrance/exit point.[8]

For this reason, most local and regional surface transportation planners and authorities consider the airport owner/operator at least partially responsible for ground access issues. Further, the local or regional authority is responsible for all surface transportation programs within their jurisdiction, and must distribute its resources and funding as optimally as possible in order to meet the most pressing needs. Most of these pieces of independent infrastructure must receive their sole funding for repair, rehabilitation, or improvement from the limited pool of money that the authority has access to, and are therefore generally placed higher on priority lists than airport ground access projects, particularly since the dominant view is that the 'wealthy airport' can handle its own problems.

With neither side taking responsibility, the end result is somewhat obvious. Infrastructure that is desperately required is never build, services that would prove useful never get organized, and the pieces that already exist fail to receive the attention they require. Since neither side is generally willing to approach the problem of airport ground

[7] Ibid., 276.
[8] Lawrence F. Cunningham and James H. Gerlach, Ground Access Assessment of North American Airport Locations (Denver, CO: University of Colorado at Denver, September 1996), II-84, NTIS, PB97-155345.

access alone, we must determine whether any sort of system can be developed that would encourage one or both parties involved to take a vested interest in these issues.

Most individuals recognize the superiority of our European counterparts within this realm—multiple European cities feature relatively seamless transit links between their airports and urban downtowns, as well as links to a wider regional transportation network. These links are generally intuitive, usable by arriving visitors completely unfamiliar with the transit system, and yet are comprehensive enough that many local residents use these networks because the are fast, convenient, provide service to where they are traveling from, and are relatively inexpensive compared to the alternatives. Although the United States will not be able to obtain this European idea for many years, steps can be taken to ensure that domestic ground access issues are brought ahead to the twenty-first century.

The Approach

This research will investigate current stumbling blocks that exist in the planning and implementation of airport ground access projects, and more importantly will attempt to develop a model that encourages one or both parties to take an interest in these issues. Generally, the goal of this research is to create an incentive scheme that will reward those airports and surface transportation agencies that work towards solving ground access problems. Specifically, the results of this research will be applied towards ground access projects that are currently in the planning stages. Specifically, several proposals have been floated in Chicago to develop a dedicated 'Airport Express' train linking O'Hare

International Airport, and possibly Midway Airport, with 'the loop' (Chicago's downtown core).

In order to determine what approaches might be successful to achieve these goals, we will first look at current practices. Specifically, a number of different funding sources are available to finance airport ground access projects, and each source has different advantages and disadvantages. For instance, some sources are only available to airport owners/operators, while other sources of funds are targeted towards local and regional surface transportation agencies. Some funds are available as outright grants, while others are merely temporary loans or bonds that must be paid back over a period of time. Among the bonds that may be issued to finance these projects, there are many different types, each type with its own benefits and detractions.

It must be noted that the case studies outlined within this thesis generally deal with providing transit access to airports. This is primarily because the best examples within the project realm of airport ground access involve transit. However, many of the principles gleaned from these transit-oriented examples are applicable on a broader scale, whether the project involves highway access, rail access, bus access, or truck access. Airport ground access is a multimodal problem, and many different modes may be considered or utilized to solve this problem, from the water taxis and ferries that service Boston's Logan International Airport to intercity rail access linked with the Baltimore/Washington International Airport.

Next, the practical advantages and disadvantages of using various organization and financing methods will be examined through several case studies of large U.S. airports. Three specific airports have been chosen as case studies, two of which are in the

final stages of completing a major enhancement to their ground access infrastructure. In New York City, the Port Authority of New York and New Jersey is putting the final touches on a new rail system at John F. Kennedy International Airport which not only links the terminals, but provides service to allow passengers to connect to the New York City Subway as well as the Long Island Rail Road. This system was designed, constructed and funded completely under the jurisdiction of the Port Authority.

On the other side of the country, the San Francisco International Airport and the Bay Area Rapid Transit (BART) system is nearing completion of a major project extending BART into the terminal area of the San Francisco Airport, as well as further extending the BART system into San Mateo County. Due to the multiple jurisdictional aspects of this project, funding was provided through multiple sources, including San Mateo county, the city and county of San Francisco, as well as the San Francisco Port Authority, operator of the airport. The Bay Area Rapid Transit District, owner/operator of the BART system, coordinated the actual construction of the new BART link.

In the above two case studies, careful attention will be paid to the organizational structures that were established during the planning and construction phases of the ground access projects, as well as the funding sources utilized in the completion of these projects. In contrast, the third case study will be of the new Denver International Airport. Unlike the other two case studies, the amount of effort put into designing the ground access infrastructure was minimal at best. Thus, this case will be useful at demonstrating ways in which the process can go awry, as well as provide a backdrop for testing the results of this research.

The Proposal

Using the case studies, I will hypothesize that incentives should be provided by the federal government to encourage cooperation between the various airport and surface transportation agencies involved with airport ground access projects. Currently, funding is restricted based on who is applying for the funding. Therefore, there is no current incentive for airport owners/operators to work in conjunction with surface transportation agencies in the planning or construction of these projects. At best, this results in minor inefficiencies; at worst, this results in projects that are grossly misaligned (e.g., a train to 'nowhere') or needed improvements that never get off the ground. The simultaneous reauthorization of AIR-21 and TEA-21 appropriations legislation, both of which must originate in the Public Works Committee of the U.S. House of Representatives, provides a unique situation that lends itself to cooperative legislation. Using this opportunity, it is believed that a new funding provision should be included in both pieces of reauthorization legislation that provides for funds dedicated towards airport ground access projects (i.e. a fraction of the funds can come from each of the two pieces of legislation). However, in order for public agencies to tap into these funds, airport owners/operators and surface transportation agencies must demonstrate that they are working together in developing the ground access project in question. Providing fiscal incentives would help to allow the ability to focus on the intermodal issues that have fallen through the cracks, while promoting the reduction of bureaucratic duplications and inefficiencies.

Chapter Two
Current Funding Sources

Funding for airport access projects can be split into two broad categories: funding that is accessible by the airport operating authority, and funding that is accessible by the surface transportation agency. Each type of funding source has its own advantages, disadvantages, and restrictions. Many of these restrictions are due to various federal regulations, although some funds may be controlled by various contractual obligations.

Airport Funding Sources

There are four main sources of funds that airport authorities have access to: passenger facility charge (PFC) revenues, federal grants, state and local grants, and retained airport revenues (such as landing fees, parking charges, and concession fees). All four of these can be leveraged to provide capital funds through bonding. Airports depend on these different sources to varying degrees, table 2-1 indicates the amount and share of each of these sources for large- and medium-hub airports in the United States in 1996.

Funding Source	Amount (millions)	Share
Passenger facility charges	$1,005	18.0%
Federal AIP grants	$592	10.6%
Airport retained earnings	$257	4.6%
Special facility bonds	$167	3.0%
State and local grants	$95	1.7%
Airport revenue bonds	$3,468	62.1%
Total	$5,584	100.0%

Table 2-1. 1996 funding sources for large- and medium-hub U.S. airports.[9]

Revenue bond proceeds. Most airport operating agencies have the authority to issue bonds to fund capital improvements, secured via several different methods. General airport revenue bonds (GARBs) are secured using the overall revenues of the airport, and any other revenues that may be defined within the bond itself. PFC revenues may also back bonds; a further discussion of the use of PFCs follows. Special facility bonds are backed by the revenues generated solely from the facility that was constructed using the bonds. Finally, general obligation bonds are guaranteed by the overall tax base of the issuing entity.[10]

As with any bond issuance, the ability of the airport authority to sell bonds is based upon a number of factors. The airport's debt structure; its management, administration and scope of operations; its revenue structure and financial operations; and its economic base and physical plant all determine the rate that a specific bond issue can

[9] United States General Accounting Office, Airport Financing, Comparing Funding Sources with Planned Development (1998).
[10] Transportation Research Board—National Research Council, TCRP Report 62: Improving Public Transportation Access to Large Airports (Washington, D.C.: National Academy Press, 2000), 129.

be sold at, and whether or not the issue will sell at all.[11] Most creditors look towards one of the major bond rating companies, such as Standard & Poor's or Moody's, to assess these factors and assign both the airport authority and the bond issuance a rating indicating its creditworthiness.

Airport revenue bonds also have the advantage that the interest income is exempt from federal income tax. This provides a further incentive for investors to purchase these bonds, and allows the airport authority to price their bonds at a slightly lower rate without changing their post-income tax earnings. According to the FAA, "[t]he Federal tax exemption shaves almost two full percentage points off interest costs for airport borrowers of all sizes, an estimated saving of nearly $1 billion per year for airports over the period 1985 to 1993."[12] Of course, the federal treasury loses a greater amount of money through this tax incentive than the benefit received by the local authority, leading to some questioning of the efficiency of this incentive. On the other hand, such tax expenditures provide a decentralized mechanism to encourage capital formation in public entities without the bureaucratic overhead required for appropriated funds.

With respect to airport ground access improvements, the restriction on the use of these funds is generally set by the terms of the bond issue itself. Of course, the airport operator must be able to pay back these bonds on-time, or risk default, and the investors must be reasonably assured that the risk of the bonds defaulting is minimal, or at the very least commensurate with the interest rate attached to the bond issue.

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[11] Christopher R. Rowley, "Comment: Financing Airport Capital Development: The Aviation Industry's Greatest Challenge," Journal of Air Law and Commerce 63 (February/March 1998): 616.
[12] Federal Aviation Administration, Innovative Approaches for Using Federal Funds to Finance Airport Development (1996).

Airport Improvement Program (AIP) Grant Funds. Under the Airway Revenue Act of 1970, the U.S. Congress established the Airport and Airway Trust Fund. Various taxes and user fees support this trust fund, including an airline ticket tax, a tax on air freight, a nationwide international departure fee, and taxes on general aviation fuel.

The Airport Improvement Program (AIP) grant program was established under the Airport and Airway Improvement Act of 1982 (AAIA), using revenues from this trust fund to assist in the development of public-use airports. The AAIA denoted a formula for the distribution of these funds, as well as specified eligible recipients of these grants. The AIP program has been modified by various pieces of legislation in 1983, 1987, 1990, 1994, 1996, 1997, 1999, and 2000.[13]

The federal Department of Transportation (DOT), including the FAA, has issued various regulations on the use of AIP grants; a number of these regulations specifically relate to airport ground access projects. Access roads and auxiliary facilities may be funded using AIP grants, if the following provisions are met: (1) the access road may extend only to the nearest public highway of sufficient capacity to accommodate airport traffic; (2) the access road must be located on the airport or within a right-of-way acquired by the airport sponsor; (3) the access road must exclusively serve airport traffic;[14] (4) more than one access road is eligible if the airport traffic is of sufficient volume to require more than one road; and (5) related facilities such as acceleration and deceleration lanes, exit and exit ramps, street lighting, and bus stops are also eligible

[13] Transportation Research Board, 130.
[14] If a section of access road does not serve airport traffic, this particular section is ineligible for AIP grant funds; however, this does not effect the eligibility of other portions of the road that otherwise meet the eligibility requirements.

when they are a necessary part of an eligible road.[15] Examples of ineligible projects include those that serve non-aviation-related facilities, or for roads that connect parking facilities to access roads.

Likewise, the DOT and FAA have set forth similar requirements for transit facilities that serve public airports. AIP grants may be used towards transit projects if the project being funded primarily services the airport. As transit projects tend to be more complicated and integrated than roadways, the FAA reviews these applications on a case-by-case basis. Historically, the FAA has looked towards the eligibility requirements outlined above for access roadways to guide its decisions on whether or not an airport-related transit project is eligible for AIP grants. However, as a practical matter, the FAA has made it clear that if an on-airport facility has both airport and general uses, it is ineligible to receive AIP funds under the current regulations.[16]

Passenger Facility Charges. The Aviation Safety and Capacity Expansion Act of 1990 gave airports the power, with federal approval, to tax enplaning passengers $1, $2, or $3 under the provision of a passenger facility charge (PFC). Under this act, these funds must be spent on PFC-eligible projects, which include capital improvements that help to "preserve or enhance safety, capacity, or security of the national air transportation system; reduce noise from an airport that is part of the system; or furnish opportunities for enhanced competition between or among air carriers."[17] The individual airlines are

[15] Ibid.
[16] Federal Aviation Administration, Airport Improvement Program Handbook (May 31, 2002), par. 622(b).
[17] Transportation Research Board, 131.

responsible for the collection and distribution of PFC funds, and are permitted to keep a small percentage of these funds to cover administrative costs.[18]

The Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR-21) allowed the amount to be collected from each passenger to increase to $4 or $4.50, again with federal approval. However, additional eligibility requirements must be met if the airport authority wishes to collect PFCs in excess of $3 per enplanements. For medium- and large-hub airports, these requirements state that the airport operator must demonstrate that "(1) a project will make significant contributions to improving safety and security, to increasing competition, to reducing current or anticipated congestion, or to reducing the impact of noise; and (2) the project cannot otherwise be paid from [airport improvement program funds]." Further, if these funds are to be used for surface or terminal projects, the airport operator must demonstrate that adequate provisions have been made for the financing of airside needs.[19]

The authorizing legislation does not set specific eligibility requirements, beyond those outlined above. Administration of the PFC program is handled under the FAA, and in 1991 the FAA issued a final rule regulating PFC funding. Ground transportation projects are PFC eligible if the public agency in charge of the airport owns or acquires the right-of-way and any necessary additional land for the project. On the other hand, the rule is silent on the permissible modes of transportation for airport access projects, as well as the geographical proximity of the project to the airport. Instead, the FAA

[18] Rowley, 618-619.
[19] Transportation Research Board, 131.

Administrator will review each application for use of PFC funds towards ground access projects on a case-by-case basis.[20]

PFC funds may be used on a 'pay-as-you-go' basis, where they are spent as they are received by the airport authority, or may be used to secure and retire debt from airport capital development projects. This ability to issue debt products that are protected by PFC revenues is very powerful, particularly for extremely large airports that have the majority of passenger enplanements in this country. Further, although airport authorities must consult with airlines and airport tenants regarding the use of PFC funds, the ultimate decision is left in the hands of the airport, as it was felt that the airport operator would have greater incentives than the airlines to make long-term capital investments.[21] Further, there is no consultation with other groups that might have interests in the use of PFC funds, such as regional MPOs, freight shippers, passenger interest groups, and travel agents.

As demonstrated in table 2-2, passenger facility charges are also becoming a significant source of revenue for domestic airports. In 2001, $1.585 billion was collected in PFCs by airport authorities, and the estimated total for 2002 is that over $2 billion will be collected in PFCs. Between 1992 and 2001, inclusive, domestic airports collected $10.9 billion in PFCs. Although the airline industry has suffered a downturn over the past two years, because of the depressed economy as well as the events of September 11, 2001, the FAA does not anticipate that PFC revenues will decrease. Although the targeted prediction of $2 billion in PFCs collected during the 2002 calendar year was not

[20] Ibid.
[21] Rowley, 619.

actually met, over $1.8 billion was actually collected, exceeding the amount collected in 2001.[22]

Calendar Year	PFCs collected, All U.S. airports
1992	$85,437,686
1993	$485,112,053
1994	$849,330,244
1995	$1,046,234,802
1996	$1,113,999,014
1997	$1,222,882,438
1998	$1,448,671,813
1999	$1,514,695,981
2000	$1,557,221,630
2001	$1,585,300,074
2002 (est.)	$2,019,000,000

Table 2-2. Annual PFC collections.[23]

As previously mentioned, PFC funds can be used towards certain airport capital development projects, such as improving security, capacity or safety, reducing noise impacts, or improving competition between airlines. Airport operators have taken advantage of PFC funds to work on projects involving all of these issues, table 2-3 shows the breakdown of project types, based upon the percentage of PFC dollars directed towards each project type. Notably, ten percent of the total PFC funds collected are being spent on ground access projects; this total is adjusted to eleven percent if the new Denver International Airport is removed from the data.[24] This information relating to

[22] Federal Aviation Administration, Passenger Facility Charges Branch, Key Passenger Facility Charge Statistics As of April 1, 2003; available from http://www2.faa.gov/arp/financial/pfc/reports/stats.cfm; Internet; accessed 29 April 2003.
[23] Federal Aviation Administration, Passenger Facility Charges Branch, Key Passenger Facility Charge Statistics As of January 1, 2003; available from http://www2.faa.gov/arp/financial/pfc/reports/stats.cfm; Internet; accessed 17 January 2003.
[24] Federal Aviation Administration, Passenger Facility Charges Branch, Distribution of PFC Funds

ground access projects is further broken down in table 2-4; note, however, that table 2-4 reflects information on PFCs that have been approved by the FAA, but does not necessarily reflect funds that have actually been collected.

Category	Distribution of PFC funds
Landside	30%
Interest on PFC bonds	28%
Airside	17%
Access	10%
New Denver airport	8%
Noise	6%

Table 2-3. Distribution of PFC Funds with New Denver International Airport as of December 31, 2002.[25]

Project Type	Amount	Percent
Roads	$1,557,960,349	38.8
Rail	$2,411,466,435	60.0
Land	$19,468,364	0.5
Planning	$30,886,594	0.8
Total	$4,019,781,742	100.0

Table 2-4. Approved Passenger Facility Charges, Access, as of December 31, 2002.[26]

Of course, due to the nature of the passenger facility charge as a "head tax," they are most favorable to the largest airports in the U.S., or more specifically those airports with a very large number of passenger boardings. The FAA limits the amount of AIP grants that large airports are eligible to receive based upon their collection of PFCs. The

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without New Denver As of December 31, 2002; available from http://www2.faa.gov/arp/financial/pfc/reports/nodenver.cfm; Internet; accessed 17 January 2003.

[25] Federal Aviation Administration, Passenger Facility Charges Branch, Distribution of PFC Funds with New Denver As of December 31, 2002; available from http://www2.faa.gov/arp/financial/pfc/reports/denver.cfm; Internet; accessed 17 January 2003.

[26] Federal Aviation Administration, Passenger Facility Charges Branch, Approved Passenger Facility Charges by Categories As of December 31, 2002; available from http://www2.faa.gov/arp/financial/pfc/reports/category.cfm; Internet; accessed 17 January 2003.

AIR-21 legislation requires an airport operator to forfeit 75 percent of its passenger-based AIP entitlement if an airport receives authorization to collect PFCs at the $4 or $4.50 level. Although this may appear as a harsh penalty on the airport operator (particularly since a disproportionately high percentage of the ticket taxes which support AIP grants originate at large airports), in practice the airports that collect PFCs at the $4 or $4.50 level receive significantly more income from collecting PFCs at these elevated levels than the value of the AIP grants forfeited. This allows AIP funds to cover a larger proportion of the needs of smaller airports.

The PFC eligibility determination for airport ground access projects by the FAA is essentially the same as those for AIP grant eligibility. For instance, a on-airport shared-use (airport and general use) transit facility would not be eligible for PFC funding, just as it would be ineligible for AIP grant funding.[27]

Airport Revenues. Most large airports in the United States generate a net income for the airport owner/operator, via a combination of landing fees, parking charges, concession rentals and fees, and other revenue sources. However, various federal laws restrict the use of these revenues. The AIAA required that airport operators "use all revenues generated by the airport for the capital or operating costs of the airport, the local airport system, or other local facilities which are owned or operated by the owner or operator of the airport and directly related to the actual transportation of passengers or property."[28]

[27] Transportation Research Board, 131.
[28] Airport and Airway Improvement Act, U.S. Code, vol. 49, sec. 47107 (1982); quoted in Transportation Research Board, 132.

The Airport and Airway Safety and Capacity Expansion Act of 1987 further restricted the use of airport revenues with regards to non-airport facilities. This act requires that these non-airport facilities be substantially, as well as directly, related to air transportation. The FAA Authorization Act of 1994 further added a reporting requirement, such that airport authorities must now provide an annual accounting of revenues and expenses to the FAA.

Most recently, in 1999 the FAA issued a final policy that sets forth and clarifies specific restrictions on the use of airport revenues that have been in place since 1982.[29] This final policy details some of the permissible uses of airport revenues in regards to ground access projects. Specifically,

> Airport revenue may be used for the capital or operating costs of those portions of an airport ground access project that can be considered an airport capital project, or of that part of a local facility that is owned or operated by the airport owner or operator and directly and substantially related to the air transportation of passengers or property, including use by airport visitors and employees. The FAA has approved the use of airport revenue for the actual costs incurred for structures and equipment associated with an airport terminal building station and a rail connector between the airport station and the nearest mass transit rail line, where the structures and equipment were (1) located entirely on airport property, and (2) designed and intended exclusively for the use of airport passengers.[30]

Further discussion of this provision will be provided in the context of the San Francisco International Airport case study, as the FAA utilizes the BART rail link extension as an explicit example in this notice of final rulemaking.

Interestingly, the FAA now permits the use of airport revenues to cover the operating cost of ground access projects that are otherwise eligible for funding as a capital project. This is a significant shift in FAA policy; prior to the release of the 1999

[29] Federal Aviation Administration, "Policy and Procedures Concerning the Use of Airport Revenue," Federal Register 64, no. 30 (16 February 1999), 7696-7723.
[30] Ibid., 7718-7719.

policy, using airport revenues to pay for the operating costs of a ground access project was forbidden.[31]

State and local grant funds. One final source of capital development funds involves state and local sources. These funds take a variety of forms, from outright grants and AIP matching grants to dedicated revenue streams such as fuel and use taxes. The restrictions placed on these funds vary depending on the type and source. However, these funding sources make up a relatively small portion of total funding available to airport operators (1.7 percent of all revenues for large and medium-hub U.S. airports in 1996[32]), and thus do not have a significant impact on the decisions of airport owners and operators.

Surface Transportation Funding

In addition to funds that are accessible by airport owners/operators, a separate pool of funding is available for airport access projects. These funds are distributed under surface transportation project programs administered by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). However, unlike the airport funding sources described above, FHWA and FTA funding sources are distributed to a wide variety of projects and agencies, resulting in a tremendous demand for these funds that far exceeds the supply available.

[31] Transportation Research Board, 132.
[32] Ibid., 130. See table 2.1, supra.

In order to determine which projects receive these limited funds, each state[33] creates a 'transportation improvement program,' which outlines surface transportation projects that the state wishes to undertake. These transportation improvement programs identify all projects that the state wishes to receive federal financing for at least the next three fiscal years. Most importantly, the projects listed in the state's transportation improvement program are prioritized by importance, as generally only those projects that are high enough on the priority scale will receive FHWA and/or FTA funding.

Federal highway and transportation funding for capital projects are currently authorized under the Transportation Equity Act for the 21st Century, more commonly known as TEA-21. This Act, enacted on June 9, 1998, provides for the multi-year funding authorization of federal programs under the FHWA and FTA. The current TEA-21 authorization is expiring in the current congressional term, however, and therefore new authorizing legislation will need to be enacted by congress during the upcoming congressional session.

TEA-21 also sets forth the various programs under which funds may be distributed, as well as formulas for the distribution of these funds under each program. The majority of funds under TEA-21 are left open to the individual states, as long as the various eligibility, matching, and distribution requirements are met. A smaller amount of funding is allocated within TEA-21 to specific projects, states, or both. Further, Congress has also 'earmarked' some portions of these funds to go towards specific projects that it feels are essential or otherwise deserving of special consideration. A list of the significant programs funded by TEA-21 is available in table 2-5.

[33] In large metropolitan areas, the state must work with the MPO.

Program project	Funding	Eligible Projects	Coordination			Comments and additional information
			State	MPO	Other	
Surface Transportation Program (STP) *(a)*	Apportionment ($33.3 billion for FYs 1998-2003)	Construction, rehabilitation, resurfacing, traffic and other improvements for highways and bridges	X	X	X *(b)*	STP funds apportioned according to a formula: 25% based on the ration of state lanes to U.S. lane miles, 35% based on the ratio of state tax payments into the Highway Trust Fund, 40% based on the ratio of state vehicle miles traveled to all U.S. miles traveled.
STP Set-Aside for Safety Improvements	10% of STP apportionments	Safety improvements on any public road including rail and highway crossings and hazard elimination projects	X	X		
STP Set-Aside for Transportation Enhancements	10% of STP apportionments	Pedestrian facilities, landscaping, environmental mitigation, control of outdoor advertising, etc.	X			
Congestion Mitigation and Air Quality Improvement Program	$8.1 billion authorized for FYs 1998-2003 (based on county air quality)	Control measures for Clean Air Act projects, traffic management, intermodal freight projects, fare/fee subsidy programs	X	X		If a state has no ozone or carbon monoxide problems, the funds may be used for STP eligible purposes.
Metropolitan Planning Funds	Apportioned to states based on the size of urban population	Inventories or routes for condition and capacity, predictions of employment, population, and growth to assess current and future transportation needs	X	X		MPOs are responsible for developing a long-range transportation plan and transportation improvement plan.
National Corridor Planning and Development Program	$140 million for each of FYs 1999-2003	Feasibility studies, corridor planning, and design, location and routing studies, environmental review and construction	X	X		
Intelligent Transportation Systems	$679 million for FYs 1998-2003	In metropolitan areas, funds are for integrating systems;	X			At least 10% of the funding will be directed towards

Integration *(c)*		outside metropolitan areas, funds may be used for installation costs			rural areas
Surface Transportation Research	$592 million authorized for FYs 1998-2003 *(d)*	R&D and technology transfer activities related to motor carrier transportation, transportation planning and development, and the effect of state laws on the above	X	X	An Advance Research Program has also been established addressing longer-term, higher-risk research.
State and Community Highway Safety Grants	$932.5 million authorized for FYs 1998-2003	Funds apportioned to states to pay for non-construction costs of highway safety programs aimed at reducing injury, death, and property damage from motor vehicle accidents	X	X	At least 40% of the apportionments to each state must be used for local traffic safety problems.
High Priority Projects	$9 billion authorized for FYs 1998-2003	Studies, engineering, construction, etc.	X	X	1,850 projects have been approved for funding.

NOTES: *(a)* A separate STP program has been established for urban areas with more than 200,000 people. The funds in this program are distributed on the basis of population unless other criteria are approved by the Secretary of Transportation.
(b) Certain projects applied for by urban areas with a population of more than 200,00 are subject to FHWA approval.
(c) ITS Program includes a separate program for R&D with authorized funds of $603.2 million for FYs 1998-2003.
(d) Funding for the Surface Transportation Research Program also includes funding for the Surface Transportation-Environmental Cooperative Research Program.

Table 2-5. FHWA federal-aid programs and projects.[34]

As indicated in table 2-5, supra, there are three primary contact points that administer FHWA funding under TEA-21. In large urban areas, generally with populations over 50,000, metropolitan planning organizations (MPOs) are responsible for developing transportation improvement programs for their respective regions. The MPO generally acts to coordinate the cooperative decision making processes to include all

[34] Transportation Research Board, TCRP Report 62, 134.

representative local governments and regional planning agencies. These transportation improvement programs are then integrated into the master state transportation improvement program, as discussed above.[35]

If an area does not have an MPO, then the administrative point of contact is the state Department of Transportation (DOT). Any federal funds that are not dedicated to metropolitan areas or otherwise restricted fall under the control of the state DOT, and the state DOT is responsible (within its transportation improvement program) for identifying the projects that will receive these funds. The FHWA itself administers a small portion of the total funds it disburses for specific programs, such as border improvement projects and certain projects in large metropolitan areas.[36]

The FTA also distributes funding to eligible agencies. These funds are divided into three sources, a formula program, a capital program, and a research and technology program. As its name implies, the formula program distributes funds to transit agencies based on a pre-determined formula; these funds may be used for certain transit purposes, including planning, capital, and occasionally maintenance expenses. Similarly, the research and technology program provides funding for planning and research efforts undertaken at the local and state levels.

The capital program is designed to fund large new transit projects, as well as certain types of modernization and upgrade projects, in addition to metropolitan planning efforts. Therefore, it is the most promising source of funds for the development and construction of airport ground access projects. Administered under the capital program is the much-desired Major Capital Investments program ("New Starts"). Further, airport

[35] Ibid., 133. See also Federal Highway Administration, Office of Program Administration, A Guide to Federal-Aid Programs and Projects (May 1999).
[36] Ibid.

ground access projects are well represented within the projects seeking funding. During the most recent funding cycle, airport access projects represented nearly 30 of the 190 proposed projects seeking New Starts funding.[37]

TEA-21 also provides for financial assistance in the form of loans and loan guarantees. Under the Transportation Infrastructure Finance and Innovation Act (TIFIA), created under TEA-21, the U.S. DOT is authorized to provide direct loans, standby lines of credit, and loan guarantees to sponsors of eligible large surface transportation projects. According to the statute, in order to be eligible for these loan funds, projects must be of "national significance," although public or private sponsors at the local level can administer them. As with the federal grants, any projects that wish to be considered for TIFIA financing must be included in the state's transportation improvement program, and the estimated project costs must equal at least the lesser of $100 million or 50 percent of a state's federal highway fund apportionment for the most recent fiscal year. Further, no more than 33 percent of eligible project costs may be financed under TIFIA-backed credit assistance.[38]

As TIFIA funds are loans, rather than grants, the project sponsor must also demonstrate that these loans will be repayable through project revenues, such as tolls, user fees, or other dedicated revenue sources. This provision makes certain airport ground access projects ideal candidates for TIFIA financing, as many of these projects will generate revenue that can be used to pay off the loans (either through fares collected for transit projects or tolls, parking fees, and freight surcharges for road projects). Further, as this program costs the federal government significantly less money, as it must

[37] Ibid., 135.
[38] Ibid. See also Federal Highway Administration, Office of Program Administration, A Guide to Federal-Aid Programs and Projects (May 1999).

only insure itself against loan defaults, TIFIA funds are generally more accessible than funding under the New Starts Program and the Surface Transportation Program.[39]

[39] Ibid.

Chapter Three

Case Studies: New York-JFK, San Francisco, and Denver

In this chapter, specific focus will be paid to three airports across the country that have recently completed, or are in the process of completing, a major ground access infrastructure improvement project. In one case, Denver, this project occurred in conjunction with the planning and construction of the entire airport property; in the other two case studies, New York-Kennedy and San Francisco, significant capital projects were undertaken to improve ground access pre-existing airport terminals. Of course, with any capital project, the new operating costs to run the system and keep it maintained must also be considered. This chapter will focus on the factual presentation of each project, with specific focus on the funding apparatuses used and the political roadblocks and successes encountered. Subsequent chapters will feature detailed analysis of the case studies, attempting to focus on the specific elements that let to the ultimate success (or failure) of the project.

John F. Kennedy International Airport

New York City is serviced by three principal airports: LaGuardia Airport in northern Queens county services primarily short-haul domestic passenger traffic, while John F. Kennedy International Airport in southeastern Queens county and Newark Liberty International Airport across the river in northeastern New Jersey serve all segments of the air transportation market, including long-haul domestic and international passenger services, as well as providing the bulk of the air cargo handling facilities for New York City. A fourth facility, Teterboro Airport, located about 12 miles from

Manhattan in northeastern New Jersey, primarily services general aviation, including many corporate aircraft movements.

All of these airport facilities fall under the jurisdiction of The Port Authority of New York and New Jersey (PANYNJ, or Port Authority). The Port Authority is also responsible for the operation and maintenance of the interstate bridge and tunnel crossings, maritime ports, and bus terminals in the New York City metropolitan area, as well as the Port Authority Trans-Hudson (PATH) rail service linking New Jersey and Manhattan.

John F. Kennedy International Airport is located approximately 15 miles from downtown Manhattan, and encompasses an area of 4,930 acres, including 30 miles of roadways within the airport boundaries. The airport is made up of nine passenger airline terminals, connected by shuttle buses, and an equal number of cargo buildings. In the 2000 calendar year, JFK Airport handled 345,311 aircraft movements, 32,827,864 passengers and 1,864,423 tons of air cargo.[1] In contrast, Newark International Airport handled slightly more plane movements (450,288) and passengers (34,188,702) during the same time period, but significantly less air cargo (1,070,379 tons).[2]

Ground access to JFK airport is primarily by rubber-tired vehicles. Currently, limited rail access is provided by rail-to-bus connections with the New York City subway at the Howard Beach/JFK Airport station on the A train, and Long Island Rail Road (LIRR) commuter trains at Jamaica station, servicing all LIRR routes except the Port Washington branch. The Port Authority currently provides shuttle bus service to the

[1] The Port Authority of New York and New Jersey, John F. Kennedy International Airport Facts and History; available from http://www.panynj.gov/aviation/jhisfram.htm; Internet; accessed 1 February 2003.
[2] The Port Authority of New York and New Jersey, Newark Liberty International Airport Facts and History; available from http://www.panynj.gov/aviation/ehisfram.htm; Internet; accessed 1 February 2003.

Howard Beach station (utilizing parking lot shuttles), and traditional transit bus lines run between Jamaica station and JFK airport.

Historical Perspective. Proposals to service JFK airport by rail have been discussed for at least the past 35 years. In 1968, the Metropolitan Transportation Authority (MTA) proposed a LIRR connection to Kennedy Airport, using an alignment running from Jamaica Station along Baisley Boulevard. This recommendation was revised in 1969 by the Kennedy Airport Access Project (a joint committee with representatives from the Port Authority, the MTA, and the airlines) to extend the LIRR Rockaway Branch to Howard Beach and the central terminal area. 12 other projects have been proposed since then to improve access to Kennedy Airport, none of them having been implemented due to lack of funding or community opposition.[3]

The only attempt made to implement such service was the JFK Express (more commonly known as the 'Train to the Plane'), which utilized dedicated express trains that ran between Times Square, Manhattan and Howard Beach, Queens, utilizing the existing A train right-of-way and trackage. This service did not last for too long, however, as it was prone to delays (e.g., getting caught behind a subway train that made local stops), and did not overcome the problem of connecting between the Howard Beach station and the airport terminals.[4]

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[3] Anthony G. Cracchiolo, "The Challenges of Building a Light Rail System at John F. Kennedy International Airport: The Influence of Public and Regulatory Processes on the Technological and Evolutionary Design of a Capital Project," in Compendium of Technical Papers of the 68th Annual Meeting of the Institute of Transportation Engineers [CD-ROM] (Washington, D.C.: Institute of Transportation Engineers, August 1998), 4.

[4] Lawrence F. Cunningham and James H. Gerlach, Ground Access Assessment of North American Airport Locations (Denver, CO: University of Colorado at Denver, September 1996), II-131, NTIS, PB97-155345.

Cunningham and Gerlach identified three primary impediments towards improved ground access at Kennedy Airport: community opposition, capacity constraints on existing right-of-way, and lack of ready funding.[5] Although JFK airport abuts Jamaica Bay on one side, a number of residential neighborhoods surround it on others, including Howard Beach, Ozone Park, Locust Manor, and Rosedale. These communities tend to be adversely effected by any construction project, both in short-term construction annoyances, as well as the lasting impacts of increased noise levels, particularly from additional roadways.

These geographical restrictions also tend to restrict what can be accomplished in terms of improved ground access. Building extensive new right-of-ways would require either the condemnation of multiple dwellings and businesses, or the additional expense of tunneling, as very little clear land remains. Thus, most of the ideas that were proposed depended on utilizing existing right-of-ways, rather than building new ones. However, the current right-of-ways generally operate at capacity, and have very little room for additional services. As mentioned above, one of the primary reasons the JFK Express failed was because of delays experienced due to the local subway trains running on the same tracks. Similarly, the commuter rail lines are also at capacity, making it difficult to implement a dedicated airport service with any reasonable frequency. Finally, the good of the many must be weighed against the good of the few; hundreds of thousands of commuters depend on the local roads and transit infrastructure daily, while only about 54,000 individuals per day would utilize a dedicated transit service to get to and from the airport.[6]

[5] Ibid.
[6] Ibid.

Implementation of the JFK AirTrain. Port Authority officials project that Kennedy Airport may need to handle as many as 37 million passengers by the middle of this decade, and project that 45 million passengers per year will be utilizing JFK by 2013. However, they also have noted that the airport is close to its capacity in terms of ground access; without significant improvements to both the rail and road network, Kennedy Airport will not be able to handle these increased passenger loads.[7]

Specifically, the Port Authority has determined that the current capacity of the on-airport roadway system would enable Kennedy Airport to handle the projected loads of 45 million passengers per year. However, the roadways leading into the airport are much more congested, and can only handle a maximum of 37 million passengers per year. Further, this figure represents a maximum capacity; the level of service is already degraded with only 32 million passengers per year using Kennedy Airport. Quite frequently, the Van Wyck Expressway (which serves as the primary access road to JFK) turns into a six-lane parking lot, and even when traffic is moving, travel times are highly variable.[8]

As part of a total improvement package for Kennedy Airport, known as JFK 2000, the Port Authority recommended the construction of a Central Terminal Complex with a people-mover system to connect the landside airline terminals. Although the Central Terminal Complex concept was eliminated in further revisions of the JFK 2000 plan, the concept of having a people mover connect the nine passenger terminals was

[7] Cracchiolo, 1.
[8] Ibid., 2-3.

transformed into a separate project which developed into the Automated Guideway Transit (AGT) system.[9]

Other options were considered, but deemed inadequate to support JFK's growth, or infeasible due to cost or environmental requirements. Expansions and improvements to the existing roadway infrastructure were ruled out due to environmental issues, as well as the problem of obtaining additional right-of-way for highway expansion. An extension to the New York City Subway was also proposed; however, as with the JFK Express, capacity on the main trunk line was insufficient to provide a regularly scheduled service with frequent headways, particularly during rush hour. Extensions to the LIRR were once again proposed, but as with the subway option, main line capacity would have restricted the ability to offer frequent service to the airport.[10]

As initially planned, the AGT system consisted of a 22-mile stand-alone system connecting all of the JFK passenger terminals with the Howard Beach subway station (also serving long-term and employee parking lots) and Federal Circle (the location of many car rental companies at Kennedy Airport), and the Jamaica LIRR/Subway station. The AGT would continue onward to provide connections to the LIRR and the 7 train at Willets Point, LaGuardia Airport, the E, F, G, and R trains[11] at Queens Plaza, with a final terminus at 59th Street and Lexington Avenue in Manhattan, providing connections to the N, R, 4, 5, and 6 trains.

This ambitious project, with an estimated cost of over $4 billion, died because of two primary reasons. First, although a number of key constituencies supported the AGT,

[9] Ibid., 7.
[10] Ibid., 6-7.
[11] Queens Plaza is currently served by the E, G, R, and V trains due to route changes made in the summer of 2001.

including elected officials, regional businesses, and environmental advocacy groups, many objections to this project were also voiced. Primary concerns included the noise and visual impact of an elevated transit system on the residential neighborhoods that it passed through, as well as a concern that the already overburdened Lexington Avenue subway line in Manhattan would suddenly have even more passengers riding the 4, 5, and 6 trains to access the AGT.

Second, and perhaps even more significant, was the price tag attached to the project. Although the Port Authority initially proposed using Passenger Facility Charge (PFC) revenues as the sole financing tool, it quickly became obvious that it would not be possible to leverage the amount of capital necessary to complete such an ambitious project. Further, a number of groups objected to the use of PFC revenues to build the AGT, with the Air Transport Association (ATA)[12] leading the opposition. The ATA argued that improved access to the airports is the responsibility of local and state government, and that the AGT, even the on-airport portion, was not eligible to use PFC revenues under the current regulations.[13] Interestingly, one of the primary reasons that the ATA is against the AirTrain project is that the airlines feared (correctly) that this project could set a nationwide precedent for the use of PFC funds.[14]

In an attempt to deal with the concerns raised over the AGT project, as well as to significantly cut the project cost, the Port Authority proposed the JFK AirTrain, a new light rail system running on elevated guideways on and adjacent to airport property. A 1.8 mile loop has been designed to link the nine passenger terminals; a 3.3 mile extension continues onward towards the Federal Circle rental car area, long term and employee

[12] The ATA is the trade organization that represents all of the major U.S. passenger and cargo airlines.
[13] Ibid., 8-9.
[14] "An Airport Link With Potential," New York Times, 29 May 1999, sec. A, p. 14.

parking lots, as well as the Howard Beach subway station. The second phase of the AirTrain project is a three mile extension from Federal Circle, running in the Van Wyck expressway (on an elevated structure above the median) to the Jamaica LIRR/subway station.[15] Figure 3-1 is a schematic map of the 8.1 mile JFK AirTrain system.

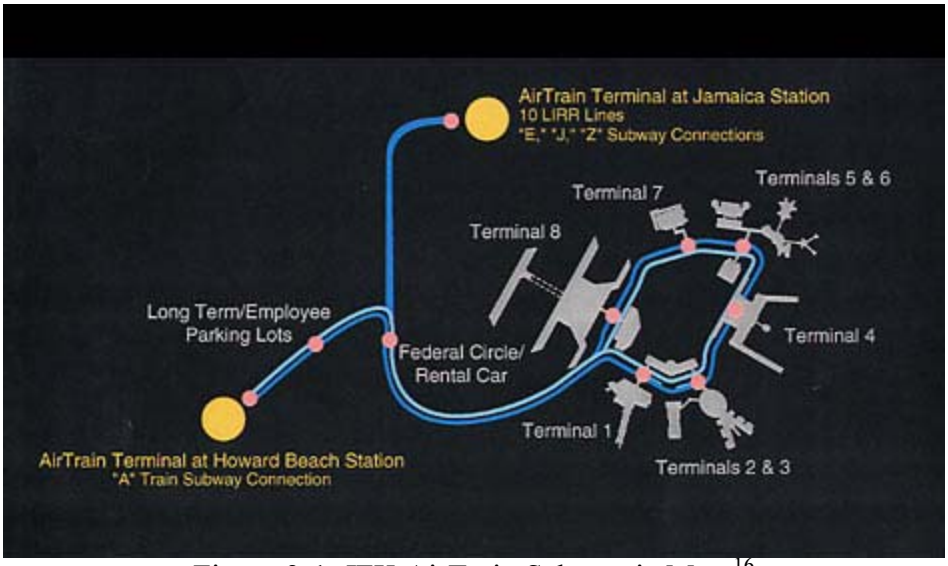

Figure 3-1. JFK AirTrain Schematic Map.[16]

Also, in order for the possible future connection of the AirTrain system with either the LIRR or New York City Subway, the AirTrain was designed with interoperability in mind. Although no formal plans exist yet regarding the cross-operation of rail equipment from Jamaica station, the AirTrain light-rail line is being constructed to standards that would permit either LIRR or New York City Subway heavy-rail equipment to operate along its entire length with minimal adjustments.[17]

[15] The Port Authority of New York and New Jersey, AirTrain: The Port Authority's Light Rail System to Improve JFK Airport Access; available from http://www.panynj.gov/airtrain/projectframe.htm; Internet; accessed 1 February 2003.
[16] Ibid.
[17] "An Airport Link With Potential," New York Times.

Eventually, the hope is that a 'one-seat ride' will be offered between Manhattan and Kennedy Airport, as well as between the airport and various destinations on Long Island.

As with the AGT, the AirTrain project remained completely under the control of the Port Authority, although cooperation was required with the MTA to ensure that seamless transfers would be possible at Howard Beach and Jamaica stations. Also, similar to the AGT proposal, the Port Authority is financing the entire project with PFC revenue bonds and internal airport revenues.[18]

As with the prior proposal, the ATA and several community groups raised similar objections over the use of PFC funds and the environmental impact caused by the AirTrain system. Although the FAA had granted approval for the use of PFCs towards the AirTrain project on February 9, 1998,[19] the ATA filed a lawsuit in an attempt to block the project.[20] The FAA had originally found that the Port Authority had 'adequate justification' to use PFC revenues for the AirTrain project, as the AirTrain would expand the airport capacity beyond the 36 million passengers per year that could be handled by the current roadway infrastructure. Since one of the permissible uses of PFC revenues is to support capital projects designed to increase the capacity of an airport, the FAA gave its approval the AirTrain project, with certain restrictions. For instance, PFC funds cannot be used to cover the construction costs of maintenance and storage facilities, nor can it be used to cover fare collection equipment.[21]

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[18] The Port Authority of New York and New Jersey, AirTrain: Funding and Schedule; available from http://www.panynj.gov/airtrain/fundingframe.htm; Internet; accessed 1 February 2003.
[19] The Port Authority of New York and New Jersey, AirTrain: Project Approval; available from http://www.panynj.gov/airtrain/approvalframe.htm; accessed 1 February 2003.
[20] Air Transport Association of America v. Federal Aviation Administration, 335 F.3d 1 (D.C. Cir. 1999).
[21] Ibid., 4.

The ATA argued that the AirTrain project did not meet the requirements for PFC financing, as "it would not be part of the 'airport' as defined in 49 U.S.C. §§40117(a)(1) and 47102(2), but would instead consist of a right-of-way along the Van Wyck Expressway."[22] Specifically, the ATA argued that the agency's approval of the project was *ultra vires*, as the FAA lacked the authority under statute to grant such an approval for a conditional project, as well as arguing that the statute prohibits the use of PFC funds for off-airport improvements. Further, the ATA raised a procedural argument that the FAA had solicited and received information from the Port Authority *ex parte*, circumventing notification and comment requirements.[23]

The court ruled that the statute did not prohibit an airport agency from applying to use PFC revenues prior to the start of a project, nor was the FAA erroneous in granting approval of such a plan, as long as certain regulatory procedures were met. More importantly, however, the court determined that the Port Authority was entitled to use PFC funds to support off-airport construction activities.[24] Specifically, an airport is partially defined as "an appurtenant area used or intended to be used for airport buildings or other airport facilities or *rights of way*."[25] Although the Port Authority, at the time of application, did not own the right-of-way that would be used by the AirTrain, the Port Authority was in the process of acquiring these rights-of-way. The statute itself is silent on whether the applicant must own the property at the time of application; however, the court felt that "it would be *un*reasonable, because likely unworkable, to require airport

[22] Ibid.
[23] Ibid.
[24] Ibid., 4-5.
[25] Ibid., 5 (emphasis in original), quoting U.S. Code, vol. 49, sec. 47102(2)(A)(ii).

authorities to expend large sums of money to acquire tracts of land before a project was even partially approved."[26]

The ATA also argued that although the Airport Improvement Program handbook states that access roads "must be located on the airport *or* within a right-of-way acquired by the airport,"[27] the standard is different for rapid transit facilities. Transit facilities "located within the airport boundary that are necessary to provide a connection to a rapid transit system may be eligible if they will primarily serve the airport."[28] As with the previous argument, however, the court ruled that airport rights-of-way are themselves within the airport boundaries, and are thus eligible for the use of PFC revenues.

However, the court did find that the FAA failed to meet the procedural review requirements on the Port Authority application when it requested and accepted *ex parte* supplementary materials from the Port Authority, and ruled that the application must be reviewed once again by the FAA in order to meet the procedural requirements set forth in the statute.[29] The FAA proceeded to do this, and upon consideration of the additional materials and comments submitted, once again granted approval for the use of PFC funds towards the construction of the Kennedy Airport AirTrain on August 16, 1999.[30]

The FAA's approval was once again challenged in court, this time by a New York City based citizens' advocacy group, the Committee for Better Transit (CBT).[31] CBT argued that the FAA failed to conduct proper cost/benefits analyses, and thus could not have found adequate justification for the AirTrain project. However, the court points

[26] Ibid., 5 (emphasis in original).
[27] Ibid., 6 (emphasis in original).
[28] Ibid.
[29] Ibid., 8.
[30] The Port Authority of New York and New Jersey, AirTrain: Project Approval.
[31] Southeast Queens Concerned Neighbors, Inc. v. Federal Aviation Administration, 229 F.3d 387 (2d Cir. 2000).

out that "[w]hile CBT may have legitimate arguments that a different transportation system would have been more cost effective or preferable, this court has no authority to require the FAA to design or implement alternative projects."[32] The court also noted that "[u]nder the PFC statute, . . . the FAA's finding of fact, if supported by substantial evidence, are conclusive."[33] Having found that the FAA's decisions were supported by substantial evidence, the court held that the approval of the Port Authority's application was reasonable, and therefore denied CBT's petition for review.[34]

Current Status. A design, build, operate and maintain (DBOM) contract was awarded to the AirRail Transit Consortium, led by Bombardier Transportation of Canada and Skanska (U.S.A.), with a projected cost of $1.5 billion (excluding the AirTrain terminal at Jamaica station) and a target completion date of late 2002.[35] The project was running close to schedule and near-budget as of mid-2002, and testing had begun on the AirTrain cars and equipment.

Unfortunately, a fatal accident during testing on 27 September 2002 has postponed the opening of the AirTrain indefinitely. Although the investigation into the accident has not been completed, initial reports indicate that the train had been running at speeds far exceeding the permissible speed limit, causing the train to derail and kill the test operator (although the trains will be fully automated once in operation, testing was being performed with drivers manually operating the equipment). This accident

[32] Ibid., 395.
[33] Ibid.
[34] Ibid., 396.
[35] David W. Dunlap, "J.F.K. Enters the Era of the Megaterminal," New York Times, 19 March 2000, sec. 11, p. 1.

destroyed one trainset, and damaged about 150 feet of track and adjacent infrastructure.[36] As of December 2002, testing had not yet been started again, and the construction consortium estimates the cost of the damage to be several million dollars.[37]

San Francisco International Airport

The San Francisco International Airport (SFIA) is located approximately 14 miles south of downtown San Francisco, and serves the nine counties of the California Bay Area, from Santa Clara county in the south to Sonoma, Napa, and Solano counties in the north, including the metropolitan areas of San Francisco, Oakland, and San Jose. SFIA provides the principle air service to the Bay Area, although two other smaller airports in Oakland and San Jose provide auxiliary air passenger services (principally via discount carriers such as Southwest Airlines and JetBlue Airways).[38]

In 2000, SFIA serviced 41,040,955 passengers, making it the 5th busiest airport in the United States and the 9th busiest in the world. On the air cargo side, SFIA handled 869,839 metric tons of cargo in 2000, placing it as the 12th largest air cargo airport in the United States and the 22nd largest in the world. SFIA is extremely significant in terms of foreign exports and imports, with the total dollar value of these imports and exports placing it second in the list of all United States airports.[39]

Currently, SFIA is only served by roadway access, principally from the north-south Highway 101 and the north-south Interstate 280 (via the connector Interstate 380).

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[36] Randy Kennedy, "Inquiry Shows Speed of Test Run Caused Derailment of AirTrain," New York Times, 18 October 2002, sec. B, p. 1.
[37] "Metro Briefing New York: Queens: Airtrain Delayed Indefinitely," New York Times, 25 November 2002, sec. B, p. 5.
[38] Cunningham and Gerlach, Ground Access Assessment of North American Airport Locations, II-170.
[39] San Francisco International Airport, San Francisco International Airport Fact Sheet; available from http://www.flysfo.com/about/press/factsheets/fs-SFOIntl.pdf; Internet; accessed 3 February 2003.

These two highways also are the only principle arteries serving the peninsula, and already suffer from severe congestion during peak periods. Due to the geographical layout of the Bay Area, passengers traveling from the East Bay must utilize one of three bridge crossings over the San Francisco Bay in order to connect to Highway 101, further adding to the traffic that Highway 101 must handle.[40]

Public transit access is provided principally by SamTrans, the operator of transit services in San Mateo County. Several bus lines link SFIA to downtown San Francisco and other cities along the peninsula in San Mateo. Caltrain, the peninsula commuter rail service, runs relatively close to SFIA, stopping in Millbrae. Similar to New York's Kennedy Airport, however, rail access does not currently extend into the airport premises, but rather requires transferring to a connecting shuttle bus.[41] The Bay Area Rapid Transit (BART) service currently in place primarily links the East Bay with San Francisco, but only runs as far as Colma station, just south of San Francisco. SamTrans operates a special express shuttle bus between Colma station and SFIA which charges the normal SamTrans local bus fare.

These buses, both the local and express routes, represent about nine percent of the total mode share at SFIA, and placing it seventh among all domestic airports based on bus/rail mode share. However, if a more liberal definition of public transportation is used which includes shared-ride vans, the total mode share of passengers and employees using public transportation to and from SFIA jumps to 21 percent; with the addition of charter buses, pre-arranged limousines, and hotel/motel courtesy vehicles, the figure reaches a

[40] Cunningham and Gerlach, II-172.
[41] Ibid.

staggering 32 percent, placing it at the top of the list amongst all domestic airports for public transportation mode share if either of these broader definitions are utilized.[42]

Historical Perspective. Rail access to SFIA was first formally proposed in 1972, in the San Francisco Airport Access Project Report, and the issue resurfaced several times over the years, until 1988, when a regional coalition developed the Regional Rail Extension Program, which detailed improvements to both Caltrain and BART, amongst which were connecting BART to SFIA. In the proposal, the principal method of financing these improvements was through an already-existing sales tax designated for transit agencies; federal funds only accounted for approximately 30 percent of the total cost of the projects proposed.[43]

A number of alternatives previously developed in a 1985 study were given further analysis, and five were identified as having significant merit by the Metropolitan Transportation Commission (MTC), the transportation planning organization for the Bay Area. These five alternatives were studied in a relatively traditional manner, under the guidelines of the Federal Transit Administration's Procedures and Technical Methods for Transit Project Planning. Upon the completion of the technical analysis, EIS, and public hearings, the MTC identified what it considered to be the best alternative among the five studied.[44]

Interestingly, the option chosen by the MTC placed a significant part of the BART extension underground, even though this resulted in significantly higher costs than

[42] Transportation Research Board—National Research Council, TCRP Report 62: Improving Public Transportation Access to Large Airports (Washington, D.C.: National Academy Press, 2000), 13-14.
[43] Cunningham and Gerlach, II-177.
[44] Ibid., II-178.

a surface-running or elevated structure. During the planning stages, several communities raised concerns about the possible disruption caused by the BART extension; specifically, Colma was interested in the preservation of several cemeteries located in the BART right-of-way, and San Bruno was afraid of BART disrupting its downtown. For these reasons, the MTC elected to proceed forward with the plan that best mitigated the effects on the surrounding communities.[45]

Implementation of the BART extension. In order to connect SFIA to the region's rail infrastructure, a 8.7 mile extension is being added to BART, running from the Colma station to a new intermodal terminal at Millbrae station, with a spur line leading to SFIA. The lengthening of the main line track represents 7.9 of these miles, with the airport spur representing the other 0.8 miles.[46] A map of BART service, with the airport extension labeled, can be seen as figure 3-2. Figure 3-3 is a map that shows the alignment as well as elevation of the new extension; the spur line, as well as the existing Caltrain alignment, can clearly be seen on this map.

[45] Ibid.
[46] United States Department of Transportation, Office of the Secretary Of Transportation, Office of Inspector General, Audit Report: Use of Airport Revenue for the Bay Area Rapid Transit District Extension to San Francisco International Airport, AV-1999-056 (Washington, D.C., 18 February 1999).

Figure 3-2. BART System Map.[47]

[47] San Francisco Bay Area Rapid Transit District, Stations & Schedules: Maps & Directions; available from http://www.bart.gov/stations/map/systemMap.asp; Internet; accessed 3 February 2003.

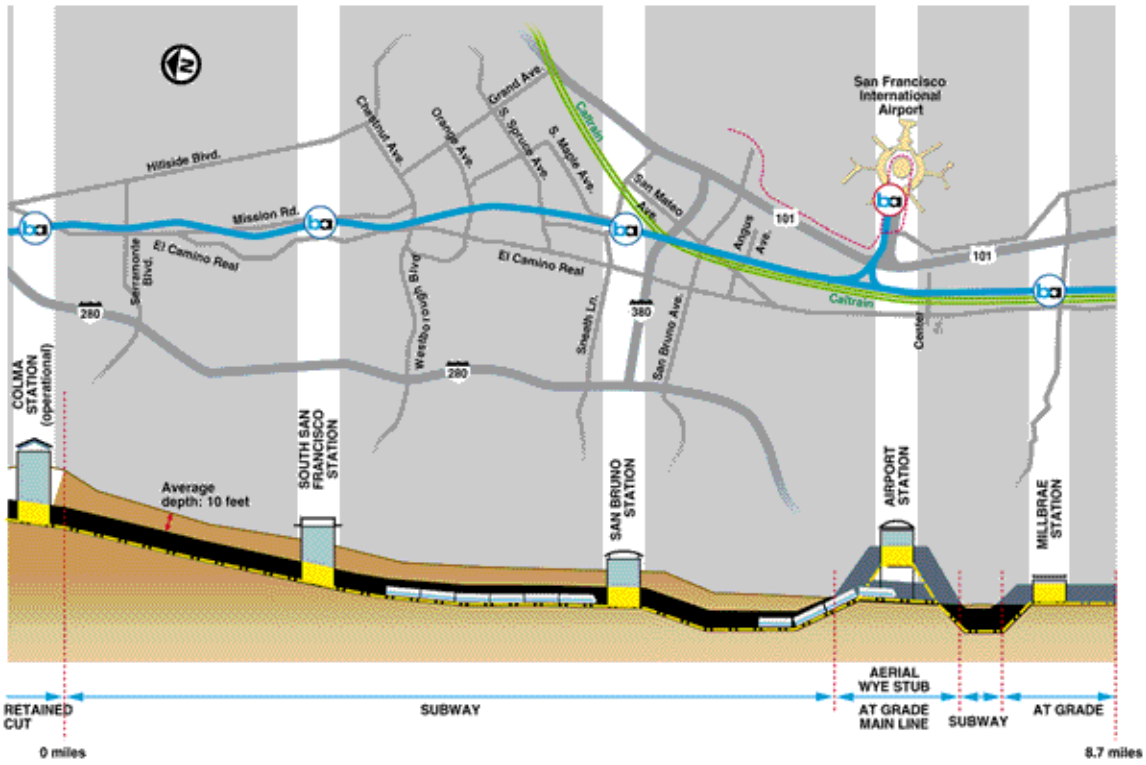

Figure 3-3. SFIA Extension Alignment and Elevation.[48]

As can be seen in figure 3-3, the majority of the new alignment is underground, in order to minimize the impact on the local communities, as described above. The airport extension is elevated, while the Millbrae station is at grade, in order to provide for cross-platform transfers to Caltrain commuter rail, as described in more detail later in this section.

At the airport, the BART line runs directly into the new International terminal, providing international air passengers with direct access to the terminal. The domestic terminals are about a five to ten minute walk from the BART station, but are also

[48] San Francisco Bay Area Rapid Transit District, About BART: SFO Extension: About: Project Features; available from http://www.bart.gov/about/sfo/aboutSFOMap.asp; Internet; accessed 4 February 2003.

accessible via the new AirTrain[49] system that is being installed concurrently with BART. For the convenience of domestic passengers, the AirTrain will have a station located directly above the BART airport station, with elevators and escalators connecting the two.[50]

Another feature of the BART extension, as noted above, is a new intermodal transfer station at Millbrae. This facility will permit cross-platform transfers between BART and Caltrain, and will be the first rail-rail intermodal transfer station west of the Mississippi.[51] This connection will permit individuals from San Jose and points north to utilize rail to reach SFIA and the East Bay, with only one transfer. Plans have also been put forward to extend BART further south in the East Bay, eventually as far as San Jose. If this ever comes to fruition, the San Francisco Bay would then become surrounded by a 'ring of transit' made up of the rail services offered by BART, Caltrain, and possibly the Santa Clara Valley Transportation Authority's light rail service currently operating in the San Jose area.

BART estimates indicate that the new extension will increase ridership by approximately 68,000 passengers daily, 18,000 of which will be heading to the airport. With the addition of three new BART stations at South San Francisco, San Bruno, and Millbrae[52], in addition to the SFIA station, further transit options will exist for individuals who live on the peninsula and commute to San Francisco for work or pleasure. Further,

[49] Not to be confused with the JFK AirTrain, the AirTrain at SFIA is strictly an on-airport circulator, and therefore will not be discussed in detail. Similar to the JFK system, however, the SFIA AirTrain will link together the airport terminals with the car rental center and the long term parking lot.
[50] Anthony Hart, "Making New Connections in San Francisco," Mass Transit, September/October 2000.
[51] Ibid.
[52] Each of these new station has at least 1,000 new parking spaces to allow them to serve as a park and ride facility, although the San Bruno station is positioned close to downtown, providing an additional link to San Bruno's commercial and entertainment options.

estimates indicate that by 2010 the BART extension will be responsible for the reduction of 484,000 vehicle miles traveled within the Bay Area per week.[53]

The total approximate cost of this project is $1,480 million. Because of the strong regional support for this project, this project became the state of California's top transit priority, ensuring its eligibility for federal funding. Further, this regional project caught the attention of the FTA, and through the original Intermodal Surface Transportation Equity Act of 1991 (ISTEA), was named one of four demonstration projects by the FTA. Along with this designation came $750 million in federal funding, representing a little over half (50.6%) of the total cost of the project.

As this project falls under the jurisdiction of (and hopefully benefits) several different communities, the other half of the funding is being contributed by various state and local agencies. San Mateo (through SamTrans) is contributing $171 million (11.5%), the regional MTC is contributing $26.5 million (1.8%), and the California Transportation Commission is kicking in $152 million (10.2%). $183.7 million (12.4%) is being furnished by BART itself.[54]

The remaining $200 million is being provided by SFIA. In order to comply with FAA regulations regarding the use of airport funds, SFIA is only funding the portion of the project which is located on airport property and which services the airport directly.[55] These restrictions on the use of airport funds also explains the layout of the BART extension to the airport, with a spur line servicing the airport terminal, instead of

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[53] Ibid.
[54] San Francisco Bay Area Rapid Transit District, About BART: SFO Extension: About: Partners & Funding; available from http://www.bart.gov/about/sfo/aboutSFOHistory_3.asp; Internet; accessed 4 February 2003.
[55] United States Department of Transportation, Office of Inspector General, Audit Report: Use of Airport Revenue for the Bay Area Rapid Transit District Extension to San Francisco International Airport.

designing the BART system extension to have the airport station located on the mainline trackage. Although the wye track design at the airport junction permits flexible train routings, the airport station is a stub-end terminal, requiring trains to reverse direction in order to depart from the station. Also, current operating plans do not have any trains running between Millbrae and the SFIA station, requiring those passengers to transfer at the San Bruno BART station to change directions. This deficiency becomes more significant when passengers traveling from further south on the peninsula transfer from Caltrain at the Millbrae station—these passengers would need to transfer at least twice in order to travel to or from the airport terminals.

Current Status. Original projections had the BART extension open by the beginning of 2003. Current project estimates by BART indicate that the extension project is 98 to 99 percent complete, with only minor finishing work left to be performed by the construction contractors. However, as of this writing, train testing has not yet started, which will require at least an additional one to two months before the system can be opened to revenue traffic. Although BART has not officially stated a target opening date, many sources estimate that the system will not be open until at the earliest summer 2003.

Although the project has run several months beyond the projected opening date, it has remained close to budget, and otherwise been relatively unnoteworthy with regards to unexpected delays and costs. Fares to and from the new stations have already been announced by the Bay Area Rapid Transit District board, and remain competitive with other BART fares along the system; there is no unique surcharge to travel to the airport

station, unlike in the New York AirTrain systems.[56] Overall public response to the extension has been positive, particularly in regards to San Francisco residents traveling to and from the airport.

Denver International Airport

Denver International Airport (DIA) serves as the primary commercial aviation facility for the city of Denver and its surrounding suburbs, handling 30 million passengers in its first year of operations. Opened in 1995, DIA serves as the replacement to the former Stapleton International Airport, which was shut down when the new airport went on-line. Located on 53 square miles of land annexed by the city of Denver from Adams County, DIA represents the largest parcel of land dedicated to commercial airline usage in the entire world.[57]

In order to have enough vacant land to develop DIA, the airport is located 24 miles from Denver's central business district, a significant increase over the seven miles that separated Stapleton from downtown. Among major United States airports, only Washington, D.C.'s Dulles Airport is located further from the downtown core (at 26.5 miles); however, unlike Denver, travelers to Washington also have the option of using National Airport, which is located significantly closer to the central core.[58] Indeed, DIA is so remote that Peña Boulevard, the sole access road connecting the airport to the closest interstate highway, is 12 miles long.[59]

[56] A surcharge does exist on all BART fares to stations located in San Mateo county, which includes the airport station; however, this surcharge is not unique to the SFIA station.
[57] Paul Stephen Dempsey, Andrew R. Goetz, and Joseph S. Szyliowicz, Denver International Airport: Lessons Learned (New York: McGraw-Hill, 1997), 1.
[58] Ibid., 235-236.
[59] Ibid., 272.

Public transportation services to DIA include shared van services, courtesy shuttles provided by hotels and motels, as well as charter carriers that transport passengers to ski resorts located around the Denver area. The Regional Transportation District (RTD) also provides scheduled buses along several different routes between DIA and several locations within the region, including downtown Denver, Boulder, and Stapleton Airport, which is currently being used as a park-and-ride facility.[60]

Original proposals for DIA included some sort of rail access to the airport. The RTD had originally proposed connecting the airport with Denver via a light rail line; however, this project was scuttled early on due to opposition from residents living along the proposed rail line between downtown and Stapleton.[61] Instead, the RTD continued on the construction of a light rail line, but the rail line eventually built travels nowhere near the airport, but rather a separate six mile line that connects the Five Points neighborhood to downtown Denver.[62]

Much popular support was also given to a proposed "Air Train," a commuter rail type service linking downtown to the airport. The airport is located adjacent to rail lines owned and operated by the Union Pacific Railroad, which provided a ready link to Denver proper. A spur line would need to be constructed linking the Union Pacific to the terminal buildings, and it was proposed that it be constructed down the median of Peña Boulevard. Indeed, adequate space was left in the median strip to permit this option to be constructed, although this option has not yet been exercised.

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[60] Ibid.
[61] Although officials acknowledged that Stapleton would be closing, they felt that if they could construct the light rail line to Stapleton, it would be relatively easy to extend the line further out to DIA.
[62] Ibid.

Construction costs for this option are projected to be $140 million, relatively inexpensive as far as rail projects are concerned, primarily because half of the required trackage already exists. Additional stops would be located at the former Stapleton International Airport, as well as in the community of Aurora. The city of Denver estimated that the train would carry 5,840 riders daily during its initial year of operation.[63]

Of course, any such rail link between downtown Denver and DIA would only be able to serve a small proportion of the traffic to the airport, particularly because a significant percentage of travelers are coming from the Denver suburbs, and as far out as the Front Range communities, areas that are at best poorly serviced by public transportation, and any "Air Train" or light rail system would not provide service to these areas. However, it is still felt that such a service would reduce traffic congestion at the airport, as well as mitigate air pollution problems as fewer automobile trips would be taken.

Dempsey, Goetz and Szyliowicz argue that although a number of ideas were floated for enhanced ground access to the new Denver International Airport, very little was done to turn these plans into actuality because no one was responsible for this aspect of the new airport. As they point out, "even after the two referenda [approving the construction of a new airport], the EIS approval, and groundbreaking in 1989, it took several years for ground transportation planners from the City of Denver, Adams County, DRCOG [Denver Regional Council of Governments], the Regional Transportation District (RTD), and Colorado Department of Transportation (CDOT), in addition to local politicians, the media, and the public at large, to realize that a new airport 24 miles away

[63] Ibid., 276-277.

from downtown needed a coordinated and comprehensive plan to address ground access issues. Because no one agency had dominant responsibility for ground access to the airport, the issue was neglected and it turned into a complex interjurisdictional interface problem."[64]

A prime example of what happened when ground access was ignored can be seen from the original master plan for DIA. The original location of the cargo facilities at DIA were on the north side of the airfield, far from any major access roads. Trucks transporting cargo to and from the airport would have been required to travel on secondary roadways in Adams County in order to access the cargo facilities, rather than using Peña Boulevard from Interstate 70. In 1993, four years after airport construction began and after the areas planned for the cargo facilities had been graded, it was decided that the cargo facilities should be located on the south side of DIA, providing significantly easier access to the interstate. This late change to the airport project is estimated to have added more than $50 million to DIA's total cost.[65]

Further, the Federal Highway Administration (FHWA) actually offered a $75 million grant to build Peña Boulevard, but the city turned down this money and elected to use bond proceeds to construct the road. One of the primary requirements for the use of FWHA funds was that the access road only have two points of access (Interstate 70 and a future beltway) before reaching the airport terminals. However, the city wanted to encourage development along the access road, even though such development would just add to the congestion along Peña Boulevard, and therefore refused these FHWA grant

[64] Ibid., 273.
[65] However, another significant motivation for the relocation of the cargo facilities was to prevent Front Range airport, a smaller airport southeast of DIA, from developing a cargo hub facility that would have removed significant cargo traffic (and therefore revenues) from DIA. Ibid., 432-433.

funds—not that the private developers complained about this decision.[66] The very layout of the boulevard (a dogleg rather than a straight line) is still a mystery; explanations range from compatibility with future runway expansions to an underhanded attempt to make sure the road passed by the property of specific individuals that the city wanted to 'thank.'[67]

Indeed, one of the primary revenue generators for the airport is its parking facilities, with 14,000+ parking stalls available for travelers to use. Given the financial difficulty that the City of Denver is currently subjected to with regards to the airport, due to significant cost overruns from the original construction, it is difficult to envision the City of Denver giving strong support to any project that would reduce the parking revenues generated.

Current Status. Denver International Airport is still without any sort of rail connection to downtown (or anywhere else), and the principle manner of accessing DIA is via private automobile. Although some alternatives exist, including scheduled buses and private van services, a significant majority of both passengers and employees utilize private vehicles to get to and from the airport. The relative remoteness of the airport location makes it difficult to develop any sort of comprehensive ground access plans for DIA.

[66] Ibid., 445.
[67] Ibid., 413-414.

Chapter Four

The Carrot and the Stick: Developing Funding Incentives to Encourage Organizational Efficiencies

In the previous chapter, significant issues and projects relating to the ground access of three major United States airports was set forth; in this chapter, various information gleaned from these case studies, including managerial knowledge, legal precedents, and organizational structures, will be used to develop a proposal for a comprehensive federal scheme to develop airport ground access projects of all sorts.

Three principle areas of concern will be identified, and each one will be discussed in turn. First, it is important that any airport ground access project be considered from both the airport owner/operator's perspective as well as the regional or state transportation authority's point of view. A project that remains one-sided will often fall short in its attempts to improve ground transportation connectivity, or perhaps even duplicate services that are already offered.

Second, although it is important to have all sides represented, project efficiency is improved if a "go-to" organization is appointed to take primary responsibility for the everyday construction of the project. Although major decisions should be presented to all parties for consideration and approval, minor decisions are best made by the individual or group that is in closest contact with the daily operations and construction progress. Finally, the ever-pressing issue of financing such projects will be discussed, and ideas presented on how to best use the limited funding sources that are currently available.

Group Consensus vs. Going It Alone

Traditionally, a single organizational entity takes charge of any large project, including airport ground access projects. Sometimes, the airport owner/operator feels that it is necessary to improve the access infrastructure, and takes the initiative to complete this project; other times, the state or regional transportation authority will organize and fund the desired improvements.

A prime example of this phenomenon is the AirTrain project at New York's Kennedy Airport. As discussed in chapter three, the AirTrain has been built completely under the authority of the Port Authority of New York and New Jersey (Port Authority). Although the Port Authority had to cooperate with several other agencies in order to complete this project, the Port Authority executed most of the planning and dealt with all of the funding requirements for the JFK AirTrain.

Because of this, the AirTrain was designed and constructed in a matter that most benefits the Port Authority and its needs. Principally, the Port Authority was looking for a way to increase the landside terminal capacity, as projections indicated that the next capacity hurdle for the airport was not airfield capacity, but rather a limit on the number of individuals who could access the airport using the current roadway infrastructure. Therefore, the AirTrain was primarily designed to enhance the landside passenger capacity of JFK airport, by creating a system that would enable connecting passengers to switch between terminals without requiring the use of shuttle buses, freeing up a significant amount of terminal roadway capacity. In addition, the connection of the AirTrain to the rental car facilities at Federal Circle remove even more traffic from the

roadways, as currently each individual car rental company circulates its own bus fleet to transport individuals between their facilities and the terminal.[1]

The Port Authority also acknowledged that public transportation access to JFK airport was very poor, and research results indicate that poor access to the New York airports is one of the primary reasons why firms have relocated out of the New York area.[2] Therefore, the Port Authority did design the AirTrain to connect with the New York City Subway and Long Island Rail Road commuter rail services. However, this was not the primary motivation for the Port Authority to develop the JFK AirTrain system.

This is primarily evidenced by the Port Authority's desire to use Passenger Facility Charges as the principle mechanism for financing this project. The Port Authority realized that ground access projects are only eligible if they are for the exclusive airport use, and had to be careful to design its system within the boundaries set by the FAA for using PFCs.[3] Although the JFK case did create some legal precedence in using PFC fees for airport ground access purposes, as discussed in chapter 3, there remained severe limitations on what the Port Authority could and could not do.

Because of these restrictions, public transportation access to Kennedy Airport will continue to remain inferior at best, and inadequate at worst. Although the shuttle bus connection between the Howard Beach subway station and the airport terminals

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[1] Congestion is so bad that the rental car companies have switched to an "on-demand" shuttle system, where buses are dispatched only when individuals call and request a pick-up. This is unlike most other major airports in the United States, where rental car company shuttles are circulated on 3-5 minute headways between all the terminals and the respective rental car facility.

[2] Anthony G. Cracchiolo, "The Challenges of Building a Light Rail System at John F. Kennedy International Airport: The Influence of Public and Regulatory Processes on the Technological and Evolutionary Design of a Capital Project," In Compendium of Technical Papers of the 68th Annual Meeting of the Institute of Transportation Engineers [CD-ROM] (Washington, D.C.: Institute of Transportation Engineers, August 1998), 2.

[3] Ibid.

represented a travel time of upwards of an hour (the AirTrain will ply this route in mere minutes), there still exists a very long subway ride from most parts of New York City. Outside of those traveling from a few select neighborhoods in Queens and Brooklyn, the majority of individuals utilizing the subway to get to JFK airport will continue to have travel times of an hour or more from their points of origin to the Howard Beach subway station, and the subway continues to remain a relatively daunting proposal for the typical airline passenger. On the other hand, the AirTrain will likely improve access for at least a portion of the airport employees, as it now makes the subway a feasible choice for the daily commute to and from work.

Although the facilities at Howard Beach station are being reconstructed to ensure full accessibility to all platforms for both disabled passengers as well as those traveling with luggage, the fact remains that the vast majority of the New York City subway is not easily accessible, and the vast majority of riders will be subjected to long walks and several staircases at their boarding station, and possibly during their journey as well if a transfer between subway trains is required.

The AirTrain is also linking the Jamaica commuter rail station to the airport, but this link suffers from similar liabilities. Although the travel time between New York's Penn Station and Jamaica station is reduced, with travel time in the neighborhood of 20-25 minutes, the fare premium is over 100%, with LIRR fares ranging from $3.75 to $5.50 (depending on the time of day), in contrast with the subway's $1.50 flat fare[4]. Further, this speed premium is only available to those living near a LIRR station. Also, many LIRR trains already operate at capacity, especially during rush hour, and it is difficult to

[4] Fares on all Metropolitan Transportation Authority properties, including the New York City Subway and the Long Island Rail Road, will be going up approximately 25 percent in May 2003.

envision how additional passengers (many with baggage) heading to the airport will be accommodated by the LIRR.

In addition, although the Port Authority has not indicated how much of a premium it will charge for utilizing the AirTrain to link to either the subway or the LIRR, it has indicated that there will be an additional charge. Comparing the similar situation at Newark Airport, also operated by the Port Authority, $5.00 to $7.00 is charged to utilize the monorail link to the Newark Airport rail station along Amtrak's Northeast Corridor rail line (serviced by Amtrak regional and New Jersey Transit commuter trains). Thus, it is not unreasonable to assume that a similar charge will be proposed by the Port Authority for the use of the AirTrain link, putting the total one-way cost of using rail to get to the airport in the neighborhood of $6.00 to $12.00 one-way, depending on the method of rail transportation used.

Although this is still significantly cheaper than using a taxi (which would range from $35.00 to $50.00 and up from Manhattan), the price now becomes comparable with fares charged by private companies that operate dedicated non-stop buses between JFK airport and various popular destinations, such as Penn Station, the Port Authority Bus Terminal in midtown Manhattan, as well as to various Manhattan hotels. In other words, the AirTrain link as implemented by the Port Authority is a relatively inferior solution as a tool to enhance public transportation to JFK.

In contrast, the Bay Area Rapid Transit District, when deciding to expand the BART line to service the San Francisco International Airport, sought out the cooperation of the region's transportation operators and planners. The California Department of Transportation, SamTrans (the San Mateo county transportation authority), and the

Metropolitan Transportation Commission (the regional metropolitan planning organization), as well as the San Francisco International Airport, all contributed towards the construction of the airport BART link, both financially as well as in the planning and design phase. From the beginning, the BART connection was designed to service not just passengers heading to or from the airport, but individuals needing to travel between the East Bay and San Francisco down into San Mateo county.

For instance, at each of the new BART stations (except for the airport station), at least 1,000 new parking spaces will be constructed for commuters using BART to head into San Francisco or the East Bay. These park-and-ride spaces will remove a large number of vehicles that currently must utilize one of the Bay Area bridge crossings, all of which are close to or at capacity during much of the day. In addition, 3,000 spaces will be installed at the Millbrae intermodal station, which will serve the riders of both BART as well as Caltrain.[5] Also, in order to prevent these new parking spaces, as well as parking at other existing BART stations, from becoming de facto off airport parking, stricter parking time limits have been implemented, reducing the maximum time a vehicle is allowed to park at a BART station from 72 hours to 24 hours, except for a few stations in the East Bay that will feature special paid long-term parking for airport users.[6]

Although there are a few advantages to having a single agency be responsible for the implementation of an airport ground access project (a way to capture these advantages will be explored below), significantly more is gained if all agencies and authorities that are involved with airport access are a part of the planning and design

[5] San Francisco Bay Area Rapid Transit District, New BART Stations; available from http://www.bart.gov/about/sfo/newStations_0.asp; Internet; accessed 20 March 2003.
[6] San Francisco Bay Area Rapid Transit District, Parking Overview; available from http://www.bart.gov/guide/parking/overview.asp; Internet; accessed 20 March 2003.

phase, and if each have a stake in the project. These entities specifically include, but are not necessarily limited to, the airport owner/operator and the regional or state transportation authority.

By maintaining a broad organizational base, the specific interests and goals of each entity are represented, but are tempered by the needs and demands of others. The need for a financial contribution from each party provides discipline and accountability. For instance, in New York, the Port Authority designed a system that was ideal for the needs that the Port Authority identified for its own property; namely, reducing vehicular congestion on the airport roadways. However, because the AirTrain project was created and executed solely under the Port Authority's jurisdiction, it is not well integrated into the region's transportation infrastructure, and the limitations of the current rail transportation infrastructure within New York City were never comprehensively addressed.

In contrast, the multi-agency planning mechanism utilized for the BART extension to SFO allowed a facility to be constructed that not only enhanced access to the San Francisco airport, but also significantly improved connectivity within the Bay Area as well. By combining multiple goals into this single project, additional gains can be had for a marginal increase in the project costs. Further, because the BART extension will benefit many additional riders beyond those traveling to the airport, the costs and operating expenses involved with this extension may be spread out across the entire rider base, and not just focused on the airport riders. This has allowed BART to set the fares to and from SFO proportional to non-airport fares, without requiring BART to charge an "airport surcharge" as the Port Authority will collect on the AirTrain system.

However, there is one major disadvantage to using a cooperative decision and planning model. There is a significant risk that one of two negative outcomes will result. The first possibility is that each entity involved will bring its own agenda to the planning table, each one disjoint with other proposals. The result of this is an organizational deadlock, where people realize that something needs to get done, but no one has the ability to do it. This can be seen in the history of both the JFK and SFO airport projects, where proposals outlining recommended improvements to the ground access infrastructure had been floated for decades, but nothing had been accomplished. Although this is not the ideal situation, the fact that a problem has been identified remains a good thing, and frequently all that is needed to 'prime the pump' is some sort of stimulus, be it financial (e.g., a ready source of financing) or organizational (e.g., a shift in the administrative power structure).

The second alternative, however, is far worse. With multiple agencies allegedly responsible for taking care of the airport access problem, isolationism may result, with everyone thinking that someone else is responsible for dealing with the issue. This is exactly what happened during the construction of the Denver International Airport. Rather than confronting the problem up front, the issue of ground access was ignored until quite late. As Dempsey and others point out, "Because no one agency had dominant responsibility for ground access to the airport, the issue was neglected and it turned into a complex inter jurisdictional interface problem."[7]

In order to avoid either of these problems, it is important that a single organization or agency be designated as the lead, or dominant, agency in planning airport

[7] Paul Stephen Dempsey, Andrew R. Goetz, and Joseph S. Szyliowicz, Denver International Airport: Lessons Learned (New York: McGraw-Hill, 1997), 273.

access improvements. This concept is put forth by Cunningham and Gerlach, who point out in their study of domestic airport ground access projects that "it has become apparent that many if not most successful systems were championed by a leader or lead-agency with a clear mission to make the airport accessible."[8]

In particular, the organizational advantage of having a lead-agency be in charge of any project is that it greatly simplifies the day-to-day process of any major project, as the agency in charge is authorized to deal with the minor details that arise on a daily basis. Major decisions would still need to be made in cooperation with all interested agencies, however, but having a lead-agency prevents the micromanaging of the project by multiple interests, most with differing interests.

This micromanagement effect can clearly be seen during the construction of the Denver International Airport, in which the Denver City Council, as well as the two major airlines (United and Continental) that had signed leases with the airport, frequently made decisions requesting changes that undermined the construction process, leaving the airport project managers "in a situation of implementing changes, the consequences of which, for whatever reason, were not foreseen, while simultaneously pressing to maintain a schedule that had been drawn up prior to the myriad modifications."[9]

It must be noted that a relatively fine line exists between maintaining the dominance of a lead-agency and making sure that the various interested organizations have a voice that remains heard during the planning and implementation of a major ground access project. However, it is important to remember that "[t]he primary inter-agency objective should be to ensure that the challenges of working across organizational

[8] Lawrence F. Cunningham and James H. Gerlach, Ground Access Assessment of North American Airport Locations (Denver, CO: University of Colorado at Denver, September 1996), IV-287, NTIS, PB97-155345.
[9] Dempsey et al., 482.

boundaries do not create significant hurdles to program success. This does not mean that agencies must work together in perfect harmony, only that an adequate level of cooperation must exist between and within organizations."[10]

With this in mind, an attempt must be made to strike the right balance between these two competing theories. A program must be developed that encourages interagency dialogue, which will promote comprehensive transportation solutions to the issues relating to ground access, while ensuring an efficient and timely completion of projects developed to further this goal. Details of such a program will be outlined later in this chapter.

Federal Funding and Monetary Sources

As with most federal programs, money talks, and a program to improve ground access at domestic airports is no exception. Access projects are extremely capital intensive, with typical project costs ranging from millions of dollars for a simple roadway enhancement to billions of dollars for a large project such as the JFK AirTrain or the BART extension to San Francisco International Airport. Airport operators and transit administrators are always on the lookout for additional sources of funding to complete such projects, and welcome any additional monetary sources.

At the same time, this provides incredible leverage to the parties that distribute the funds. As with most federal funding legislation, certain requirements must be met in order to be eligible to receive funding, and funding for airport ground access projects would be no different. These requirements can be used to shape the course of a project, either by setting specific details as to how the money must be used, or by providing for

[10] Cunningham and Gerlach, IV-287.

the oversight of the funded projects by another interested party (for instance, the FAA or the FTA). Throughout the course of this chapter, various such requirements will be proposed and detailed, and their potential impact will be analyzed.

As discussed in chapter 2, federal funding programs are not just limited to outright grants, although understandably this is the most desired type of funding from the perspective of the airport owner/operator and respective department of transportation. Other types of programs authorized by the federal government that remain quite useful include the ability to collect user fees, such as the Passenger Facility Charge (PFC) discussed previously, as well as offering secured loans or government-backed bonds. Unlike the cost of grants, these alternative programs cost the government pennies on the dollar,[11] and can result in creative leveraging of limited funding sources.

However, it is important to recognize that, in addition to providing access to funds, the federal government could provide a source of expertise and regulatory competence, so that each metropolitan area would not have to start from scratch. A central structure under the federal Department of Transportation has already been created under the ISTEA legislation to encourage intermodal projects, although this office is currently underutilized. If the Office of Intermodalism were in control of the regulatory and funding aspects, with a mission of encouraging intermodalism, each new ground access project could tap the resources and experience of such a central organization.

Understandably, airport revenue sources have dropped in the past couple of years, for a number of reasons. Passenger traffic dropped significantly after September 2001

[11] The major risk (and potential expense) to the federal government is if the bond issuers or loan recipients default on their obligations. If reasonable protections are taken in the funding legislation (i.e. a requirement that funding recipients demonstrate that proposed projects are self-sustaining), this risk can be minimized, although it will never be eliminated.

due to the terrorist events that took place, and has been very slow to recover due to the weak economy. For instance, during the first and second quarters of 2002, revenue passenger miles were down about 15 to 20 billion passengers each quarter compared to the same time period in 2001, approximately a 10 to 15 percent drop. Similarly, passenger enplanements were down by a similar percentage during the same time periods. The air freight market was less effected, although it too saw about a five percent drop in freight revenue ton miles during the same time period.[12]

This affects airport operators in a number of ways, both directly and indirectly. Lower passenger traffic through the airport itself results in decreased revenues from various non-aviation activities, such as airport concessions and on-site parking. Also, for those airports that collect PFCs, the revenue collected through this program is directly tied to the number of passengers that utilize the airport. Decreased passenger and freight traffic also puts the airlines in worse financial shape, which also affects the airport owner/operator. For instance, a primary component of aviation fees collected are based on airplane landings; as airlines cut their schedules to cope with decreased passenger traffic, fewer airplane movements results in reduced revenue for the airport.

Airports are supposed to raise fees to offset this reduced revenues, but this results in an increased cost to the airlines, particularly when considered on a per-passenger basis. While landing fees are only a small part of the costs incurred by the airlines, there has been some reluctance to raise these fees. Airport operators remain in a delicate balance with the airlines; without the airlines, there is no need for the airport, but without an airport, the airlines have no way to service the city. In order to not upset this balance,

[12] United States Department of Transportation, Bureau of Transportation Statistics, Traffic System Details: Air Traffic Statistics and Airline Financial Statistics; available from http://www.bts.gov/oai/indicators/SysMovAgv.html; Internet; accessed 5 March 2003.

most airport operators look towards other sources to raise necessary funds, rather than risk upsetting the airlines by increasing landing fees.

This loss of revenue sources is particularly critical for airports, as much of the airport cost is fixed due to the capital-intensive nature of the facility. Although some services might be able to be pared down as passenger traffic decreases, the cost of most airport services are not largely dependent on the number of passengers utilizing the airport. For instance, the airfield must be kept operating at the same level of service, and terminal buildings and concessions must remain open, irregardless of passenger and freight traffic levels.

This drop in revenue is further exacerbated by the costs being incurred by the airports to cover increased security measures that have been mandated by the federal government in the wake of the events of September 11. Although the federal government is directly absorbing the cost of the individuals who work as airport security screeners through the Transportation Security Administration, there have been many major issues that have been left to the airports.

These costs are not insignificant; for instance, various parking regulations set forth by the FAA and TSA require that parking stalls within a certain distance of terminal buildings be blocked off, or that vehicles that utilize these spaces be inspected before parking. Either way, this costs airports a significant sum of money, either from the lost revenue from parking or the cost of hiring individuals to conduct vehicle inspections. Even more significant is the new requirement that all checked baggage be screened for explosives. Although the TSA is handling the actual screening process, the airport authorities must figure out how and where to install minivan-sized CTX systems without

adversely impacting passenger or baggage flow. Steps that various airports have had to take in order to create adequate space for these machines include removing concession space, reinforcing floors to handle the heavy weight of this equipment, and various baggage handling modifications such as the installation or adjustment of conveyor belts. All of these cost money, and the airport owner/operator is expected to cover all of these preparatory costs.

Because of this, aviation funding priority should, and most likely will, be given to aviation security improvements. Outright grants, both under the AIP program as well as through other lines, are the most appropriate form of financing for most of these projects. There is a philosophical argument that since the aviation security net is a national, and not a local, structure, the onus of funding such projects should fall on the federal government, and not the local and regional governments.

It is important to remember that, in an attempt to create a secure national aviation network, the security provisions undertaken are only as strong as the weakest link within the network. Within the United States, once a passenger or a bag has been screened, generally no further screening is conducted, even at subsequent transfer airports. Therefore, it is important that these security programs be implemented and oversight be provided from the federal level, to ensure uniformity and consistency of the security requirements. In order to expedite national completion of security measures, it may well make sense for the federal government to issue bonds based on part of the AIP revenue streams to `create a national security fund accessible to all airports regardless of their use of PFCs.

However, this also means that funding for other aviation-related projects, including airport ground access projects, is severely limited. Therefore, in order to develop legislation to enhance the efficiency of ground access projects, it is extremely important to identify potential new or increased sources of funding, such as loans and loan guarantees, or increased PFCs.

Linking It All Together

As discussed above, developing the model for a federal program that will encourage cooperative solutions to airport ground access projects must meet three primary requirements: (1) it must ensure that all interested agencies and organizations, both from the airport perspective and the transportation perspective, be allowed to provide their opinions and shape the decision-making process; (2) at the same time, a lead organization should be identified to take primary responsibility for the day-to-day workings of such a project; and (3) adequate funding must be provided to permit the various ground access projects to be translated from mere thought into reality.

It is important to note that these three provisions are interdependent on one another; one should not work without the others present. For instance, even with adequate funding for such a program, these funds should not be distributed until the agencies and organizations involved can demonstrate that they have implemented an appropriate organizational model to ensure that the first two requirements are met. In addition, although it has been left unstated, it is assumed that a project review process will remain with some other federal agency, such as the Office of Intermodalism, to make sure that projects submitted for funding approval are both appropriate and feasible.

First, all interested entities must remain involved in the major planning decisions relating to proposed ground access projects. To ensure that this takes place, some sort of reporting requirement would need to be implemented. As the FAA's Office of Airport Planning and Programming already has jurisdiction over most airport-related projects that are undertaken, enforcement and compliance issues might be rolled into this office. However, given the historic antipathy of the FAA towards permitting ground access projects being funded by aviation sources, this might not be the best choice.

As discussed earlier, it may be worthwhile to have the Office of Intermodalism act as the supervising organization, where it can supply both the regulatory oversight as well as technical expertise focusing on airport ground access projects. Also, by providing a common and unified source of regulation and guidance, passing these tasks to the Office of Intermodalism may also have the added benefit of reducing costly litigation, such as the lawsuits detailed in chapter 3 that slowed down the JFK AirTrain project.

This reporting requirement could be as simple as having each agency supply certifications indicating that they believed they have been adequately represented during the planning, design, and construction processes of the project. If further assurances are desired, each entity could be required to submit a report indicating the extent of their involvement, the issues that they feel are most important, and the proposed resolution to these issues.

Likewise, the indication of a lead organization may be done in a similar matter. It would be imprudent for this model to always require a specific organization (the airport owner/operator, for instance) to take the project lead, as demands are very different depending on the unique needs of each of this nation's airports and geographical regions.

For instance, in San Francisco, due to the nature of the construction project, it was most appropriate for BART to take the lead in the project, as they were the most capable of dealing with the day-to-day planning and technical issues, as well as the most equipped to act as the overall supervisor of the extension project. In contrast, at New York's JFK airport, even if the AirTrain project had been supported by a multi-agency conglomerate, in this instance the Port Authority was likely the most qualified entity to handle the daily needs of AirTrain's planning and construction.

Although these organizational elements are extremely important, without a proper funding scheme, there is no incentive for agencies to follow these guidelines. Ideally, a separate source of funding would be created to fund airport access improvement projects, allowing current programs to remain as they are. There are several possibilities to generate additional revenue to fund such a program; a possible candidate would be to increase the federal fuel tax. However, increasing the federal gas tax is extremely unpopular within the political arena, and would be incredibly difficult to achieve. Although this might be a valid option for programs with nationwide scope and immediate urgency, such as airport security, increasing the gas tax would not be a viable answer to funding ground access improvements, which tend to be viewed as only local or regional in nature, and are generally focused on large airports, which generate significant ground access needs.

Likewise, a new federal program to promote airport ground access could be created by using money taken from other programs. However, this might not be the best solution. Although such a solution might be adequate in creating a program to encourage capital projects improving airport ground access, it would merely be a zero-sum game, as

some other programs would suffer at this program's expense. Further, a dedicated line of funding would encourage a plethora of ground access improvement projects, merely because the funding is available, and not necessarily because they are required.

As outlined in the past few chapters, there already exists a current funding mechanism that airports can use to generate revenue while localizing the impact—the passenger facility charge. At first glance, PFCs seem to be an ideal solution to funding ground access improvements. They are a "user tax" which can be used to fund local infrastructure projects. Therefore, only those who actually generate the need for the facilities need to pay for them. The amount of PFCs collected can be adjusted (within federal limits) depending on the needs of the local airport, which allows them to be custom-tailored to the needs of each local community, unlike a increase in the gas tax, which would impact individuals nationwide on a relatively equal basis, even though the majority of ground access improvement projects would be taking place in urbanized areas.

However, certain changes must be made to the funding regulations in order to make PFCs, and other airport funding sources, more appealing for ground access projects. Current regulations restrict what airports can do with PFCs, including specific limitations on what types of airport ground access projects may be funded with PFCs (or other federal aviation funds). Further, transportation agencies currently have absolutely no access to these funds, no matter what the circumstances. Finally, the statutory limit on PFCs would need to be increased to provide adequate financing.

Although some creative organizational posturing can be utilized to access some of these aviation funds, like what was done at San Francisco International Airport for the

construction of the BART extension, this is not an ideal solution. For instance, in order to access aviation funds, the San Francisco Airport had to take responsibility for the construction of the BART extension onto airport property, including the station itself. Further, the physical design of the extension had to be in a 'wye' format so that the airport station would be off of the BART mainline, and therefore only service airport-bound passengers, a requirement to receive federal funding. Thus, rather than being able to design the extension so that the airport was a mainline station, which would generally be better operationally as well as for passenger convenience, the inferior spur station design had to be used.

Therefore, it is proposed that a new program be developed which allows funds to be utilized from both aviation-based sources and transportation-based sources, depending on the scope of the project. Instead of airport ground access projects having to be classified as either aviation related or transportation related, it will be recognized that these projects encompass both sides of the coin. Rather than being limited to one or the other, agencies could tap both sources of funding. Of course, agencies would not be able to "double-bill" projects and collect twice the amount of funding available; rather, it would bridge the gap between projects that exclusively service airports and projects that increase accessibility to surrounding communities.

This concept might best be expressed in terms of one of the examples given in the last chapter. The BART extension project budget is approximately $1.5 billion.[13] Of this total, about $200 million is allocated towards the portion that is being built on airport

[13] San Francisco Bay Area Rapid Transit District, About BART: SFO Extension: About: Partners & Funding; available from http://www.bart.gov/about/sfo/aboutSFOHistory_3.asp; Internet; accessed 4 February 2003.

property and will be serving the airport facility.[14] In other words, about 13 percent of the total project budget is going towards what would traditionally be covered by aviation funding sources. Under the concept proposed above, the Bay Area Rapid Transit District, as the lead agency of the BART extension project, would be able to apply directly to the Office of Intermodalism to secure aviation-related PFC funding, including the authority to charge increased PFCs, above the current statutory limit. Of course, the approval of the airport authority would be required, but under the joint decision making model presented above, this should not be an issue, as the airport authority would have already granted permission for this to happen.

At the same time, the definition of what is an approved aviation-related expense should be broadened beyond the present definition. Although the FAA recently amended the regulations so that more airport ground access projects would be eligible for federal aviation funding, the core requirement that the project be constructed completely on airport owned right-of-way still stands. This definition is still too narrow to permit truly integrated transportation projects, as almost any integrated project will have portions that are not located on airport owned right-of-way. Instead, the regulation should be broadened to permit aviation funds to be spent on portions of airport access improvement projects that will service significant demand from workers and passengers traveling to and from the airport. In conjunction with this change, a different measure of project appropriation would need to be used; such a measure could include the percentage of the physical system that will provide service to the airport property, or perhaps allocate funds

[14] United States Department of Transportation, Office of the Secretary Of Transportation, Office of Inspector General, Audit Report: Use of Airport Revenue for the Bay Area Rapid Transit District Extension to San Francisco International Airport, AV-1999-056 (Washington, D.C., 18 February 1999).

based on the projected ratio of individuals traveling to and from the airport versus those with other origin and destination points.

With this loosening of restrictions, airport access projects would no longer need to be designed to separate the airport components from the non-airport components to maximize the potential funding. Further utilizing the San Francisco example, aviation funding could be used to construct the BART airport station as part of the mainline BART system, further enhancing connectivity within the San Francisco region, rather than requiring that the airport BART station be build as a branch line off of the main line in order to isolate it (and the corresponding airport-bound passengers) from the rest of the BART system.

An added benefit to the loosening of the restrictions on these funds is that less oversight is required by the federal regulatory agencies. Currently, since specific types of funding may only be spent on certain elements of the project, extensive auditing is required to ensure that every dollar used is spent on eligible project costs. For instance, aviation funding comes under the jurisdiction of the FAA, whose Office of the Inspector General audits uses of aviation-related funding, including AIP grants and PFC fund uses.

In addition, such an arrangement simplifies the legal procedures and paperwork required to utilize funds. Under the current regulations, the San Francisco Airport was required to execute no less than three separate project agreements between October 1996 and April 1997, in order to ensure compliance with Federal law. Further, in order to receive these aviation funds, the airport is required to not only construct, but own all of the fixed on-airport BART facilities. Since the job of operating the BART trains is not the responsibility of the airport (nor do they have the ability or skill to do so), the airport

is then required to lease back the station and related facilities to BART. Although this structuring is perfectly legal, it involves additional procedures and costs that could be avoided if BART was able to be the owner-operator of the airport facilities.

Also, the proposed arrangement opens funding towards a wide array of airport ground access projects. Although the case studies in the previous chapters focus on transit and rail-related improvements, the majority of airports nationwide would not be well served by such an intensive approach to passenger ground access. For instance, some airports need improved truck access, to permit improved cargo operations, while other airports would be better served by a distributed bus network, akin to the Logan Express service in Boston, which provides 'airporter' bus shuttles between the airport and remote park-and-ride lots around the metropolitan area. Also, the ability to spend ground access funds on initial operating expenses, and not just capital expenses, is much more beneficial to certain access schemes, such as the 'airporter' bus service just mentioned.

Most fundamental, of course, would be the need to raise or eliminate the $4.50 limit on PFCs that currently exists. Without increasing the size of the pot of money used to finance capital projects, it will be impossible to create any new funding proposal. Although the current PFC cap exists to ensure that the financial burden to passengers does not become onerous, there is no reason that a flat cap is applicable to all airports nationwide. Rather than having an arbitrary limit set by Congress and the FAA, the Office of Intermodalism could review any new PFC applications, and grant or deny permission to charge PFCs at a level that would sufficiently cover the needs of the organization requesting the funds.

Given that both AIR-21 and TEA-21 are up for reauthorization in the next legislative session, this is an ideal time to align the language between the air transportation side and the surface transportation side. There must be language in both bills that clarify the details surrounding this new federal program. Further, there should be language tailored to each of the two pieces of legislation that permit the pooling of resources towards ground access projects. For instance, in the reauthorization of AIR-21, it would be greatly beneficial if language was included authorizing the use of PFCs for not just capital expenses, but to cover the operating and maintenance expenses of ground access infrastructure. Further, unlike in the current regulations, a new provision should be added so that PFCs may be spent on infrastructure that is used for airport access, whether or not it is located on airport property or an airport right-of-way. Again, the Office of Intermodalism would be responsible for reviewing projects to ensure their compliance with the stated goals of improving ground access to the airport.

On the surface transportation side, the successor to TEA-21 should create a new categorical program as an incentive to work on airport ground access projects. However, this would require either new funding be provided, either through an increase of the gas tax or other federal tax, a shifting of the current capital budget to accommodate a new program, or the use of bonds to generate an expanded pool of capital funds from anticipated revenue sources. Further, a local-match scheme could be implemented, requiring that the state or local communities fund a percentage of any proposed project. Not only would a local match scheme increase the total amount of money available to be distributed, it would ensure that communities submitting project plans to access federal funding are serious about and committed to their project ideas. Overall, such a program

would be the first large-scale embodiment of the intermodal moniker that was introduced with the ISTEA legislation 12 years ago. Hopefully, a ground access program will demonstrate how implementing intermodal projects on a wide-scale national basis can be successful in both social and economic terms.

Overall, the restructuring of the regulations surrounding aviation and transportation-based funding of airport ground access projects would achieve the stated benefits of increased efficiency and cooperation on these types of projects. Additional funding for ground access projects can be achieved by allowing airport access projects to tap both the reauthorization successors of the TEA-21 and AIR-21 funding legislation, while still allowing other newly prioritized projects of national importance, such as aviation security, to receive their share of federal appropriations.

Chapter Five

O'Hare Express: Applications for Chicago and Final Thoughts

One of the primary motivations of this research is to assist the Chicago Transit Authority (CTA) in looking and financing options for the implementation of an Airport Express service linking the downtown loop with O'Hare International Airport. This chapter will demonstrate how the organizational and financing structure outlined in the previous chapter can assist the CTA in achieving their goals for this project. Finally, this chapter will provide a final summary of what was presented over the past few chapters, as well as discuss topics that may be of future interest for further research.

The O'Hare Airport Express Link

Chicago is primarily serviced by two commercial airports; the larger O'Hare International Airport approximately 17 miles to the northwest of downtown Chicago, and Midway Airport, located about 10 miles southwest of downtown. Currently, both of these airports are serviced by CTA trains. The Blue Line runs from Forest Park, to the west of downtown, through downtown, and back out towards the northwest, terminating at O'Hare. The Orange Line runs from Midway Airport to the downtown loop, at which point passengers may transfer to any other CTA rail line.

Both CTA rail lines feature relatively easy transfers to the airport terminals. The Blue Line is connected to all but the international terminal at O'Hare International Airport by somewhat lengthy underground walkways, while the international terminal is accessed via an intra-airport shuttle train. The Midway connection is also direct, although passengers must traverse a parking garage located between the station and the

airport terminal. Both lines feature frequent service throughout the majority of the day, with Orange Line trains operating between 4:30 am and 1:00 am and the Blue Line operating 24 hours a day.

In addition to having traditional highway access, O'Hare is also serviced by the Metra commuter rail's North Central Line. However, although there is a Metra train station specifically servicing the airport, passengers must transfer to a shuttle bus, and then the intra-airport shuttle train, in order to access the terminals. Also, as this is a commuter rail operation, service is relatively infrequent, and focused around weekday peak directional flows to and from downtown rather than servicing the needs of airport passengers and employees.

There are several concurrent ideas under consideration to enhance access to O'Hare International Airport as well as outwards to the community of Schaumburg. First, the only current highway access to O'Hare is from the east, which is relatively convenient for those coming from the city of Chicago, but quite inconvenient for those travelers arriving from the suburbs, particularly those to the west. In order to enhance road access, several studies undertaken by the State of Illinois indicate that an "O'Hare western by-pass" is essential to providing better access from the western suburbs, as well as alleviating congestion on the current access roadway. However, local communities to the west of the airport are opposed to this idea, primarily due to the disruption potentially caused by a new highway passing through their neighborhoods.[1]

Another project would involve extending the Blue Line terminus from O'Hare to Schaumburg. Originally, this plan involved building a branch line that would separate from the current Blue Line somewhere between Cumberland and Rosemont, as tunneling

[1] City of Chicago, O'Hare International Airport: Airport Layout Plan Submittal, March 2003, 11.

under the airport would have been prohibitively expensive.[2] However, Chicago's Mayor Richard M. Daley has proposed a comprehensive plan to reconstruct and reconfigure O'Hare International Airport, which opens up the possibility of extending the Blue Line outwards from its current terminus at the airport for a much lower cost, as construction of the extension would proceed concurrently with the reconstruction of the airport property itself.[3]

The bulk of this plan rests on the city of Chicago's ability to take control of approximately 233 acres of land immediately adjacent to O'Hare International Airport. This land claim proposal, which was recently submitted to the Illinois General Assembly by Mayor Daley, must be approved by the legislature, as well as the governor, although it is generally believed that Mayor Daley has the level of support required to allow this proposal to pass. Further, the financing method proposed is structured via airport revenue bonds so that the airlines need not pay for the airport improvements until the first runway is built in 2006.[4]

A third proposal has been proffered to create an "Airport Express" service that would run between downtown and O'Hare International Airport; a separate express train service is being considered that would run between downtown and Midway airport via the Orange Line. The dedicated express trains would operate on the current Blue Line right-of-way; however, in order to accomplish this, the Blue Line would need to be expanded to build at least two parallel passing sidings at specific locations along the

[2] www.Chicago-L.org, Stations – O'Hare; available from http://www.chicago-l.org/stations/ohare.html; Internet; accessed 30 March 2003.
[3] City of Chicago, O'Hare International Airport: Airport Layout Plan Submittal, 11.
[4] Fran Spielman and Robert C. Herguth, "Mayor Touts Bill to Snap Up O'Hare Land," Chicago Sun-Times, 8 May 2003, p. 8.

right-of-way between downtown and O'Hare International Airport in order to permit the express trains to pass slower-moving Blue Line local trains.[5]

In addition to dedicated train sets and express service, it has also been suggested that a downtown check-in facility be created as part of the Airport Express service. The most likely site for this facility would be on what is known as block 37, a currently undeveloped parcel of land in downtown Chicago bounded by State, Washington, Dearborn, and Randolph streets. Negotiations are currently underway with the city's chosen developer for this site, and if successful, this facility would be integrated with the other uses, including retail and commercial space as well as possible housing. This site also makes sense logistically, as it allows easy access to both of Chicago's subway tunnels, which run under State (Red Line) and Dearborn (Blue Line) streets. Although things are still in the very early planning stages, possible features of this off-site facility would include flight and baggage check-in options, package delivery services, as well as separate trackage and platforms for the Airport Express trains.[6]

Second, all of the players would need to be involved in the major decisions surrounding the planning and construction of these facilities. In addition to the key agencies cited above, the other significant entity in either of these projects would be the Chicago Department of Aviation (DoA). Other involved parties, depending on the project, would include the block 37 site developer, as well as the City of Chicago, which owns the land. As each entity controls a portion of the project, it is important that every interested party is in agreement as to what should be achieved, as well as how the project should proceed. Without such an agreement, this project will become gridlocked and

[5] Jeffrey Sriver, interview by author, Chicago, 5 August 2002.
[6] Ibid.

nothing will happen, defeating the entire purpose of enhanced airport ground access. With the right cooperation, however, a project can be designed that will both allow travelers to go between O'Hare and the loop quickly and easily, while also adding access between Chicago's northwest suburbs and the rest of the CTA's rail network.

Such a project also represents an ideal setting to implement the concepts and ideas proposed in the previous chapter to enhance cooperation and efficiency on airport ground access projects. First, a primary agency would need to be identified to handle the primary responsibilities of each project. For the Airport Express train and Schaumburg extension, this would most likely be the CTA. First, although a key component of the project would involve facilities directly connected with airport operations, the majority of planning and construction details would involve CTA owned property. Second, as the CTA would be the agency responsible for operating the trains upon the completion of this project, they are also the ones with the best understanding of how to go about the planning and construction of this rail enhancement and extension project. Chicago has a great advantage in that the airports and the CTA are all effectively run by the city, so the institutional issues at the local level are simplified. With regards to the O'Hare western by-pass, the most likely candidate would be the Illinois Department of Transportation, as it has the experience required to handle a major road construction project.

Finally, it is important to see how the proposed funding regulations would impact this project. Under the current system, all funding for the Blue Line extension, as well as the Airport Express train, would come though the CTA. Due to this, these projects would be eligible to receive Federal Transit Administration funding, including funding under the New Starts program. However, access to aviation funding would generally be prohibited,

as the vast majority of this project does not occur on airport owned right-of-ways. For similar reasons, the O'Hare western by-pass would be eligible for Federal Highway Administration funds, but not funding administered by the Federal Aviation Administration.

Under the proposed financing guidelines, both of these projects would be eligible for funding under multiple sources. If the proportional use standard is used, where aviation funding is allocated based on the percentage of users whose origin or destination is the airport, the O'Hare western by-pass project fares quite well. Depending on the eventual design of the highway, particularly the locations of entry and exit ramps, a significant proportion of the users of the highway will be traveling to or from the airport. As an example, if it is projected that 70 percent of the highway users would be going to or headed from the airport, 70 percent of the total project cost would be eligible for aviation funding sources. In this instance, the project could be funded utilizing either 100 percent highway funds, or 70 percent federal aviation funds and 30 percent highway funds, or some combination of the two. Of course, these funds would include some combination of federal, state, and local money, as well as internal revenues from the sponsoring agencies.

Similarly, the Blue Line projects would be eligible for a similar range of funding options. As the Airport Express train would only serve passengers whose destination is O'Hare International Airport, under the funding structure proposed above, the total cost of the project would be eligible for airport funds. As with the highway project, however, this is not the only option, but provides a range of options to chose from, depending on the specific needs of the CTA and the DoA. By providing flexible spending tools, this

empowers the local and regional agencies to determine the best way to fund local projects, and allows local projects to be better adapted for local needs, rather than having the shape of the project dictated by strict federal funding regulations. At this point in time, the most reasonable financing source for Chicago is to utilize TIFIA funds, particularly for the downtown terminal, which will enable this project to get off the ground as quickly as possible. At the same time, it must be remembered that the airfield project itself will take many years to complete, particularly since the airfield must not only be kept open, but near-full capacity must be maintained at all times. Although no completion date is currently set, current belief is that it would take approximately 10 years to complete all of the improvements desired.

Overall, the proposed plan would both encourage development of airport ground access projects, which are critical to the stability of the national aviation system, while at the same time providing enough flexibility to local communities to design projects that are best suited to their needs. In this instance, such provisions would enable Chicago to design and implement a multi-tiered ground access plan for O'Hare International Airport. On one level, the roadways would provide improved ground access for rubber-tired vehicles from both the city as well as the western suburbs. In addition, the Blue Line extension will bring in passengers from the northwest suburbs, out to Schaumburg, as well as provide a connection for the residents of these suburbs, as well as others, between these communities and downtown, with further connections to the rest of CTA's rail network. Also, the Blue Line will continue to service local traffic to and from the airport. Finally, the enhanced Airport Express trains will serve the premium market between the

airport and downtown, providing an all-inclusive and rapid service for a commensurate increase in price.

As such, Chicago is an ideal location to demonstrate many of the issues that have been discussed throughout this paper. Chicago is already in a relatively good position, with rail access to both of its major airports, and is positioned to move ahead even further. With the implementation of a downtown terminal, which will provide a seamless link between the airfield and the loop, and the potential of improving the Blue Line services to provide significantly improved access to O'Hare from the greater metropolitan region, Chicago is poised to make a major step forward in the realm of airport ground access within the United States.

Recommendations for Future Work

Over the past several chapters, the problems surrounding the current structuring of airport ground access projects have been discussed. A clear tension currently exists between the aviation and transportation communities, and often causes ground access projects to fracture between agency lines. Although strides have been made in order to bridge such gaps, the current federal regulations leave much to be desired, particularly with the interconnection of ground access projects with the rest of a regional transportation network.

Scott Bernstein, President of the Center for Neighborhood Technology, has suggested the integration of the national rail network into the fabric of regional and national transportation. He points out that 56 percent of domestic airline trips are under 500 miles in length, a distance that could just as easily, and more safely and efficiently,

be covered by high speed trains.[7] In order to achieve this, Bernstein proposes a network of travelports, or locations that would fuse together the roles of airports and long-distance train stations. These travelports would, in essence, be airports that are linked to cities with high speed rail connections.

These rail links would serve two purposes: first, they would offer an improved method of accessing regional airports for those individuals who are traveling long distances which are best accomplished by air, and second, they would connect cities within a region (such as Chicago and Milwaukee, or Dallas, Houston, and San Antonio) providing an added link for regional short- and medium-distance travel.[8] In addition to providing more convenience to the travelers on these trips, such a model would free up a significant amount of airport capacity, avoiding the costly requirement of expanding airports, as well as reducing air and noise pollution, particularly with respect to the communities closest to the airports. This concept might be pursued further in connection with O'Hare Airport, as several current Metra rail lines run within a mile or so of the airport.

In another attempt to promote the use of transit connections to airports, it may be possible to include a city transport fee within the cost of every airline ticket sold. Under such a system, airline passengers would be able to travel to or from downtown on a dedicated airport transit service merely by showing their airline ticket, without having to pay a fare. Those not flying would still be able to use the system by paying a cash fare as well. This type of pre-payment system is already implemented with successful results at

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[7] U.S. Congress, Senate, Committee on Environment and Public Works, Planning As If People And Places Matter: Surface Transportation Research Needs and Performance for The Next Century, 107th Cong., 2nd sess., 15 March 2002.

[8] Center for Neighborhood Technology, Experts Call for Focus on High Speed Rail to Create Travelports and Redefine Air Travel, press release, Chicago, 17 March 2003.

several large concert venues, such as the Chronicle Pavilion in Concord, California—within each ticket sold for a concert event consists a $2.75 transportation fee. This fee is used to cover the cost of parking for those who drive to the Pavilion, and the cost of bus transportation for those taking public transportation. In addition to making it more convenient for concert audiences, the inclusion of this fee into the ticket price significantly speeds up the parking of cars as well as the boarding of shuttle buses, reducing traffic congestion.

Another area that might be facilitated by this approach is land access to water ports. Domestic maritime ports suffer from similar connectivity and jurisdictional problems as airports, and like most airports, maritime ports are owned and operated by a different organization than that responsible for providing access to the port. Although funding regulations are significantly different for maritime ports and airports, implementing a similar organizational structure might prove useful. Similarly, if the concept of the travelport is pursued further, a similar organizational structure might be applied.

Further research should also be performed, looking at the needs and requirements of airport employees with regards to getting to and from work. Traditionally, most airport access studies and projects have focused on the needs of the traveling passenger; however, a large number of airport trips are undertaken by individuals who work at the airport in various capacities. Although the needs of some of these employees are the same or similar to those of airline passengers, there are many employees that require different services or are traveling to destinations other than the passenger terminal.

For instance, many employees work at cargo handling facilities that are not located near the passenger terminal. In addition, almost all major airports are 24 hour a day operations, although very few passengers utilize these facilities during the overnight hours. Because of this, many transportation options are unavailable to airport employees who must travel to and from the airport during off-peak nighttime hours. Although the methodologies and recommendations made in the previous chapters are broad enough and expandable to include airport employees, attention should be paid to ensure that airport access projects consider the different needs of these employees.

Conclusions

One of the recurring themes throughout this thesis has been the differing needs and relative isolation of the surface transportation and aviation communities, and how this isolation has resulted in a lack of progress in the field of ground access and intermodalism. Without any one organization specifically focusing on the interfacing of passengers, employees, and cargo between external transportation networks and the airport grounds, this area has generally been overlooked.

However, with a strong central federal structure, such as one administered through the Office of Intermodalism, combined with a program of financial incentives to encourage the development of efficient ground access projects, it is hoped that communities and regions will see the importance of good connectivity between airports and the region at large. As these projects, by definition, overlap many different modes of transportation, both federal aviation and federal surface transportation funds will be opened up for use on ground access projects. The ability to leverage local funds with a

matching-funds program stemming from PFCs and the TIFIA program, communities committed to improving airport access will have adequate funds available to work on these projects. Further, the Office of Intermodalism will provide the regulatory oversight necessary to ensure compliance with the law, as well as be a source of technical knowledge so that each community need not reinvent the wheel during the planning, construction, and operation of these projects. Overall, such a scheme will allow for all communities to plan and develop a comprehensive intermodal outlook towards airport access projects.

REFERENCE LIST

Air Transport Association of America v. Federal Aviation Administration. 335 F.3d 1 (D.C. Cir. 1999).

Airport and Airway Improvement Act. U.S. Code, vol. 49, sec. 47107 (1982).

"An Airport Link With Potential." New York Times. 29 May 1999.

Center for Neighborhood Technology. Experts Call for Focus on High Speed Rail to Create Travelports and Redefine Air Travel. Press release. Chicago, 17 March 2003.

City of Chicago. O'Hare International Airport: Airport Layout Plan Submittal. Chicago: City of Chicago, March 2003.

Cracchiolo, Anthony G. "The Challenges of Building a Light Rail System at John F. Kennedy International Airport: The Influence of Public and Regulatory Processes on the Technological and Evolutionary Design of a Capital Project." Compendium of Technical Papers of the 68th Annual Meeting of the Institute of Transportation Engineers [CD-ROM]. Washington, D.C.: Institute of Transportation Engineers, August 1998.

Cunningham, Lawrence F. and James H. Gerlach. Ground Access Assessment of North American Airport Locations. NTIS, PB97-155345. Denver, CO: University of Colorado at Denver, September 1996.

Dempsey, Paul Stephen, Andrew R. Goetz, and Joseph S. Szyliowicz. Denver International Airport: Lessons Learned. New York: McGraw-Hill, 1997.

Dunlap, David W. "J.F.K. Enters the Era of the Megaterminal." New York Times. 19 March 2000.

Federal Aviation Administration. Airport Improvement Program Handbook Washington, D.C.: Government Printing Office, 31 May 2002.

_____. Innovative Approaches for Using Federal Funds to Finance Airport Development. Washington, D.C.: Government Printing Office, 1996.

_____. "Policy and Procedures Concerning the Use of Airport Revenue." Federal Register 64, no. 30. Washington, D.C.: Government Printing Office, 16 February 1999.

Federal Aviation Administration, Passenger Facility Charges Branch. Approved Passenger Facility Charges by Categories As of December 31, 2002; available from http://www2.faa.gov/arp/financial/pfc/reports/category.cfm; Internet; accessed 17 January 2003.

_____. Distribution of PFC Funds with New Denver As of December 31, 2002; available from http://www2.faa.gov/arp/financial/pfc/reports/denver.cfm; Internet; accessed 17 January 2003.

_____. Distribution of PFC Funds without New Denver As of December 31, 2002; available from http://www2.faa.gov/arp/financial/pfc/reports/nodenver.cfm; Internet; accessed 17 January 2003.

_____. Key Passenger Facility Charge Statistics As of April 1, 2003; available from http://www2.faa.gov/arp/financial/pfc/reports/stats.cfm; Internet; accessed 28 April 2003.

_____. Key Passenger Facility Charge Statistics As of January 1, 2003; available from http://www2.faa.gov/arp/financial/pfc/reports/stats.cfm; Internet; accessed 17 January 2003.

Federal Highway Administration, Office of Program Administration. A Guide to Federal-Aid Programs and Projects. Washington, D.C.: Government Printing Office, May 1999.

Hart, Anthony. "Making New Connections in San Francisco." Mass Transit. September/October 2000.

Kennedy, Randy. "Inquiry Shows Speed of Test Run Caused Derailment of AirTrain." New York Times. 18 October 2002.

"Metro Briefing New York: Queens: Airtrain Delayed Indefinitely." New York Times. 25 November 2002.

The Port Authority of New York and New Jersey. AirTrain: Funding and Schedule; available from http://www.panynj.gov/airtrain/fundingframe.htm; Internet; accessed 1 February 2003.

_____. AirTrain: Project Approval; available from http://www.panynj.gov/airtrain/approvalframe.htm; accessed 1 February 2003.

_____. AirTrain: The Port Authority's Light Rail System to Improve JFK Airport Access; available from http://www.panynj.gov/airtrain/projectframe.htm; Internet; accessed 1 February 2003

_____. John F. Kennedy International Airport Facts and History; available from http://www.panynj.gov/aviation/jhisfram.htm; Internet; accessed 1 February 2003.

_____. Newark Liberty International Airport Facts and History; available from http://www.panynj.gov/aviation/ehisfram.htm; Internet; accessed 1 February 2003.

Rowley, Christopher R. "Comment: Financing Airport Capital Development: The Aviation Industry's Greatest Challenge." Journal of Air Law and Commerce 63 (February/March 1998).

San Francisco Bay Area Rapid Transit District. About BART: SFO Extension: About: Partners & Funding; available from http://www.bart.gov/about/sfo/aboutSFOHistory_3.asp; Internet; accessed 4 February 2003.

_____. About BART: SFO Extension: About: Project Features; available from http://www.bart.gov/about/sfo/aboutSFOMap.asp; Internet; accessed 4 February 2003.

_____. New BART Stations; available from http://www.bart.gov/about/sfo/newStations_0.asp; Internet; accessed 20 March 2003.

_____. Parking Overview; available from http://www.bart.gov/guide/parking/overview.asp; Internet; accessed 20 March 2003.

_____. Stations & Schedules: Maps & Directions; available from http://www.bart.gov/stations/map/systemMap.asp; Internet; accessed 3 February 2003.

San Francisco International Airport. San Francisco International Airport Fact Sheet; available from http://www.flysfo.com/about/press/factsheets/fs-SFOIntl.pdf; Internet; accessed 3 February 2003.

Southeast Queens Concerned Neighbors, Inc. v. Federal Aviation Administration. 229 F.3d 387 (2d Cir. 2000).

Spielman, Fran and Robert C. Herguth. "Mayor Touts Bill to Snap Up O'Hare Land." Chicago Sun-Times. 8 May 2003.

Sriver, Jeffrey. Interview by author. Chicago, 5 August 2002.

Transportation Research Board—National Research Council. TCRP Report 62: Improving Public Transportation Access to Large Airports. Washington, D.C.: National Academy Press, 2000.

United States Congress, Senate, Committee on Environment and Public Works. Planning As If People And Places Matter: Surface Transportation Research Needs and Performance for The Next Century. 107th Cong., 2nd sess., 15 March 2002.

United States Department of Transportation, Bureau of Transportation Statistics. Traffic System Details: Air Traffic Statistics and Airline Financial Statistics; available from http://www.bts.gov/oai/indicators/SysMovAgv.html; Internet; accessed 5 March 2003.

United States Department of Transportation, Office of the Secretary Of Transportation, Office of Inspector General. Audit Report: Use of Airport Revenue for the Bay Area Rapid Transit District Extension to San Francisco International Airport. AV-1999-056. Washington, D.C.: Government Printing Office, 18 February 1999.

United States General Accounting Office, Airport Financing, Comparing Funding Sources with Planned Development. Washington, D.C.: Government Printing Office, 1998.

www.Chicago-L.org. Stations – O'Hare; available from http://www.chicago-l.org/stations/ohare.html; Internet; accessed 30 March 2003.