CHALLENGES AND PROSPECTS OF THE PROPOSED INTERMODAL TRANSPORTATION HUB AT T.F. GREEN AIRPORT IN WARWICK, RHODE ISLAND

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The State of Rhode Island, unlike other states in New England, has a unique opportunity to develop an intermodal transportation hub at T.F. Green Airport in Warwick due to close proximity of travel modes, namely air and rail. The current plan for the hub includes a train station, a consolidated car rental facility garage and an Automated People Mover connecting the proposed train station with the airport terminal. This study focuses on the proposed intermodal transportation hub at T.F. Green Airport. Specifically, the study has four objectives. First, it reviews and analyzes the current conditions and status of the proposed intermodal transportation hub. Second, drawing from the findings of the current conditions, the study presents a list of primary prospects and challenges facing the development of the intermodal transportation hub at T.F. Green Airport in Warwick. Third, the study examines six intermodal airports to learn the best practices in planning and development of the intermodal transportation facilities. These are: Miami International Center; Portland International Airport; Newark Liberty International Airport; Baltimore Washington International Airport; Frankfurt International Airport and Zurich International Airport. Lastly, using the lessons learned from the review of best practices, the study offers policy recommendations to address the key challenges facing the development of the proposed intermodal transportation hub at T.F. Green Airport.

The study concludes that although the proposed intermodal transportation hub is a challenging and complex project, its successful development is within reach and the State of Rhode Island and the City of Warwick stand to benefit from it greatly. Benefits in the areas of economic development, improved environmental quality, and greater transportation alternatives clearly outweigh the possible drawbacks of the project. Three practical requirements for the success of the project are: Communication, effective collaboration and consensus among the various stakeholders of the project; creative financing to share the benefits and costs of the project among different stakeholders; and the management of the negative environmental externalities of the project.

The proposed intermodal transportation hub at T.F. Green Airport has the potential to become a national model and a vibrant, urban, transit-oriented district in the City of Warwick functioning as a new gateway to the State of Rhode Island. This vision and its associated benefits should compel the State of Rhode Island and the City of Warwick to proceed with the development of the proposed intermodal transportation hub at T.F. Green Airport.

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Intermodal transportation planning, intermodal train station and airport facilities

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EXECUTIVE SUMMARY
EXECUTIVE SUMMARY

RATIONALE AND VISION FOR THE WARWICK INTERMODAL TRAIN STATION

Intermodal public transit networks are a growing national trend and offer many benefits to the public, including improved mobility and air quality and reduced congestion and energy consumption. The term, intermodal, describes convenient connections available between various modes of travel, such as automobile, train, bus, ferry, and plane, allowing the combination of multiple modes in a single trip. These connections increase the flexibility with which public transit can be utilized, making it more useful to the public.

Rhode Island has a unique opportunity to easily connect air and rail modes of travel. T.F. Green, the state’s major airport, is located a mere 1570 feet away from the tracks of AMTRAK’s popular Northeast Corridor rail line. This is the closest proximity in the country between an AMTRAK line and a major commercial airport. A train station at this location would make it possible for passengers to travel to and from T.F. Green airport and the surrounding commercial area by rail.

Planning, design, financing, and site work for the Warwick Intermodal Train Station (WITS) at T.F. Green Airport have been in progress since 1997, when the idea was first proposed by Governor Almond. The current concept includes a train station with an Automated People Mover (APM), which would function like a horizontal elevator, transporting passengers between the station and the airport terminal, passing over Post Road. The plan also includes a consolidated car rental facility (CRF) garage, in which the various car rental companies associated with the airport would operate, with automobile access onto Jefferson Boulevard. The WITS is envisioned as full service intermodal center with bus, taxi, and limousine services and a parking garage. Additionally, the City of Warwick plans to redevelop the area surrounding the WITS in a compact, urban, pedestrian-oriented style. The Warwick Intermodal Train Station and associated development are shown in Map 1.
Map 1. Warwick Intermodal Train Station and Associated Development

- Warwick Intermodal Train Station (WITS Approximate Location)
- People Mover Alignment
- Intermodal District
- Gateway District
- T.F. Green Airport

WITS COMPONENTS:
- Train Service with MBTA Service
- Car Rental Facility with Quick Turn-around
- Station to Airport People Mover
- Bus Terminal, Raid & Drop Areas
- RUTRAIL Regional Shop
- Providence to Airport Rail Shuttle Dedicated Line
The Massachusetts Bay Transit Authority (MBTA) has agreed to extend commuter rail service on its existing Attleboro line to the WITS, with connections to Providence and Boston and the larger transportation network of the Boston area, and also service to the south with a stop at Wickford. In the long term, this South County Commuter Rail Service (SCCRS) would also include stops at East Greenwich, Kingston, and Westerly.

Rhode Island Department of Transportation (RIDOT), and the many other agencies involved, are in agreement that the WITS project offers many potential benefits to the public such as: reduced traffic congestion, improved environmental quality, and enhanced economic development. The successful development of the station would create a unique gateway for travelers and commuters entering the state, and also make T.F. Green a national model for an intermodal transportation facility.

OVERVIEW OF THE STUDY

This report was prepared by the University of Rhode Island (URI) Community Planning Studio of 2004, a class of seven graduate students supervised by Professor Farhad Atash. The report is the culmination of one semester of study focused on the WITS project. The study began with a review of the history and current status of the WITS. Analysis of this information resulted in identification of the major prospects, challenges and key issues related to the WITS project. Ideas for addressing these key issues were sought by studying the examples provided by other airports around the world where rail connections are either operating, or under development. The lessons learned from study of other, similar airports were then applied to the development of a set of policy recommendations intended to address the challenges faced by the WITS project and to facilitate its successful development and operation.

HISTORY AND CURRENT STATUS OF THE WITS

The timeline in later sections illustrates that progress on the project has been slow and encountered many challenges. This is not unusual in the development of intermodal facilities, which require the cooperation of many diverse stakeholders who are not generally accustomed to working together. The stakeholders of the WITS project include government agencies, transportation providers, businesses, the local community, and travelers. The numerous stakeholders and their complex relationships are also discussed in later sections.

Particular issues which make the development of the WITS complex include the fact that the airport is located in residential area and therefore affects the quality of life of its neighbors. Also, existing car rental businesses will be impacted by the need to relocate into the CRF. Current businesses in the Warwick Station Redevelopment District (WSRD), immediately surrounding the station, will need to relocate. Lastly, AMTRAK's fast Acela trains cannot be impeded by slower moving commuter trains on the same tracks.
ANALYSIS AND ISSUE IDENTIFICATION

This analysis takes a community planning perspective by prioritizing the public interest and looking at the project from a long term, macro-scale view. The overall outcome of the WITS has been determined to be the redistribution of surface vehicle traffic: out of personal autos and into public transit. Weighing of the prospects and challenges, benefits and drawbacks of the project illustrates why the project should proceed. Benefits to the community in the areas of economic development, improved environmental quality, and better transportation options clearly outweigh the drawbacks of the project.

Specifically, three great potentials of the project were identified:
- A model intermodal transportation hub at T.F. Green Airport
- A vibrant, urban, transit-oriented district in Warwick, and
- Greater economic development opportunities for Rhode Island.

Additionally, three practical requirements for the success of the project were identified. These are:
- Stakeholder collaboration and consensus
- Financing for development and operating costs, and
- Managing the effects of the facility on surrounding neighborhoods.

These six key issues framed the subsequent research into approaches taken by other airports with intermodal connections, and the development of policy recommendations for the WITS.
LESSONS LEARNED FROM OTHER INTERMODAL AIRPORTS

Six other intermodal airports were studied to determine the lessons they might hold for application to the WITS project.

- The Miami Intermodal Center (MIC), under development at Miami International Airport (MIA) illustrates the value of public participation in the development process and the importance of piecing together funding from a variety of sources for such a capital intensive project.

- Portland International Airport (PDX) recently developed a close and convenient connection from the city's light rail system, which drops passengers off within 200 ft. of the baggage claim. Ridership on this line is more than three times higher than on the previously operating bus service to the airport, illustrating the popularity that a well planned rail line can achieve. A creative public-private financing partnership allowed the line to be built without the use of any federal appropriations, state general funds, or additional property taxes.

- Newark Liberty International Airport (EWR) is connected to AMTRAK and NJ Transit rail lines by a monorail built and operated by New York-New Jersey Port Authority. The Port Authority's regional and multi-modal scope facilitated development of the project by unifying the various agencies involved.

- Baltimore Washington International Airport (BWI) is a good example of the confusion of passengers when faced with an inconvenient shuttle connection between air and rail.

- Frankfurt International Airport (FRA) is a growing airport in an urban context. A neutral planning process included all stakeholders in discussions leading to a program of monitoring and evaluation of noise and air pollution. This program has gained the community's trust and documented the airport's success at reducing its negative impacts on the surrounding neighborhoods.

- Zurich International Airport (ZRH) exhibits a seamless connectivity between different modes of travel with passenger oriented coordination of services such as ticketing and baggage collection. This coordination is achieved by a regional transit organization, which oversees the operations of each of the specific transit providers.

Each of the airports studied offers valuable lessons for how to proceed in developing a successful intermodal facility at T.F. Green Airport. The airports selected for this portion of the study are shown in their context in Map 2.
Map 2. Airport Case Studies

- **Frankfurt International Airport (FRA)**
  - 49 million passengers/year (2002)

- **Zurich International Airport (ZRH)**
  - 16 million passengers/year (2003)

- **Portland International Airport (PDX)**
  - 12.4 million passengers/year (2003)

- **T.F. Green Airport (PVD)**
  - 5.5 million passengers/year (2001)

- **Newark Liberty International Airport (EWR)**
  - 29.4 million passengers/year (2003)

- **Baltimore Washington International Airport (BWI)**
  - 19.7 million passengers/year (2003)

- **Miami International Airport (MIA)**
  - Passengers/year (2003)
POLICY RECOMMENDATIONS

The policy recommendations for development of the WITS focus on the need for greater communication and collaboration between the various parties involved and affected by the development of the WITS. The ten recommendations are as follows:

• Develop a stakeholder council to foster communication and collaboration among the various stakeholder groups.

• Develop a regional transit organization to coordinate the scheduling and services of the various transit providers, in order to achieve a seamless integrated, passenger oriented travel experience.

• Conduct a marketing campaign with a website, a concise report explaining the project, and a sign at the construction site to raise public awareness and support for the project.

• Phase the development of the WITS. All components should be included the initial plan, but some components cannot be constructed until financing and stakeholder consensus have been achieved. Those components that are ready to proceed should be constructed first.

• Accelerate land acquisition in the WSRD either by organizing the land owners to sell as a group or through a relocation and barter program.

• Institute a progressive tax structure in the WSRD with a two-rate property tax that will encourage redevelopment.

• Seek public-private partnerships in order to share the costs and benefits of the project among many parties.

• Develop transit-oriented design for the WSRD with mixed-use, pedestrian-oriented development and uniform standards for signage, lighting, and landscaping.

• Monitor environmental impacts of the facility, such as air quality and noise, in order to document and quantify the benefits of the project and improve the airport's relationship with the neighborhood.

• Create a physical connection between air and rail modes of travel. The people mover will make the airport and train station into one unified facility that is seamless and convenient for passengers to navigate.
CONCLUSION

Although it is a challenging and complex undertaking, successful development of the WITS is already within reach and the state and local community stands to benefit greatly. In order to maximize the success of the project, the costs and benefits will need to be shared among all of the various stakeholders involved, and effective communication and cooperation will need to be achieved. The WITS has the potential to become a nationally significant model of an intermodal transportation hub. This vision and all of its associated community benefits should compel Rhode Island to proceed with well planned and coordinated construction of the Warwick Intermodal Train Station.
INTRODUCTION
INTRODUCTION

Rhode Island has a unique opportunity to develop an intermodal transportation facility at T.F. Green Airport due to the close proximity of travel modes, namely air and rail. Currently, there is no rail service to the airport; however the Amtrak Northeast Corridor Rail Line travels through the area 1,570 feet to the west of the airport terminal. This is the closest Amtrak rail line to a major airport terminal in the country. This rail line provides service throughout the northeast and at Rhode Island stations in Providence, Westerly, and Kingston. The proposed Warwick Intermodal Train Station would bring rail service to Warwick and to T.F. Green Airport, thereby creating a major transportation gateway, which can positively impact the state’s economic development.

The station will provide connection rail service to Boston and New York via Massachusetts Bay Transportation Authority (MBTA) Commuter Rail and Amtrak. With completion of the Warwick Intermodal Train Station, the MBTA has agreed to extend commuter rail service south from its current terminus at Union Station in Providence. There are also plans to extend MBTA service to South County with a new station at Wickford Junction in North Kingstown.

PURPOSE OF THE STUDY

The University of Rhode Island Transportation Center (URITC) engaged and funded the University of Rhode Island’s Community Planning Studio to study the challenges and prospects of the proposed Warwick Intermodal Train Station at T.F. Green Airport in Warwick, Rhode Island. The Community Planning Studio also worked with the stakeholders of the Warwick Intermodal Train Station to gather opinions and input about the project’s current status and to help shape policy recommendations for its development. Input from state and local official officials included, Rhode Island Department of Transportation (RIDOT), Rhode Island Statewide Planning Program, the City of Warwick's Department of Planning and Development, and the Warwick Station Redevelopment Agency (WSRA). The studio also considered the interests of the project’s other major stakeholders including, the rental car companies, district landowners and businesses, local residents, taxi and limo companies, Rhode Island Public Transit Authority (RIPTA), and the Bullfinch Companies, Inc. the real estate firm hired to handle property acquisition and development in the district.

AREA OF THE STUDY

The proposed Warwick Intermodal Train Station is to be located at the southeast corner of Jefferson Boulevard and Coronado Road. An Automated People-Mover (APM) connecting T.F. Green’s airport terminal and the train station will assure convenient access. The airport and proposed site of the Warwick Intermodal Train Station are located approximately 10 miles south of downtown Providence. The Warwick Station Redevelopment District is shown in Map 3.
The Warwick Intermodal Train Station Study

The study also includes the two districts, the Warwick Station Intermodal District and the Warwick Station Gateway District, that are both within the Warwick Station Redevelopment District, as established by the Warwick City Council. The 22-acre Intermodal District is the land area that connects the airport terminal and the train station. The adjacent 48-acre Gateway District is the transitional area from outlying areas, including Post Road and Airport Road that lead to the Intermodal District.

EXISTING CONDITIONS

City Of Warwick

The City of Warwick is centrally located in the heart of Rhode Island in Kent County. Warwick is the second largest city in the State, offering a variety of services for local residents and tourists alike. According to the United States Census Bureau, the city has a total area of 49.6 square miles. As of the 2000 Census, the city had a total population of 85,808 residents.

T.F. Green Airport

T.F. Green Airport is Rhode Island's primary commercial flight airport. T.F. Green is owned by the state of Rhode Island and is managed by the Rhode Island Airport Corporation (RIAC). The airport is located in the City of Warwick, Rhode Island and is part of the Federal Aviation Administration's (FAA) New England regional airport system that includes Boston's Logan, Manchester, Bradley, and Portland airports.

Since 1991, more than $210 million has been invested to construct a new two-story terminal building, access roads, parking facilities and related improvements at T.F. Green Airport. The new facilities at the Airport have been in operation since 1996 and have helped to attract the low-cost Southwest Airlines to the Airport. With the addition of Southwest Airlines and added air service, passenger volumes have increased sharply. In 1996, the Airport served 2.5 million passengers. In one year, that number increased to 4.1 million passengers. Passenger numbers have continued to rise at T.F. Green. In 2003, the Airport served 5.2 million passengers and in 2004, 5.5 million passengers, an increase of 6.4 percent. RIAC projects that passenger numbers will only continue to grow in the coming years (RIAC, 2005).

T.F. Green has several unique strengths that set it apart from other airports in the region. Foremost of T.F. Green's strengths is the easy access to and around the airport and the low fares provided by the competing airlines. Other strengths include its location in central Rhode Island and in the southern New England region, its relatively small size, and its reputation for dependable and convenient service.
T.F. Green also has several inherent challenges, particularly the airport's relationship with the host community, the City of Warwick, and its close proximity and resulting impacts to residential neighborhoods. Residents of Warwick and bordering communities have a reduced quality of life due to loud aircraft noise, air pollution and odors, and congestion on local roads. Identified challenges for airport users include limitations in air service to desired destinations due to the physical constraints of the existing runway. This limitation reduces the convenience of travel from T.F. Green to the West Coast and other desired destinations, and possibly results in diversion to other New England airports with more accommodating air service. Existing land use interpreted from 1995 orthophotography illustrating the residential component on the WITS site is shown in Map 4.
METHOD AND PROCESS OF THE STUDY

The study followed a four-step process to accomplish its primary objective.

- Review and analyze the current conditions and status of the proposed project through interviews with local and state public officials as well as referring to relevant studies, reports and publications on the project;

- Review the current literature to identify the best practices in planning and development of intermodal transportation facilities and transit-oriented development projects in the United States and abroad;

- Draw from the findings of the current conditions and review of best management practices, to develop a list of primary prospects and challenges facing the development of the Warwick Intermodal Train Station; and

- Use the lessons learned from the review of best practices and input from the public officials, to offer specific policy recommendations to address the key challenges facing the development of the proposed Warwick Intermodal Train Station at T.F. Green Airport.

The Studio analyzed other case studies to learn about best planning and development practices from other intermodal transportation facilities and transit-oriented development projects in the United States and abroad.
SIGNIFICANCE OF THE PROJECT

Warwick Intermodal Train Station

In addition to providing rail service, the Warwick Intermodal Train Station will also offer bus service, rental car operations, and taxi service. The station location will be easily accessible facilitating modal shifts from single occupancy automobile to high occupancy transit, thereby helping to reduce highway congestion in the immediate area. The easy connection for rail-air travelers over busy Post Road should be a major incentive for drivers to switch modes. In addition, the Warwick Intermodal Train Station will increase use of new rail service by commuters, especially those not necessarily destined for air travel.

Car Rental Facility

Currently, eight rental car companies operate at T.F. Green Airport. Hertz, Budget, and Avis occupy 160 parking spaces inside of Rhode Island Airport Corporation’s main parking garage. The remaining companies, Alamo, Dollar, Enterprise, National, and Payless operate along Post Road and provide their customers with shuttle bus service to their facilities. The rental car companies shuttle van operations and the movement of rental cars for fueling, washing, maintenance, storage, and customer drop-off and pickup all contribute to frequent traffic congestion on Post Road. A key element of the planned Warwick Intermodal Train Station is the consolidation of all of the rental car facilities for the airport into the future train station parking garage. The relocation and consolidation of rental car facilities would help reduce traffic volumes on Post Road. In addition, washing, vehicle storage, and possible fueling will be conducted at the consolidated rental car facility.

Automated People-Mover

An Automated People-Mover (APM) is planned to transport passengers from the T.F. Green Airport terminal to the planned Warwick Intermodal Train Station on Jefferson Boulevard. The current plans for the APM are for it to extend from the third level of the Bruce Sunlund Terminal and span the upper departure level, cross the hourly parking lot and Post Road (Route 1), and run along Fresno Road to the proposed Warwick Intermodal Train Station and consolidated rental car garage lobby. The use of the APM to the rental car facility would eliminate the need for rental car shuttle buses.
OUTLINE OF THE STUDY

This study begins with a brief history and timeline of the Warwick Intermodal Train Station. This is followed by an analysis of major issues facing the development of the Warwick Intermodal Train Station. The study then examines lessons learned from six other airports with air and rail connections. Miami International Airport (Florida), Newark Liberty International Airport (New Jersey), Baltimore / Washington International Airport (Maryland), Portland International Airport (Oregon), Zurich Airport (Switzerland), and Frankfurt Airport (Germany) were studied for lessons and solutions that could be applicable to the Warwick Intermodal Train Station. It proceeds with a set of policy recommendations divided into ten topics: stakeholder council, regional transportation association, marketing, public / private partnership, tax structure, land assembly, phased development, design, management of externalities, and physical connection.
THE WARWICK INTERMODAL TRAIN STATION: AN EVOLVING NARRATIVE
THE WARWICK INTERMODAL TRAIN STATION: AN EVOLVING NARRATIVE

The history of the Warwick Intermodal Train Station has been long and complicated and for those reasons we felt the best way to represent this intricate history was to create a unique timeline. This timeline is an extended text version of the Figure 1. The main line was developed to represent milestones in history that played a pivotal role in the evolution of the WITS project. There are seven additional lines that represent financing, public participation, environmental externalities, car rental facility events, economic development, design and planning, and stakeholder concerns. These timeliness are close approximations of time based on research from articles published in the Warwick Beacon and the Providence Journal.

MAIN LINE

July 1997
  • Proposal for construction of a $15 million train station in Warwick (Lieberman, 1997).

November 1998
  • Governor Lincoln Almond re-elected to office.

October 1999
  • Death of U.S. Senator John Chafee.

November 1999
  • Lincoln Chafee takes office as U.S. Senator.

February 2000
  • Scott Avedisian takes office as Mayor of Warwick.

September 2001
  • World Trade Center Attacks.

November 2002
  • Donald Carcieri elected Governor of Rhode Island.
  • Mayor Scott Avedisian re-elected to office.

November 2004
  • Mayor Avedisian re-elected to office.
FINANCING

May 1998
• U.S. Senator John Chafee secures a $25 million federal grant that is awarded for construction of an airport-rail terminal, with a $10 million people mover proposed as part of the overall design (DePaul, 1998a).

June 1998
• Announced that DOT is tapping into the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) to fund the project (DePaul, 1998c).

May 2002
• House approves a budget article giving Warwick approximately $1.1 million in airport-related revenue, assuming the long-planned Amtrak station becomes a reality (Anon., 2002b).

June 2002
• Governor Almond vetoes a bill establishing a 5% city tax on airport parking, stating that if Warwick is seeking additional revenue, they should construct the train station (Andersen, 2002).

February 2004
• James Capaldi, director of DOT, requested that Lincoln Chafee make a one-sentence amendment that would lift restrictions on the use of "off system" bridge funds to be applied to the station project through the proposed Safe, Accountable, Flexible, and Efficient Transportation Efficiency Act of 2004.
• Chafee noted that the new amendment does not change the funding levels, but rather changes how the money can be spent.
• The proposed Safe, Accountable, Flexible, and Efficient Transportation Efficiency Act of 2004 would provide the State with $1.224 billion through 2009 (Howell, 2004J)(Anon., 2004).
PUBLIC PARTICIPATION

February 2001
• Concerned Airport Neighbors' representative, Raleigh Jenkins, meets with RIAC to voice neighborhood opinions about airport issues.
• Jenkins stressed the history of how the organization of sixteen Warwick and Cranston neighborhood associations was created the prior fall in response to the extremely shoddy treatment dealt citizens the prior fall by RIAC consultant hired to draft the 20-year master plan (Howell, 2001a).
• Just as DOT nears an agreement with RIAC, three Warwick residents asked the City Council to find a way to put the breaks on the station proposal.
• In a last minute attempt to stall construction to allow for additional study, the three residents met with three councilmen in hopes the City Council would intervene.
• The residents have 3 reasons to delay the project: 1) the new council, mayor and planning staff need time to study issues, 2) they are just now becoming aware of 600 families, living within proximity to the airport, who want to move and they need to be taken into consideration, and 3) the planning process provided public hearings with vague, visionary, and largely unsubstantiated views of what might occur in the future (Brugmen, 2001a).

March 2001
• Airport neighbors raise health concerns and are frustrated by repeated attempts to see a thorough air quality test of areas surrounding the airport.
• According to a Warwick resident there have been nine cancer related deaths in recent years in his neighborhood of thirty-three homes that abut T.F. Green in recent years. Seven of those have been in the form of lung cancer. He contends that the levels of air pollution caused by the airport have put his health and the health of his neighbors in grave danger.
• Neighbors of the airport are frustrated by repeated attempts to see a thorough air quality test of areas surrounding the airport (Brugmen, 2001b).

May, 2001
• Landowners within the Station District say their offers from Bulfinch are "ridiculously low."
• One property owner in the district of approximately 5,000 square feet says Bulfinch offered $225,000 for property that cost him in excess of $550,000 -- $230,000 to exercise an option to buy the land a year ago and $225,000 in improvements and an addition completed over the past several years (Howell, 2001b).
CAR RENTAL FACILITY

December 2000
- State begins seeking partnership with 9 car rental agencies for a CRF at station (Anon., 2000).

February 2001
- 9 car rental agencies agree in principle to partner with the state on the project (Anon., 2001).

July 2001
- Those renting cars at T.F. Green Airport commence paying a $3.25 daily charge to fund station project (Gesualdo, 2002).

April 2002
- Car rental agencies have backed out of agreement with state, citing 9/11 related loses (Anon., 2002a).

March 2003
- RIAC conducts feasibility study for CRF comparing the intermodal site with three other potential sites (RIAC, 2003).

ECONOMIC DEVELOPMENT

January 2004
- Warwick Station Redevelopment Agency (WSRA) announces that it has granted its first major project within the district, Joseph Piscopio’s hotel complex.
- Piscopio agreed to several requests: improve the façade on the north side of the building with added windows; the spa, pool restaurant and retail areas be operated substantially for the benefit of hotel guests; the ingress/egress to Kilvert Street be expanded to at least 26 feet and that the rear entrance of the hotel be improved (Howell, 2004h).
STAKEHOLDERS

May 1998
• MBTA adds 3 commuter runs between Boston and Providence (McKinney, 1998).

June 1998
• Proposal to rewrite the city’s zoning ordinance to create an “intermodal zone” and a “gateway zone” (DePaul, 1998b).

November 1998
• Warwick City Council votes to create a “Station District” (Anon., 1998a).

April 2000
• Bullfinch and the city of Warwick enter an agreement to begin negotiations for development of the Station District (Smith, 2000).

February 2001
• 9 car rental agencies agree in principle to partner with state on the project (Anon., 2001).

July 2001
• South County Commuter Rail System operations plan executive summary published; MBTA chosen to run trains (RIDOT, 2001).

October 2003
• Carcieri is frustrated by the ‘red tape’ holding up the station project, and he is anxious to get started with the construction of a Warwick railroad station. He expressed his frustration with federal agencies for delaying the project.
• Without going into detail, the governor said the EPA has “an air quality issue.” The issue centers over the scope of the development and whether it will include a people mover connecting the station to Sunland Terminal at Green Airport (Howell, 2003g).

August 2004
• Michael McMahon, Executive Director of the Economic Development Corporation, announced that Amtrak does not want to stop in Warwick, and does not want to let MBTA stop on their tracks.
• McMahon believes the way around Amtrak is the Freight Rail Improvement Plan (FRIP), which runs parallel to Amtrak lines (Howell, 2004J).
ENIRONMENTAL MONITORING AND EVALUATION

January 1999
- DOT makes public the results of the draft Environmental Assessment (EA) (RIDOT, 1999c).

July 1999
- Federal Highway Administration finds that the project will cause "no significant impact" on the environment (RIDOT/FHWA, 1999a).

January 2001
- Lincoln Environmental Services begins cleanup of the Baylis site.

May 2001
- Gail Lattrell of the FAA, and a member of the Study Resource Committee, states that the agency will not overlook regulations requiring Runway 16/34 to have 1,000-foot safety roll offs when it is resurfaced, which is scheduled for some time within the next three years.
- Two developments, the need to extend the shorter of Green's two major runways if it is to remain an option for commercial use, and the prospect that the proposed people mover and 4,500-car parking garage may be impractical to build have become the focus of attention.
- Although Runway 16/34 does not meet the current safety standard it has been allowed to continue operations because they were grand-fathered in, according to RIAC planner (Howell, 2001c).

February 2002
- Reevaluation of EA with new design including CRF receives finding of no significant impact (FONSI) (RIDOT, 2002).

January 2003
- Noise monitoring to be included in newest EIS airport study for Apponaug, Arnold's Neck, Greenwoods, Gaspee, Norwood, and Lakewood neighborhoods.
- Cranston officials have questioned the method of noise measurement arguing it does not adequately determine impacts on people. Cranston has suggested that the noise study reach beyond the 65-decibel average day/night contour to a 55-decibel baseline (Howell, 2003d).

May 2003
- Citing difficulties with wetlands, RIAC has abandoned its efforts to extend Green Airport's crosswind runway; there is renewed discussion over the extension of Green's longer runway.
- In an effort to provide additional safety areas, RIAC is seeking FAA approval for installation of arresting pavements at the end of the runway, meanwhile there is renewed discussion over the extension of Green's longer runway (Howell, 2003f).
DESIGN AND PLANNING

January 1999
• Employees’ parking lot at Leviton, Budget truck-rental property and Baylis Chemical plant proposed as site for train station (DePaul, 1999).

June 1999
• RIDOT briefs the WSRA on site and design choices and project status, construction estimated to begin late 2000 (RIDOT/FHWA, 1999b).

September 1999
• Developers meet to get first-hand look at plans for Station District; collaborative report published on transportation opportunities in WSRA (Lowe, 1999).

February, 2000
• February 22 represents the “start of the beginning”, for on that date the WSRA is to be shown a proposal for the development of the 70-acre intermodal zone between Green Airport and the railroad (Howell, 2000).
• Announced that people mover would run along Fresno Street (Revens, 2000)

December 2000
• Announced that Warwick station being designed in concrete-and-brick fashion (Anon., 2000).

March, 2002
• Landrum & Brown, planning consultants, recommends that Green have runway lengthened from 6,100 feet to 7,600 feet. In addition, it was recommended that the terminal, now comprised of 352,000 square feet be enlarged to 800,000 square feet with 40 gates and that another 5,000 long-term parking spaces be added (Howell, 2002).

January, 2003
• Department of Transportation drafts plans for future ‘expandable’ station
• The station on the east side of the tracks is one of three plans DOT Director James Capaldi will share with Governor Carcieri and Mayor Avedisian, as the state considers alternatives to the consolidated rental car garage/people mover and station (Howell, 2003e).

August 2004
• Senator Chafee favors the use of the Freight Rail Improvement Plan (FRIP) as side rail for MBTA trains stopping in Warwick. This line would connect Quonset Port and the Providence and Worcester Railroad as a station siding for trains on the Amtrak lines.
• James Capaldi, Director of DOT, said that the design on the use of the FRIP is being done and that it offers a means of providing MBTA service to Warwick. Additional improvements, including a second siding to serve a Warwick station, could be made at a later time.
Figure 1. An Evolving Narrative

Warwick Intermodal Train Station
An Evolving Narrative

Public Participation
Environmental Considerations
Financing
Stakeholder Meetings
Design
Cost Estimation
Economic Development
ANALYSIS AND ISSUE IDENTIFICATION
ANALYSIS AND ISSUE IDENTIFICATION

The information gathered about the history and background of the WITS project, along with interviews of key stakeholders involved, was used to identify and analyze the issues surrounding the project. Most importantly, the potential outcomes of the project were also analyzed in order to weigh the prospects, challenges, benefits, and drawbacks of the project to the local and state community. This analysis provided the focus for development of policy recommendations to address the challenges of the project.

THE STAKEHOLDERS

There are many different groups of stakeholders that will be impacted by the WITS and each has a different interest in the project. The stakeholders can be categorized into five groups:

- The government bodies overseeing or funding the project, RIDOT, the RI Governor’s Office, the RI Legislature, and USDOT;

- The transportation providers who will carry on the day to day functioning of the facility, MBTA, Amtrak, RIAC, and RIPTA;

- The businesses affected by or involved in the project, the car rental companies, Bullfinch Co., land owners in the WSRD, nearby businesses, and bus, taxi, and limousine companies;

- The local community, WSRA, CAN, City of Warwick, and Warwick citizens; and

- Travelers who will use the facility, including rail commuters and those who fly using T.F. Green.

This categorization of stakeholder groups is shown in Figure 2. Such a complex assortment of stakeholders makes cooperation and coordination challenging to achieve.
Figure 2. Stakeholders
EXISTING CONDITIONS

Existing conditions affecting the project include both prospects, factors that are working in favor of the project, and challenges, hurdles that stand in the way of progress on the project. The existing conditions were categorized into two groups, those related to the context and setting of the project, and those related to the stakeholders.

The most important factor of the context and setting is the fact that the existing railroad tracks lie only about 1500 ft. away from the airport terminal, making the two relatively easy to connect. The high costs of constructing a people mover and acquiring land for redevelopment, however, are significant challenges. Another challenge to the success of the WITS is the fact that the airport's long term competitiveness within the region is compromised by its short runway length; however the airport's current plans for runway expansion would resolve this issue. Existing conditions related to the context and settings are shown in Figure 3.

Figure 3. Existing Conditions of the Context and Setting.

Prospects

- Tracks only 1500’ from airport
- Area next to tracks under utilized
- Proximity to 3 major economic nodes
- Link to Boston MBTA
- Airport may expand
- Financing for project in place

Challenges

- Providence lacks extensive transit network
- Airport lacks infrastructure to remain competitive
- High land costs
- People mover expensive

Context + Setting
The proximity of the site to three of the states most promising economic development nodes, downtown Providence/East Providence, the AMGEN corridor, and Quonset point, present the prospect that the WITS could have a synergistic effect further spurring development at these locations by providing ease of transportation and possibly an office/hotel district. The relationship of the WITS to these three promising economic nodes is shown in Map 5.

Map 5. Economic Nodes
Stakeholders in support of the project include the key state agencies and the city. The federal government has also provided support for the project in the form of loans. However, the project faces challenges in getting Amtrak cooperation and in the concern of the car rental companies that their financial burden in the project may be unfeasible for them. The low level of public awareness of the project statewide may also be working against it. Existing conditions related to the stakeholders are shown in Figure 4.

**Figure 4. Existing Conditions Related to Stakeholders.**

Prospects

- Support from key state agencies
- Much of preliminary work done
- MBTA wants to run trains
- Support from city of Warwick

Challenges

- Little public awareness of project
- Amtrak requires sidetracks
- Neighbors concerned about expansion
- Car rental companies want feasible financial burden
- Some landowners do not want to sell
POTENTIAL FUTURE OUTCOMES

The most important part of this analysis is weighing the outcomes to the local and statewide community, which would be likely to result from the construction of the WITS. The many specific benefits and drawbacks to the community are listed below in Figures 5, 6, and 7. They are grouped into the categories of transportation, the economy, and land-use and the environment.

In the category of transportation, the project will be predominantly beneficial, with the possible exception of competing with other transportation projects for funding and resources. The benefits include an extension of commuter rail to Warwick and more options for travel to and from the airport. Potential future outcomes in the area of transportation are shown in Figure 5.

Figure 5. Potential Future Outcomes in the Area of Transportation

Benefits
- Extension of commuter rail to Warwick
- More travel options
- Quality travel options
- Reduced auto traffic congestion

Drawbacks

Transportation
Economically, the project has the potential to generate increased tax revenues for the city by bringing development to the WSRD. It also may result in better job options for the community by providing easier commuting to the Boston area and attracting businesses to locate nearby. On the other hand, the construction and operating costs of the project will be significant. Potential future outcomes in the area of the economy are shown in Figure 6.

**Figure 6. Potential Future Outcomes in the Area of the Economy**

- **Benefits**
  - More quality job options
  - State more attractive to business
  - Increased tax revenues
  - Increased air passengers

- **Disadvantages**
  - Operating costs of people mover + facility
  - Construction debt repayment
  - Negative impacts to car rental, bus, taxi, etc...
  - More facilities requiring security

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Economy
In the category of land use and the environment, the benefits of the WITS will far outweigh its drawbacks. Most importantly, the WITS provides the opportunity to develop a compact, urban, mixed-use district in Warwick, something the city currently lacks. This district would give the city the benefits of a thriving, pedestrian-friendly environment and would also become an attractive gateway to Rhode Island for travelers flying into the state. A possible increase in flights due to the WITS is unlikely to match the decrease in flights expected as the airport shifts to the use of larger aircraft. Potential future outcomes in the area of land use and the environment are shown in Figure 7.

**Figure 7. Potential Future Outcomes in the Area of Land Use and the Environment**

This analysis of potential outcomes illustrates that the benefits offered by the WITS project far outweigh the drawbacks. The local and state communities clearly stand to gain from this project and should proceed with its completion. This analysis does not attempt to determine which components should be included in the WITS, of the many possibilities that have been proposed. Each component should be individually analyzed.
KEY ISSUES

The key issues raised by this analysis include three great potentials for the local and state community:

- The potential to create an intermodal transportation hub, that will provide convenient and affordable public transit;

- The potential to create a vibrant, urban, transit-oriented district in Warwick, which will improve quality of life in the city and for travelers; and

- The potential to generate economic development nearby that will offer more and better job options for Rhode Islanders.

The key issues also point out three types of practical requirements that will need to be accomplished in order for the project to succeed. These include:

- Achieving stakeholder consensus, including public support and political leadership;

- Securing financing for each stage of the development and for long term operating costs; and

- Managing the environmental externalities associated with a transportation hub in an urban environment.

These key issues are further addressed in the next section by reporting on the ways that other intermodal facilities have handled similar issues. The policy recommendations at the end of this study are intended to suggest ways that the practical requirements of the WITS can be accomplished and the three great potentials that the project offers achieved.
LESSONS LEARNED:
AIRPORT CASE STUDIES
LESSONS LEARNED: AIRPORT CASE STUDIES

This section of the study reviews current literature on intermodal transportation planning in the United States and abroad to identify best practices around the globe. These practices are taken into consideration based on the key issues identified for the successful development of the WITS as a major intermodal transportation hub at T.F. Green Airport.

The section examines six international airports and their associated intermodal train stations. Four of these airports were located in the United States including: Miami International, Newark Liberty International, Baltimore Washington International, and Portland International. Two of the selected airports were located in Europe including: Zurich International and Frankfurt International. Best practices are reviewed and demonstrated in their own context, and the lessons related to the major issues facing the Warwick Intermodal Train Station are extracted.

MIAMI INTERMODAL CENTER (MIC)

Providing a strategic planning and development based example is necessary since the Warwick Intermodal Train Station is still in its planning phase. The city of Miami has garnered political and community support as well as secured funding for the project, which has allowed them to initiate the initial development phases of the project. There were and still are many hurdles that Miami had to overcome or are still dealing with that are aligned with the Warwick Intermodal Stations planning issues. In order to truly understand the scope of the MIC project it is essential to have background information about the city itself. Miami is a city located in southeast Florida in Miami-Dade County on the Miami River, between the Florida Everglades and the Atlantic Ocean, in the United States. It is the county seat and largest city in Miami-Dade County (est. 2000 population: 2,253,362). As of the 2000 census, the city proper had a total population of 362,470. The area of the city is 55.3 square miles (19.3 of which is water) (http://en.wikipedia.org/wiki/Miami,_Florida 2004).

Miami's government structure is composed of 5 members of a council, which is headed by a city manager. Each council member presides over a particular section of the city. The small amount of representation allows for consensus in the policy-making process.

Although the city itself is not large, the metropolis of Miami comprises many small surrounding towns, cities, and unincorporated areas, which effectively forms the Metropolitan Miami-Dade County consolidated city-county. Municipalities in the conurbation include Miami Beach, Bal Harbour, North Bay Village, Sunny Isles, North Miami Beach, Aventura, North Miami, Opa-Locka, Carol City, Miami Lakes, Hialeah, Medley, Miami Springs, Westchester, West Miami, Kendall, Pinecrest, Key Biscayne, Coconut Grove, Coral Gables, Islandia, Sweetwater, Homestead, and Miami Shores. As of the census of 2000, there are 362,470 people, 134,198 households, and 83,336 families residing in the city.
The population density is 3,923.5/km (10,160.9/mi). There are 148,388 housing units at an average density of 1,606.2/km (4,159.7/mi). The racial makeup of the city is 66.62% White, 22.31% African American, 0.22% Native American, 0.66% Asian, 0.04% Pacific Islander, 5.42% from other races, and 4.74% from two or more races. 65.76% of the population is Hispanic or Latino of any race (http://en.wikipedia.org/wiki/Miami,_Florida 2004).

Miami International Airport (MIA) is one of the busiest international airports in the world, serving over 35 million passengers every year. It is the headquarters for American Airlines, Delta Air Lines, and is served by many international carriers. The main seaport, the Port of Miami, is the largest cruise ship port in the world, serving over 18 million passengers per year. Additionally, the port is one of the busiest cargo ports, importing nearly ten million tons of cargo annually. Miami is also connected to Amtrak’s Atlantic Coast services. Local public transportation includes Miami’s Metrorail and the Metrorail, a rapid transit system (both operated by Miami-Dade Transit). Furthermore, Tri-Rail, which is a commuter rail, connects the major cities and airports of the South Florida metropolitan area (http://en.wikipedia.org/wiki/Miami,_Florida 2004).

Even though the city of Miami has public transit it is primarily an auto-oriented city. The city’s wide, long boulevards and rounded curbs that allow for a wide turning radius indicate this. This causes the city to accommodate to the automobile, which as a result creates urban sprawl. The aforementioned sprawl contributes to varying densities and an extensive landscape, which are not as conducive to pedestrian use. These are prime indicators that the city of Miami is not a pedestrian-oriented environment.

There are two crucial reasons behind building an MIC in Miami. One is to reduce the current congestion on the streets, highways, and freeways in and around the city. Another is to create a more pedestrian-friendly environment. In order to create an environment that is more inviting to pedestrians providing adequate and efficient public transportation is essential. Attempting to provide public transportation with no actual transportation hub is very difficult. Therefore the proposed MIC indicates the beginning of change in the city’s overall design by including elements that would contribute to transit oriented development. In fact one of the first steps to building this project was rezoning the project area as a TODD (Transit Oriented Development District). The Miami Intermodal Center (MIC), a $2.25 billion project located just east of Miami-Dade International Airport (MIA), is envisioned as a consolidated transfer center for passengers using the airport, intercity and commuter trains, rapid transit, local and intercity buses, and cruise ships in the Port of Miami. The project is being developed by the Florida Department of Transportation (FDOT) and the Miami-Dade Aviation Department, with cooperation from the Miami-Dade Expressway Authority, Miami-Dade Transit, Amtrak, and various rental car agencies serving the airport. The MIC is the centerpiece of a series of projects, including a consolidated rental car facility for MIA, a people mover connection to the airport, and a number of road access improvements around the airport (www.micdot.com 2004).

The MIC “core” will include 1.45 million square feet of developable space, with longer range plans calling for 500,000 square feet of office space, 600 hotel rooms, 350,000 square feet of retail and
entertainment space, and 1,400 parking spaces. Parcels surrounding the MIC core will allow over 12 million square feet of associated development governed by a new zoning overlay. Rental car fees will finance the construction of the rental car facility, and airport user fees will pay for the construction of the automated people mover connecting the MIC to the airport terminals. Airport terminal roadways are faced with increasing congestion due to growth in air travel. Surrounding highways used to access the airport are clogged with traffic, in part due to the airport's location in the center of the Miami metropolitan area, the nation's third most-congested automobile throughway. In addition to new ramps and upgraded interchanges on airport access roads, an improved link between two major east-west highways, SR 836 and SR 112, will separate through traffic from local airport traffic in the vicinity of the airport entrance (www.micdot.com 2004).

Approximately 80 percent of the passengers destined for nearby cruise terminals arrive at MIA and travel from the airport to the seaport by bus. Further adding to congestion on airport roadways, the 28 on-airport rental car companies each use courtesy vans to shuttle customers between the airport terminals and their respective lots. The MIC core will provide enhanced bus service areas for cruise ship passengers, and a consolidated rental car facility with an automated people mover connecting to the terminals will eliminate the need for rental car shuttles (www.micdot.com 2004).

The large overall size of the MIC program prevented funding the entire project in a short period of time on a pay-as-you-go basis. The State of Florida, Miami-Dade County Metropolitan Planning Organization (MPO), and Miami-Dade County had committed funding for Phase 1 of the overall project; however, the funds were spread over 15 years. These cash flow constraints would have caused the Phase 1 elements to be spread over 10 or more years resulting in significantly higher costs for right-of-way acquisition and construction. In addition, this would have resulted in the disruption of traffic in the area for an extended period of time (www.micdot.com 2004).
Financing

The first and foremost lesson learned about the MIC project is its large, complex scope and budget. Since there is such a complex and diverse assembly of funding sources being provided to construct the project there are many agencies that the FDOT has to work in conjunction with. The entire project is comprised of a total of 37 separate projects. It also requires over 141-acres of land.

Figure 8. Miami Intermodal Center Funding Sources

(Information Obtained From MIC.DOT.COM)

The Transportation Infrastructure and Finance Act (TIFIA) has provided Miami with the impetus to complete the first phase of the MIC project. Through the award of two direct loans from TIFIA in 1999 totaling $433 million, MIC will be able to accelerate right-of-way acquisition and construction of the MIC core saving over $100 million in overall project cost. A $269 million TIFIA loan secured by state motor fuel tax revenues will enable the fast-tracked acquisition of right-of-way and initiation of work on the MIC core. The second TIFIA loan, for $164 million, will be used to finance the consolidated rental car facility (RCF), and will be secured by rental car fees (Jeffrey Parker & Associates, 2004).

There are also several other major funding sources for the MIC project. For Phase 1, the MIC will receive approximately $165 million in FHWA grants, over $386 million of FDOT state funds, and a $25 million Florida State Infrastructure Bank (SIB) loan. The Miami-Dade Expressway Authority is providing $87 million in toll-backed funding and has received $18 million from Florida's SIB for the SR 836/SR 112 connector. The Miami-Dade Aviation Department will fund the $400 million MIA-MIC Connector with airport user fees (www.micdot.com 2004).
Rental Car Facility

Since the Rental Car Facility (RCF) is such an integral component of the MIC at the Miami International Airport it deserved its own section. The section was created in order to delve into issues the proposed MIC is faced with when developing this aspect of the project. Car rental agencies were reluctant to move from their current locales to the proposed MIC. With the move to the MIC they had to consider the costs of reducing Chlorofluorocarbon (CFC) levels at the rental car facility. This came as a blow since 9/11, which caused many car rental facilities to experience financial woes. Miami’s solution was to consolidate 14 of the 20 companies into one car rental facility. The facility would be attached to an 8,000-space parking lot. This was no easy task since there had to be consensus amongst a diverse group of business entities. They had to arrange financing for tenants with a weak market, shrinking balance sheets and facing industry consolidation. The role of smaller car companies also became an issue. The sizing, aesthetics, and space allocation for each company’s customer service area varied so a consensus had to be reached as to how the RCF would be designed. The remainder of the companies would have their customers bussed from the airport to their perspective off-site locations (Jeffrey Parker & Associates, 2004).

Design and Planning

The design and planning of the proposed MIC was no small feat. There are a total of 37 projects being constructed in order to complete the MIC. The projects included in Phase I on the MIC project are as follows: Right of Way, Environmental Cleanup, RCF, MIC Core (includes tri-rail connections, courtesy vehicles, and taxis), MIA/MIC Connector, Road and Highway Improvements (Route 836/112 connector). The design and building of the people mover was a major issue. The idea for one was actually scrapped at one point during the project’s development phase. This would have been a major blow to the MIC since one of its primary purposes was to reduce traffic, which is the primary purpose of the people mover. They are still also dealing with developers on what type of People Mover will be built in the MIC and how and where it will be placed in conjunction with the airport.

Competition

The MIA has been dealing with the issue of competition due to the fact that the Fort Lauderdale-Hollywood International Airport (FLL) Airport provides the alternative option of lower cost of tickets by carriers. Since the FLL airport is so close in proximity and serves a similar demographic this has been an impending problem for the MIA. Future expansion and improvement of their current facilities is one way to alleviate the threat of competition from other airports in the South Florida Region.
Transportation Related Issues

Rail

There were three rail lines that would be provided with connection to the proposed MIC that were initially proposed for this project. The proposed East-West light rail was scratched during one of the design phases. This element could still be re-integrated into the current project but for now it is considered a loss.

The Tri-Rail is another proposed connection. Tri-Rail is a commuter rail line, which extends 72 miles from Miami (at a station near the airport) to Magnolia Park (just north of West Palm Beach), with stations in intermediate locations such as Hollywood, Fort Lauderdale, Pompano Beach, Boca Raton, etc. The name refers to the three counties through which the line passes: Miami-Dade, Broward and Palm Beach. The South Florida Regional Transportation Authority, an agency of the State of Florida, operates it. Service began in 1989, as an alternative to the I-95 expressway during its reconstruction. The proposed connection will allow for people within the region served by the Tri-Rail to have direct access to the MIA via the MIC Core. Since there is already a connection nearby the proposed MIC site, it is just a matter of realigning the location of the current stop so that it connects directly to the MIC.

The Metrorail is Miami-Dade County’s 22-mile, elevated rapid transit system that runs from Kendall through South Miami, Coral Gables, and downtown Miami; to the Civic Center/Jackson Memorial Hospital area; and to Browntown, Liberty City, Hialeah, and Medley in northwest Miami-Dade, with connections to Broward and Palm Beach counties at the Tri-Rail/Metrorail transfer station (http://www.co.miami-dade.fl.us/transit/ 2004).

The 22 accessible Metrorail stations are about one-mile apart, providing easy access for bus riders, pedestrians, and passengers being dropped off and picked up. Parking is available at 19 Metrorail stations, including the new Palmetto Station. By providing a connection from the Tri-rail to the Metrorail, the MIC will grant access to all of these stations throughout Miami and parking for those who decide to use the rail line (http://www.co.miami-dade.fl.us/transit/ 2004).

Bus

Currently buses are the only access via public transport to airport. A goal of the new MIC is to directly connect rail transit lines to the airport rather than completely relying on the current bussing system to transport rail passengers from their perspective stations to the airport. This will alleviate roadway congestion as well.
Roadways

A major part of the proposed design for Phase I of the project is reducing congestion on Route 836 by constructing a 112/836 connector. By building a new connection, the current road network will be better integrated.

Economic Development and Land Acquisition

Eminent domain was used to acquire 70 of the 141 acres required for this project. The majority of this land was designated a blighted area. The remainder of the required land was purchased at market price or better. The purpose of purchasing the land surrounding the site was to allow for overall redevelopment of the area surrounding the airport. This could foster future opportunities for pedestrian-oriented redevelopment in the area. The proposed development for the site surrounding the airport includes hotels, luxury apartments, and shopping venues (Jeffrey Parker & Associates, 2004).

Public Participation

Public participation was identified as an integral component of this project's success. The consulting firm working on the project, Cambridge Systems put together a project team and designed a method in which to gather public opinion on the project. The group also worked in conjunction with SITAC (State Intermodal Transportation Committee) to assign the varying responsibilities of the project to capable professionals with a proper technical background. The organizational charts are located on the MICDOT website (www.micdot.com)

Marketing

At this point the MIC has its own website (www.micdot.com). It provides information about the project's construction progress, components and major players. There is also a connection to public transit options on the MIA website.

Hopefully, when implementing planning procedures in the development phase of the Warwick Intermodal Station project the parties involved can look to Miami's Intermodal Center as a prime example.
NEWARK LIBERTY INTERNATIONAL AIRPORT

Newark International Airport is located in Essex and Union Counties between the New Jersey Turnpike and U.S. Routes 1 and 9 and I-78. The airport began operating on October 1, 1928 as the regions first major airport. The initial airport consisted of 68 acres of marshland and it quickly became the world’s busiest commercial airport. Today, Newark airport consists of 2,027 acres. The airport is operated by The Port Authority of New York and New Jersey under a lease with the City of Newark (PANYNJ, 2004).

In 1999, terminal A went through an upgrade which included the relocation of a variety of airlines’ ticket counters and gates; additional ticket counters; new and improved food, beverages, and retail shops; a new baggage handling system; new and refurbished airline passenger lounges; new lighting, and improvements to basic infrastructure of the terminal (EWR, 2004).

In 1999 a multi-million dollar project for the modernization of the terminal began. This project included the replacement of escalators, new revolving doors, three freight-sized elevators to better accommodate airport customers with luggage and baggage carts to all levels of the terminal, and the installation of glass and stainless steel finishes (EWR, 2004). In 1998, Continental launched its Global Gateway Project. This $800 million project added the new 325,000 square-foot C-3 concourse, with 12 wide-body gates; a new baggage handling facility; a ramp control tower to efficiently move the airline’s traffic; and a new air side corridor. Continental doubled curbside capacity at terminal C by creating two levels for vehicles dropping off departing passengers, and new expanded arrivals area at grade level (EWR, 2004).

Figure 9. Newark Liberty International Airport Concourse Layout
Air-Train Newark

Air Train Newark was built, managed and maintained by The Port Authority of New York and New Jersey. The construction of Air Train Newark began in May of 1997 with the expansion of the existing on-airport monorail system. Air Train Newark began operating on October 21, 2001 completing the connection between Air Train Service, New Jersey Transit and Amtrak. The monorail is extended from on-airport station E to the existing rail corridor about one mile away. This allows connections to New Jersey Transit and Amtrak trains that operate in the New England Corridor. The air-train provides a fast, convenient and comfortable experience to the people using the airport. Since its opening, millions of people have used Air Train Newark to navigate their way to and from the airport. Today, over 30,000 passengers use Air Train Newark, to and from the airport per day (EWR, 2004).

Figure 10. Air-Train Newark System

Funding of Air-Train Newark

The total project cost approximately $415 million was funded via user fees and Port Authority capital funds (EWR, 2004). User fees are generated through a Passenger Facility Charge (PFC) program under which a $3 surcharge is collected for every departing passenger's ticket. No federal, state or local tax dollars were used to fund the project.
Figure 11. Air Train Newark

Benefits Derived from Air-Train Newark

- Reduction in trip time between long term parking lots D and E and Terminals A, B, and C;
- Interconnecting passenger travel experience is more convenient;
- Better service for car rental patrons;
- Improved traffic flow at the terminal frontages;
- Enhancement of the regional environment and economy; and
- High level link with the Northeast Corridor train system

Other Forms of Transportation

When one is traveling to and from Newark International Airport they can use their car. Other public transportation, which is linked to the airport outside of Air Train Newark are buses, shuttles, limousines, taxis and car rentals.
New York and New Jersey Port Authority Organizational Model

The New York and New Jersey Port Authority operate and maintains Newark Liberty International Airport. It was formed in 1921 after many disputes over who had control over the Port Area. It was established to administer the common harbor interests of New York and New Jersey. The NY and NJ Port Authority has governance, over the “Port District”, a bi-state region of about 1,500 square miles centered on the Statue of Liberty. The Port Authority is responsible for managing and maintaining the bridges, tunnels, bus terminals, airports and seaports. The Port Authority governmental body is based on the Port of London model, which at the time was the only public authority of its kind in the world.

The New York and New Jersey Port Authority is financially self-supporting agency. It receives no tax revenues from any state or local jurisdiction and has no power to tax. The Board of Commissioners are appointed positions by the governor. The Port Authority generates its money from facility users, tolls, fees and rents. The board meetings held by the Port Authority are open to the public (PANYNJ, 2004).

Lesson’s Learned

Air Train Newark provides a relatively seamless transit network however there are still lessons to be learned (Cox and Coogan, 2004). The following is a list of things, which were not taken into account but should have been while designing and operating Air Train Newark.

Lack of Integration of Information

While there were screens at the airport and at the train station often times they were not synchronized, which led to confusion and delays among the travelers. Lack of integration of fare collection media to pay for the full multi-segment trip. There was much confusion by both the passengers and the conductors on how to use the one ticket option. If incorporated both the passenger, conductor and driver must be educated on how to use this option.

Customer Service, Operations and Technical Staff from all the operating agencies were not involved in design process. The customer service, operations and technical staff are the ultimate service providers to the passenger. They have a lot of insight into how a train station should be designed in order to serve the customer. Their input is very crucial.
Train Stations Are Not Passenger Friendly

The passengers interviewed at the stations mentioned that while the waiting areas and passenger amenities were provided for the traveler often times they were very uncomfortable. The environment of the train stations was described as relatively bleak in comparison with the level of amenity associated with the airport terminal.
Baltimore/Washington International Airport

Baltimore/Washington International Airport (BWI) is located in Baltimore, Maryland. The area of the airport consists of 3,596 acres. It is operated by the Maryland Aviation Administration and The Maryland Department of Transportation. Within the airport there are four concourses (BWI, 2004).

One of the key issues which was learned from Baltimore/Washington International Airport was that the shuttle service which connects the airport to the train station is not seamless.

In the case of Baltimore there is a shuttle service, which connects the train station to the airport. However, passengers often describe it as a very confusing transportation network to figure out.
PORTLAND INTERNATIONAL AIRPORT

Portland, Oregon provides an attractive model of a truly train to plane connection in the United States. The Portland model is relevant to the development and design of the Warwick Intermodal Train Station for the following reasons:

- The Portland train to plane connection was recently constructed, with the light rail extension line opening in September 2001;
- The train to plane connection was built to help mitigate the increasing number of air passengers at the Portland International Airport (PDX);
- This passenger increase created additional challenges to the airport area in terms of auto congestion in and around the terminal and on the area highways and local roads, as well as the available space for short and long-term parking;
- The cost sharing public / private partnership to construct the light rail extension line; and
- The maximizing of ridership, the airport rail line was designed to offer a high level of convenience to passengers.

Context

The 2003 population of the Portland metro area is 2,009,350. The population of the City of Portland is 545,140 (2003 estimate: Center for Population Research & Census). From 1990–2003, the City of Portland’s population increased by 107,821 people, a 25 percent increase. Oregon’s population is projected to grow by about 27 percent over the next 20 years. In 2002, the land area of the Portland metropolitan area totaled 462.2 square miles, while the City of Portland covered 130 square miles. Of Portland’s land area, 15 percent (12,591 acres) is devoted to public parkland and open space; including Forest Park, which at 5,124 acres and over 74 miles of hiking, bicycling and equestrian trails is the largest urban wilderness area within a U.S. city's boundaries (Portland Development Commission, 2004).

Government

The City of Portland has the last remaining Commission form of government among large cities in the United States. The Mayor, four Commissioners and the Auditor comprise the City’s six elected officials. The Mayor and the Commissioners together make up the City Council. The commission form of government differs from most other municipal governments in that its members have legislative, administrative and quasi-judicial powers.
Portland International Airport

Portland, Oregon is fortunate to have a light rail system, the Metropolitan Area Express (MAX) that services the city and its metropolitan area. In 2001, the MAX Red Line was extended to the Portland International Airport thereby making it able to take passengers directly to the airport terminal. Portland International Airport has the only true “train to the plane” connection on the West Coast of the United States (Oliver, 2001).

Portland, Oregon International Airport (PDX) has experienced steady growth for many decades, making it the nation’s fastest growing airport in the late 1990s. The number of air travelers at PDX more than doubled from 6 million in 1990 to 14 million in 2000. By 2020 it is projected that there will be 29 million travelers at PDX. Additional access was needed to handle the growing traffic congestion at and around the airport (TriMet, 2004).

Prior to the September 2001 completion of the MAX Red Line extension, Portland’s public bus service carried a limited number of travelers to the airport, despite its frequent service between the airport terminal and downtown Portland. Light rail service to PDX had been part of the regional and airport master plans since the mid 1980s. The design of Interstate 205 included a future transit way in the median, including a tunnel beneath the northbound lanes to access the median. While a preliminary light rail alignment to the airport terminal was established in the late 1980s, regional plans placed development closer to 2010.
Airport Terminal Max Line

To maximize ridership, the airport line offers the highest level of convenience to passengers. The MAX airport station is sited just outside the south entry to the airport terminal. The station is less than 200 feet from the PDX baggage claim and offers one of the most convenient airport stations anywhere (Portland International Airport, 2004).

Figure 12. PDX Terminal and Light Rail Max Layout
The track way approaching the MAX airport station was designed to be temporary and to be relocated in necessary for future terminal expansion. The temporary section was built as a single track to fit into the available right-of-way. The MAX rail car can enter the two-track terminal station without the need for crossover tracks. In addition, the terminal platform is wedge-shaped, with its widest end at the terminal doors and then narrows to fit the geometry of the track switch at the end of the platform.

Car Rental Facility

The Rental Car Center is located in the parking garage located directly across from the airport terminal. Hertz, Avis, Enterprise, Budget and Dollar have rental car centers located in this garage. Alamo/National and Thrifty have kiosks located just outside the Rental Car Center.
Financing and Partnerships

In 1997 Bechtel Enterprises, an international engineering, construction and project management firm, approached the region with a proposal to design and construct a MAX extension to the airport under a public/private partnership. The partnership resulted in Bechtel providing a quarter of the project's funding and was contracted to build the light rail extension. In return, Bechtel received development rights on a 120-acre mixed-use commercial site located near the entrance to the airport. This cost sharing partnership meant no federal appropriations, state general funds, or additional property taxes were needed to build the extension of the MAX Red Line.

Figure 14. Max Funding Sources

- $23.8 million
  City of Portland
- $28.2 million
  Bechtel Enterprises
- $45.5 million
  TriMet
- $28.3 million
  Port of Portland

Total: $125 million
Shared Alignment

The airport MAX Red Line shares the light rail tracks with MAX Blue Line between downtown Portland and the Gateway Transit Center, which were already existed prior to the airport extension. For riders in this corridor, a train runs every 3 to 5 minutes during peak ridership hours. Due to increasing MAX ridership, the shared alignment was extended west on the Blue Line to Beaverton Transit Center in September 2003.

Figure 15. Portland Rail Lines

Ridership

During the first 10 months of operation, starting in September 2001, the MAX Red Line has had 3.14 million riders arrive or depart from the airport station. The total number of travelers to date is 8.5 million, which is equal to 5.5 riders for every resident in the Portland metropolitan area. The weekday ridership for the PDX MAX Station totals 2,600 people daily, which is more than three times the former bus ridership numbers at PDX.

Travel Frequency

The MAX Red Line runs every 15 minutes to and from the PDX airport station. The Line runs from 5:00 A.M. to 11:30 P.M. seven days a week. Traveling from downtown Portland (Pioneer Square) to the PDX airport terminal takes 38 minutes on the MAX.
ZURICH INTERNATIONAL AIRPORT

Zurich International Airport (ZRH) has been selected for this study to illustrate lessons learned related to transportation associations or partnerships that create a seamless and fully integrated rail/air service experience for passengers.

Context

ZRH, also called Kloten International Airport, is located in Kloten, a canton of Zurich, Switzerland; eight miles north of the city center of Zurich. The greater metropolitan area of Zurich contains more than 1,000,000 people and serves as a major cultural and economic center for the country of Switzerland and Europe as a whole. ZRH is Switzerland's largest international flight gateway and hub to Swiss International Airlines. The area covered by ZRH is shown in the larger context of the urban area of Zurich in orange below in Map 6.

Map 6. ZRH Locus Map

ZRH is marketed as the central traffic junction in Switzerland. ZRH has its own railway station that is fully integrated into the regional bus, train and streetcar network—with combined tickets available for all modes of transportation. This airport railway station is one of the largest stations in Switzerland and is serviced by six trains that operate each hour between Zurich’s main station and ZRH's intermodal railway station located beneath terminal B and Parking B as shown in Figure 16.
ZRH station is served by a number of intercity and suburban train connections making it a hub in the national rail network. Additionally, there is also an extensive regional bus network serving the airport.

Transportation Partnerships

The train station at ZRH is operated by the Zürcher Verkehrsverbund or the Zurich Transport Federation (ZVV). ZVV creates an organization that links all public transit companies in the Canton of Zurich. Thus, the ZVV functions as a regional transport association - with the purpose of coordinating schedules and transfers; creating a seamless transportation system. The ZVV includes a number of separate transit providers and involves complex fare allocation agreements (MIT, 2000).

The ZVV has separated policy and rate-making functions from operating functions allowing the metropolitan area of Zurich to provide a number of transit services and options. The organizational opportunities created by the ZVV equate to a dense route network of frequent customer-centric public transport services equating to regular intervals and short waiting times for connections. ZRH benefits from this transport association approach and is able to provide quality services to those accessing air transit via public transit.
Rail Check-In

Airline passengers may check in at any of the 23 rail stations in Switzerland. This service directly addresses luggage issues commonly encountered by passengers who use transit to access airport travel. The majority of airlines servicing ZRH permit passengers to make seat reservations, check baggage and pick-up boarding passes at the train station remote baggage counters, reducing time at the check in counter- but perhaps more importantly encouraging those traveling with luggage to make use of public transit to access the airport. This remote check-in must be done 24 hours prior to departure time (Zurich Airport, 2004).

Fly-Rail

Passengers who do not wish to depart from one of the 23 rail stations with remote check-in can choose the alternate Fly-Rail Baggage Service, which allows the checking of baggage at one of 102 additional Swiss rail stations. With the Fly-Rail Baggage service, passengers can check their bags in at the rail station up to 24-hours before their flight. This checked baggage can travel via the airports of: Zurich, Geneva and Basel to any final destination worldwide. Likewise, arriving passengers can check their bags from the originating airport straight through to a Swiss railway station, allowing passengers from any airport in the world and with any airline (via one of the aforementioned airports), to collect there baggage at any rail station in Switzerland upon arrival (Zurich Airport, 2004).

Although the passenger and transit friendly services centered on remote check-in may seem impractical in light of current security concerns there are several important points to take from their success at ZRH. The first is a high degree of cooperation and coordination is necessary to accomplish the Rail and Fly-Rail Services, their popularity is proof that they are deemed practical and useful to airline passengers. Undoubtedly the success of these services is aided by an administration from a central authority- the Zurich Transport Federation which could be considered a regional transport association. The second is a very close relationship between various modes of transit; strategic intersection of ZRH at an important transport node benefits the entire transit system of Switzerland. There is great value in a placing an airport with intermodal capabilities in close relationship with a regional or even citywide rail system. Although a more intimate linkage between T.F. Green, the MBTA, AMTRAK and the associated regional bus lines may not be on the menu currently it should be examined and even considered a prospect.
FRANKFURT/MAIN INTERNATIONAL AIRPORT

Frankfurt/Main International (FRA) and its associated intermodal train station have been selected for this section to illustrate lessons learned related to the successful expansion of an intermodal airport facility that is intimately linked to the fabric of the surrounding urban area. FRA, realizing the important relationship between any growth and negative externalities that may be considered a function of this growth, has taken a proactive approach to several issues that could have become major conflicts with surrounding uses.

For airports and their associated intermodal facilities growth related externalities and the issues they raise are not unique; those selected for examination in this study do have specific relevance for the WITS Project. They include:

Air/surface vehicle traffic congestion;

Air quality degradation; and

Noise pollution.

Context

FRA is a leading Central European hub for global air transportation. FRA is the largest passenger and cargo gateway in Europe, and ranks seventh worldwide as a passenger and cargo gateway. FRA is also Germany’s busiest airport, on peak days more than 150,000 passengers passing through the FRA on the way to destinations throughout Germany, Eastern and Western Europe, and abroad. Of the 46 million passengers that passed through FRA in 1999, 44% were business travelers with transfers accounting for 49%. Of departing passengers, 18.3% traveled to domestic destinations and 81.7% to international destinations (Mahmassani et al, 2001).
FRA is linked intimately to the larger city context of an important European city with a population of more than 600,000. Frankfurt has been a vital transport node since the Middle Ages. With its strategic location and superior network of ocean, river and land connections, Frankfurt has traditionally served as the port of entry to the Old World and a prosperous center of trade. The area covered by FRA is shown in the larger context of the urban area of Frankfurt in orange in Map 7.

Map 7. FRA Locus Map

Growth as a Function of the Intermodal Focus

Fraport AG—the ownership/management entity for FRA considers itself a leader in the development of intermodal travel concepts, which involve integrating air, rail and road transportation. With the continued expansion of the European high-speed rail network, FRA will be considered one of the best examples of integrated transportation centers in Europe, and the world. For FRA the ultimate goal is to reach integration between air and rail systems creating a single easy to use service convenient to all travelers (http://www.fraport.com, 2004).

Services and components related to the intermodal character of FRA including: the Sky Line people mover, spatial relationship with the city bus station, and the regional/long distance train station are shown in context below in Figure 17.
The successes of FRA illustrate the principle that airports with intermodal capabilities enjoy a competitive advantage over their competitors; primarily due to additional traffic generated by intermodality. The Integration of Frankfurt Airport into the German high-speed rail network has expanded the airport's service area, and raised the number of passengers served by the airport; this means growth of both the airport and its associated intermodal facilities.
Marketing

The intermodal focus of FRA has been successful and air traffic has grown continuously over the past decades for FRA. Current FRA forecasts predict that this growth trend will not only continue, but cause the airport to meet its capacity limits by 2005. The growth of demand for flights based on FRA’s projections over time in relation to existing FRA capacity is illustrated in Figure 18 (http://www.fraport.com, 2004).

Figure 18. FRA Flight Demand Projections

One of the major factors driving the growth of FRA is focused on competition with other major European Hubs. Recognizing that fierce business competition often pits international cities against one another, Frankfurt has benefited from a sense of boosterism shared by a number of stakeholders.

Frankfurt’s main competitors are the other major European airports which also serve as hubs. These include, primarily, Amsterdam and the airport systems of Paris and London. All of these competitors already offer a declared hourly movement rate higher than FRA’s (http://www.fraport.com, 2004). The airport has made the arguable case that the larger city of Frankfurt’s fortunes are linked with those of the airport and its associated intermodal facilities.
Planning for and Managing Externalities

Planning: A Neutral Process to Address the Goals of Multiple Stakeholders
FRA plans to meet the forecast demand by significantly developing capacities at FRA key projects
including: the expansion of the runway system and passenger facilities, the construction of new maintenance
facilities, and the continuous development of technical systems which provide for optimization
of air and rail traffic flows through FRA.

Public discussions centered on the need for airport expansion were initiated in the 1990s. In July
1998, the Hesse state government initiated a neutral mediation process to examine the expansion of
Frankfurt Airport with the formation of inclusive Mediation Group made up of all stakeholders. The
Mediation Group included representatives of the neighboring communities, the "Offenbach Air Traffic
Noise Association" citizens’ action committee, affected federal and state ministries, trade associations,
and trade unions. Also represented were Fraport AG, Deutsche Lufthansa, Deutsche Flugsicherung
GmbH (DFS - German Air Navigation Services) and BARIG (Board of Airline Representatives
in Germany). The group was jointly chaired by three mediators: Dr. Frank Niethammer, president
of the Frankfurt Chamber of Commerce and Industry; Prof. Kurt Oeser, a Protestant minister; and
Prof. Klaus Hänsch, social democratic member of the European Parliament. (http://www.fraport.com,
2004).

Plan Development: Building Lasting Partnerships

On January 2000, the Mediation Group issued its final report supporting expansion of Frankfurt Air-
port’s runway system provided certain conditions. The report included recommendations and propos-
als consisting of “five inseparably linked components” including: an optimization of the existing sys-
tem; a capacity increase through expansion; a ban on nighttime flights between 11 p.m. and 5 a.m.
(once the new runway goes into operation); an anti-noise pact (a binding program for reducing noise
levels) and a Regional Forum for Dialog (to continue and intensify the dialog initiated by the Mediation
Group).

During the mediation process 20 different options for expanding FRA were examined. In the final
report of the Mediation Group, three options were recommended for further review: the northwest
runway option (for landing only); the northeast runway option (for landing only) and the south runway
option (for landing and takeoff)
The three options were examined and compared during the regional planning procedure, which was concluded in June 2002 with the presentation of the Regional Planning Evaluation Report. This concluding report found the northwest landing runway option to be the best solution for expanding capacity and for meeting regional planning objectives. The planned northwest runway expansion is depicted in orange in Map 8 (http://www.fraport.com, 2004).

Map 8. FRA Northwest Runway Expansion

Plan Implementation

The approval process for airport expansion is currently entering an important second phase: The purpose of the zoning procedure is to obtain a zoning permit which establishes the construction right for the runway expansion. As part of the zoning procedure, the environmental compatibility of the runway expansion will be studied again in depth, taking into account the first environmental evaluation made during earlier regional planning procedures. Initiation of a zoning procedure formally requires a zoning application. This will be submitted by Fraport AG in its capacity as owner and developer of FRA. Together with this application, Fraport AG will state the reasons for the planned expansion projects. Key issues brought up during the mediation process were considered. Recognizing the issue of noise pollution as a major sticking point from the Mediation Group recommendations, Fraport AG will also file a request to restrict scheduled flight operations at Frankfurt Airport between 11:00 PM and 5:00 am when the new runway opens. Based on this request and considering all other interests, the responsible aviation authority of the state of Hesse could then issue a ban on nighttime flights at Frankfurt Airport (http://www.fraport.com, 2004).
Managing Externalities

Air and Surface Traffic Congestion are two serious negative externalities associated with airport growth identified by the neutral Mediation Group. FRA hopes to address these issues with increased reliance on air to rail modal shifts to manage increased air and surface traffic through a reduction in short haul trips using both air and automobile modes. Over 50 percent of the FRA's passengers are transfers who change planes there. The remaining are either departing, or arriving non-transfer passengers who travel to or from FRA by public transportation or private vehicle. For optimizing these traffic streams in terms of environmental protection Frankfurt Airport is banking on a strong intermodal concept - the intelligent integration of rail, road and air transportation systems. With the intermodal transportation concept, use of rail transportation is encouraged on short-haul routes as an alternative to flying. Increased efficiency, choice and ease of access with regards to rail use is hoped to reduce both short-haul flight services, and short-haul automobile traffic (Mahmassani et al, 2001).

FRA also hopes to manage Surface Vehicle Traffic associated with those passengers using either rail, or air by encouraging public transit use. With the opening of FRA's Long-distance Train Station in May 1999 and the ensuing shorter travel times, the modal split of ground traffic to and from the airport has significantly shifted away from private vehicle to public transportation. Passengers, visitors and employees of Frankfurt Airport increasingly use public transportation reducing surface traffic associated with the airport and the intermodal facilities. To encourage increasing use of public transportation by FRA employees, the company provides a free "Job Ticket" and employees make use of public transit free of charge (http://www.fraport.com, 2004).

FRA makes use of a computer-supported Transport Efficiency Support System (TESS). This system ensures optimum utilization of service roads, vehicles and operating times, to reduce vehicle waiting and idling times. Efficiency in service vehicular traffic flow in turn, eases roadway demand on passenger and citizen-centric modes of transport including personal vehicles and bus transport (http://www.fraport.com, 2004).

Air Quality

It is recognized that aircraft produce air contaminants created as a result of the combustion of fuel. Exhaust emissions from aircraft engines consist primarily of injected air (90%), carbon dioxide (about 7%) and water vapor (about 3%). In addition, emissions contain less than one percent of pollutants such as carbon monoxide, nitrogen oxides, sulfur dioxide, hydrocarbons and soot in total.
Although air transport at FRA is in a process of growth, there are some positive developments to be observed in this area. Since 1970, fuel consumption has been reduced by 50% thanks to the use of environment-friendly engines. In recent years emissions of carbon monoxide and hydrocarbons have been drastically reduced. A visual description of the effects of these environment-friendly engines can be seen with the annual emission levels (tons per year) at Frankfurt Airport in 1979, 1988 and 1996 (ground traffic up to an altitude of 1,000 ft., stationary sources) in Figure 19 (http://www.fraport.com, 2004).

**Figure 19. FRA Annual Emission Levels**

Currently, air pollution levels at Frankfurt Airport are lower than legally required, even with increased aircraft traffic. Air quality measurements which FRA completed in cooperation with the Hesse Environmental Office revealed that only in the immediate surroundings of the runways do local concentrations of air pollutants reach levels comparable to those in the city center of Frankfurt or along expressways. At the airport perimeter, concentrations are noticeably lower already. The results from the Air Quality study: comparing air pollution at FRA and in the vicinity are shown in Figure 20 (http://www.fraport.com, 2004).
FRA has taken a proactive approach to air quality monitoring and evaluation with extensive monitoring projects. To ensure an impartial view FRA has carried out environmental monitoring projects in cooperation with the German Federal Office for the Environment and the Hesse State Office for Environment and Geology. These projects included: measurement of emissions originating from aircraft engine testing and measurement of exhaust gases in the wake of taxiing aircraft. FRA is making a detailed inventory of noxious air emissions associated with airport operations. This inventory will serve as a basis for calculating the impact of emissions using computer-assisted diffusion models (http://www.fraport.com, 2004).

Since the middle of 2002 FRA has been operating two air quality monitoring stations at Frankfurt Airport. Measurements at these stations revealed that air traffic does not significantly impact local air quality levels. Emissions of road traffic on the automobile expressway to the east of the airport resulted in considerably higher concentrations of nitrogen oxides being measured at the station in this area than at a second station which was temporarily operated near western runway to measure the impact of departing aircraft on air quality. The extensive air quality monitoring program enacted by FRA is
vital to any evaluation of the airports progress, or lack thereof with regards to air quality. Additionally, rather than simply place blame on sources of air pollution, monitoring helps to establish responsibility and provide information for addressing serious environmental problems related to air quality. To improve its environmental reporting and public dialogue, FRA now also issues an annual air quality report; this transparency helps to maintain the trust of surrounding stakeholders, by keeping them informed (http://www.fraport.com, 2004).

Noise Pollution

Vehicles on the ground, in the water, or in the air are a source of noise; their growing intensity could be considered harmful to surrounding uses. The Mediation Group process indicated that noise pollution issues were a major concern for stakeholders, and FRA has paid close attention to noise pollution related issues.

Technological advances as well as aircraft improvements and better flight procedures have led to a considerable reduction in air noise emissions during the past few years. As a result, the equivalent continuous sound level Leq (4) determined in accordance with the German Aircraft Noise Act is now generally considerably lower than 20 years ago, despite the growing number of aircraft movements. Some of the results of FRA’s innovative approach to noise management can be seen in Figure 21. (http://www.fraport.com, 2004).
Monitoring

FRA operates one of the world’s most comprehensive noise and flight track monitoring systems. The system allows FRA to determine the footprint developing from aircraft noise emissions, the pollution they cause on the ground, and to find out when an aircraft does not observe the prescribed procedures or strays from the designated flight track. Continuously improved and refined since its inception in 1964, the measuring and monitoring system now comprises a total of 26 fixed monitoring stations, 2 mobile monitoring terminals and one noise measuring bus (http://www.fraport.com, 2004).
Abatement

FRA’s noise abatement efforts are another means of addressing noise issues. Continuous measurements of aircraft noise emissions since 1964 have created the basis for these efforts. In addition, FRA has developed noise reducing approach and takeoff procedures, introduced and continuously adjusted noise surcharges on landing fees, and launched noise insulation programs for buildings in particularly affected areas (http://www.fraport.com, 2004).

Differential Noise-related Charges

For type certification, ICAO - the International Civil Aviation Organization – classifies aircraft into different noise categories. These noise categories have been used by all German airports as a basis for introducing a differential pricing system for landing fees – including FRA. However, ICAO regulations have not been adapted to reflect the continuous development of new and increasingly quieter aircraft types (http://www.fraport.com, 2004).

Effective January 2001, Frankfurt Airport, therefore, was the first airport in Germany to introduce noise-based landing fees on the basis of data captured by its own aircraft noise-monitoring system. Under the new pricing system, aircraft have been assigned to seven different noise categories. The fees charged increase significantly from categories 1 to 7. The goal of this new system is to give the airlines a greater incentive to serve FRA with the quietest and most modern aircraft. Consistent with this goal, landing fees for aircraft of noise category 1 are now lower at daytime than during the night to discourage the use of loud aircraft, especially at night. Whenever possible, nighttime flights should be shifted to daytime hours (http://www.fraport.com, 2004).

Noise Quota System

A noise quota system has been used at Frankfurt Airport since the 2002 summer timetable as an active step toward reducing noise from nighttime flying between 12:00 am and 5:00 am. This quota system will be continued until the winter 2005/2006 timetable period. The quota count is related to the noise classification of aircraft into seven categories for charging purposes. For example, a flight movement in aircraft of noise category 1 uses up one point of the quota count allowance. The number of points doubles with each higher noise category; i.e., each movement in category 2 uses up 2 points, in category 3 as many as four points, and so on. Quota limits have been set on a seasonal basis; i.e., different quotas apply during the summer timetable than during the winter timetable. However, the permissible total number of points for all movements scheduled was reduced by 5 percent compared to the summer 2000 and winter 2000/2001 timetable periods. This reduction in seasonal quota counts is to ensure an improvement in the noise situation compared to the year 2000/2001 (http://www.fraport.com, 2004).
At the end of each timetable period the airport will review the situation and show the extent to which the quota count allowance has been used. If the quota count allowance has not been used in full the current season, one third of the unused points can be carried over. Any overrun corresponding reduces the quota for the next timetable period (http://www.fraport.com, 2004).

Minimum Noise Approach and Departure Routes

Approach and departure routes to and from Frankfurt Airport are defined by Deutsche Flugsicherung GmbH (German Air Navigation Services). The Noise Abatement Commission advises DFS on the task. In addition to ensuring flight safety, the goal of flight route planning is to minimize aircraft exposure of residential areas in the airport vicinity to the extent technically feasible. Departure routes in particular have been designed to avoid densely populated areas (http://www.fraport.com, 2004).

Deviations from the desired course may occur because of technical limitations to navigational accuracy. These limitations are determined by aircraft performance characteristics. Furthermore, there can be weather-related deviations. Each departure route a maximum permissible corridor around ideal flight track has been defined in accordance with international standards (http://www.fraport.com, 2004).

The Frankfurt Approach Procedure

FRA with Deutsche Lufthansa and a group of technical experts from the Noise Abatement Commission developed the "Frankfurt Procedure" specifically for aircraft in landing approach. Today an ICAO standard, this procedure has become standard practice at many airports around the world. The technical term is "low drag - low power". Under this approach procedure, extension of the landing flap and lowering of the undercarriage is delayed as long as possible. This reduces drag and requires less engine power to compensate for the drag. As a result noise impact on the ground is considerably reduced, both in terms of level and time. The Frankfurt Approach is now an international standard (http://www.fraport.com, 2004).
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The Warwick Intermodal Train Station Study

The applications of the lessons learned from FRA in dealing with some of the common negative externalities associated with growth/expansion of an urban airport/intermodal facility are promising. It is crucial to note that FRA has taken a proactive stance with regards to managing these negative externalities; bringing in stakeholders at the beginning of the planning process for the proposed expansion to forge partnerships and build trust.

The methods and approaches examined in this section are all taken within the context of an integrated airport/intermodal facility. Application of the examined lessons learned to T.F. Green and the Warwick Station Project suggest a close tie between the two may be beneficial. The airport is an asset to the community, state, region and especially the proposed intermodal station. Ideally the two entities (airport and station) would function symbiotically since their destinies are undeniably linked.
POLICY RECOMMENDATIONS

The ultimate products of this report are specific and informed policy recommendations focused on addressing key challenges facing the development of an intermodal transportation hub at T.F. Green Airport. The policy recommendations for development of the WITS vary, but the primary focus for many of these recommendations highlight the need for greater communication and collaboration between the various parties involved and affected by the development of the WITS.

The ten policy recommendations produced from this study are as follows:

1. Develop a stakeholder council to foster communication and collaboration among the various stakeholder groups.

2. Develop a regional transit organization to coordinate the scheduling and services of the various transit providers, in order to achieve a seamless integrated, passenger-oriented travel experience.

3. Conduct a marketing campaign with a website, a concise report explaining the project, and a sign at the construction site to raise public awareness and support for the project.

4. Phase the development of the WITS. All components should be included in the initial plan, but some components cannot be constructed until financing and stakeholder consensus have been achieved. Those components that are ready to proceed should be constructed first.

5. Accelerate land acquisition in the WSRD either by organizing the land owners to sell as a group or through a relocation and barter program.

6. Institute a progressive tax structure in the WSRD with a two-rate property tax that will encourage redevelopment.

7. Seek public-private partnerships in order to share the costs and benefits of the project among many parties.

8. Develop transit-oriented design for the WSRD with mixed-use, pedestrian-oriented development and uniform standards for signage, lighting, and landscaping.

9. Monitor environmental impacts of the facility, such as air quality and noise, to document and quantify the benefits of the project and improve the airport’s relationship with the community.

10. Create a physical connection between air and rail modes of travel. The people mover will
The city/local element will exist to ensure that local perspectives are represented in all issues related to the Warwick Intermodal Train Station and ensure conformity with comprehensive plan for the City of Warwick. The city/local element will also serve to bring stakeholders at this level together physically and ideologically to effectively work out issues to communicate with State and Federal and regional elements. It is suggested that the city/local element be headed by the Warwick Station Redevelopment Agency (WSRA), which would serve as representation and also as a facilitator for city/local stakeholders. The city/local element may include:

The City of Warwick;

The citizens of Warwick (Neighbors of the Warwick Intermodal Train Station, Concerned Airport Neighbors (CAN), and transit users); and

Impacted local businesses (car rental companies and surrounding uses).
The state level stakeholder element of the council will serve to represent state level issues. This element will ensure coordination of statewide transportation goals and policies with local objectives with regards to Warwick Intermodal Train Station. Additionally the state element will ensure appropriate regulatory conformity on all issues related to the Warwick Intermodal Train Station. It is suggested that the State element be headed by the Rhode Island Department of Transportation (RIDOT), which would be responsible for bringing together the state level organizations with a stake in issues dealing with transportation, economic development and environmental management related to the Warwick Intermodal Train Station. The state element may include:

Rhode Island Airport Corporation (RIAC);

Rhode Island Economic Development Corporation (RIEDC);

State of RI;

RI Department of Environmental Management (RIDEM); and

Rhode Island Public Transit Authority (RIPTA).

The federal element of the council will represent federal level concerns for the Warwick Intermodal Train Station. It will serve as a crucial link between state and Regional elements and also ensure regulatory conformity with federal considerations. It is suggested that the Federal element be headed by the US Department of Transportation (USDOT). Other possible stakeholders represented at the federal level include:

US Environmental Protection Agency (EPA) and the

Federal Highway Administration (FHWA).

The final regional element consists of a Regional transit organization (this organization is described in greater detail in the following policy recommendation). Existing transit providers that may be members of this organization include:

Mass Bay Transit Authority (MBTA);

Amtrak;

Car rental companies; and

Regional bus services.
The regional transit organization will serve to bring together mosaic of transport service providers with the aim of coordinating scheduling issues for WITS, and effectively managing the services offered by its constituents per direct local and state, and federal level element feedback.

**How The Warwick Intermodal Stakeholder Council May Function**

The council will provide a forum for all Warwick Intermodal Stakeholders to meet to create policies and goals. Dialogue among various elements allows the transmission of consensus backed recommendations from each element directly to appropriate stakeholder elements. Appropriate elements are able to review recommendations, ensuring alignment with policies and goals related to Warwick Intermodal Train Station.

The next steps permit feedback on policies and goals, which should encourage the refinement of policies and goals to align with recommendations from each stakeholder element, the implementation of these refined policies and goals into the Warwick Intermodal Train Station, and the collection of feedback on the implementation of these policies and goals.

Warwick Intermodal Train Station meetings will be public and held in the WITS. Local/Regional/National Media will be invited and encouraged to attend and will serve as: valuable source of information to larger public; a barometer for functionality of WITS and WITS Council. The media will in effect communicate to the public major issues related to intermodality identified by stakeholders.
POLICY RECOMMENDATION 2: CONSIDER A REGIONAL TRANSIT ORGANIZATION

This policy recommendation seeks to capitalize on the special potential of the WITS as a transportation node - connecting air, train, car, and bus services; recognizing the value of a fully integrated transit network. A regional transit organization (RTO) would create an entity that links all public transit companies that may service the Warwick Intermodal Train Station and may include:

- Mass. Bay Transit Authority (MBTA)
- Amtrak
- Rhode Island Transit Authority (RIPTA)
- Regional Bus Services (Peter Pan + Bonanza)

**Figure 23. RTO Organizational Structure**

**Benefits of the RTO**

The RTO will serve to coordinate schedules and transfers among all public transit service providers; creating the opportunity for a seamless transportation system – with combined tickets available for all modes of transportation. By acting as an administrative central authority the RTO will:

- Permit the separation of rate-making functions from operating functions, allowing the transit providers included to provide a number of transit services and options;

- Serve as a third party facilitator, able to ask questions, raise issues and make suggestions to each individual public transit provider with a customer service focus; and

- Monitor regional transit related projects for consistency and possible improvements.
It is believed that the RTO will equate to a dense route network of frequent customer-centric public transport services equating to regular intervals and short waiting times for connections for the Warwick Intermodal Train Station, Rhode Island, and the larger region served by each of the RTO's constituent transit providers. The Warwick Intermodal Train Station will benefit from the RTO approach and will be able to provide quality services not only to those accessing air transit via public transit, but also to public transit users in general.

POLICY RECOMMENDATION 3: CREATE MARKETING CAMPAIGN

Currently, no marketing campaign exists surrounding the development of this project. The recommendation is to launch a marketing plan to increase public awareness surrounding the development of this project. Awareness of the project will lead to the public's knowledge of the Warwick Intermodal Train Station. When construction of the WITS is complete and train service is in operation, this knowledge will ultimately lead to the customer's liking and preference of the WITS and excitement about the new option of getting to and from the airport by train.

Figure 24. Market Readiness Stages

Awareness → Knowledge → Liking

Preference → Conviction → Purchase

Currently, the marketing campaign should be in the awareness and knowledge stage. Methods of marketing strategies in these stages can include:

- Create a report that interested individuals or groups can use as a reference for the project.
• Place a sign at the site stating, "Future site of Warwick Intermodal Train Station;"

• Create a website dedicated to the Warwick Intermodal Train Station project. The website should include design, layout plans, project timetable, etc;

• Create a link to this website from RI Department of Transportation's, Rhode Island Airport Corporation, and T.F. Green Airport’s websites.; and

• Run a feature article or articles in the Providence Journal and Boston Globe pertaining to the Warwick Intermodal Train Station, its development and the rail services that will be provided.
POLICY RECOMMENDATION 4: PHASE DEVELOPMENT OF THE WITS

This study agrees with the Rhode Island Department of Transportation's current plan to build the WITS in phases. The WITS could potentially include many components. The initial development of a simple train station with MBTA commuter rail service should be the first stage of development. The station should be built to accommodate future development since all of the project will not be completed at once. Once the first phase has begun, redevelopment of the Intermodal District can be initiated. Concurrently the redevelopment of the Gateway District can occur. It must be understood that the train station be built with consideration for the future development of a people mover connection to the airport. Other elements that can be constructed following the initiation of the construction of the train station include:

- Bus terminal, taxi, and limousine stops;
- Car rental facility with quick turn around area;
- Amtrak regional train stop; and
- Providence-Warwick rail shuttle on a dedicated rail line.

Figure 26. Phased Development Diagram

Inclusion of each of these components is a separate decision. Some are ready to proceed now, while others are only possible in the long-term future, or depend on the previous development of a different component. Construction of the train station and establishment of commuter rail service should proceed as soon as possible. The design should include all of the additional components so that building each of them will be easy when agreement has been reached and funding is in place.
POLICY RECOMMENDATION 5: EXPEDITE LAND ACQUISITION, ASSEMBLY & DEVELOPMENT

Land acquisition and assembly can be a difficult task when it involves an area consisting of multiple landowners. Bringing those landowners to a common agreement involving acquisition procedures and pricing can be quite difficult.

In the case of the Warwick Station Redevelopment District problems arose between individual landowners and the Bulfinch Company, the redevelopment agency that was hired. Offers began early in 2001, and initial efforts to assemble the land were moving slower than what was initially expected, or hoped for. In March of 2001, Bulfinch had offered over $10 million for 12 acres to 17 property owners, to which none had agreed to sell and their reactions were categorized as being dissatisfied to non-responsive. Bulfinch offers were based on appraisal using comparable sales, replacement costs and estimated income generated by the property as a means of establishing a value. It was stressed repeatedly that only as a last resort would Bulfinch appeal to the redevelopment agency to use its powers of condemnation. Landowners in the district were being encouraged to get their own appraisals and band together as did the people of the adjacent neighborhood of Hillsgrove South, but not to take their sale of $1 million an acre as the market value for the area (Howell, 4/19/2001, Warwick Beacon).

In order to expedite the land acquisition and assembly process it is recommended that the Bulfinch Company in conjunction with the Warwick Station Redevelopment Agency (WSRA) take one of two courses of action.

1. One opportunity for the acceleration of land acquisition and assembly would be to work as closely as possible with as many of the individual landowners as would be willing to develop an informal organization. An informal organization for the purpose of encouraging individual landowners to band together and sell as a single unit, or several unified units. This could be accomplished by holding several meetings specifically inviting district landowners, catering to land acquisition and assembly issues, and portraying the benefits of landowner organization. In addition to these few meetings, the opportunity should be given to the landowners to have information on hiring independent appraisers, information such as who could be contacted and how to contact those individuals. Efforts should be made to make the landowners feel that by organizing together they are expediting the land acquisition and assembly process in addition to benefiting themselves.

2. A second opportunity for the acceleration of land acquisition and assembly is to work with the City of Warwick on developing a land relocation and barter program. It would be necessary to work closely with the City of Warwick in identifying suitable land to relocate or be used in a barter agreement with the individual landowners. In this type of program each landowner would have to be dealt with individually. For the relocation program, a suitable piece of land, one comparable in size, amenities and value would be identified on city land and the landowner, currently in the WSRD would be relocated with assistance. The City would have to agree to a trade agreement for the new relocation land in exchange for the currently occupied WSRD
land. The landowner would still own land in the City where they could operate their business, and the City would then gain the land within the WSRD, which would then be purchased by the Bulfinch Company at a predetermined price. This would avoid much of the price negotiations with individual landowners and would appeal to their desire to have their relocation needs tended to. In the case that a comparable parcel of land cannot be determined, and a lesser parcel of land could be offered, the landowner would enter into the land barter program. This program is much like the relocation program, the only difference is that a comparable parcel of land could not be located and a lesser parcel would be offered. In this case the difference would be made up monetarily, and the landowner could either utilize the land for business purposes or sell the land for additional profit.

POLICY RECOMMENDATION 6: ENCOURAGE DEVELOPMENT WITH A PROGRESSIVE TAX STRUCTURE

Currently, the City of Warwick is considering using Tax Increment Financing (TIF) to finance bonds for public infrastructure in the WSRD (Geagan, 2004). This financing technique would allow infrastructure improvements to be paid for by the increase in property values, and hence property tax revenues, resulting from those very improvements. This approach makes good sense for the district, since it would make possible more public improvements than would be possible without it.

Along with Tax Increment Financing, the city should consider establishing a property tax structure that encourages development by minimizing the disincentive to building that a property tax represents. This could be done by instituting a two-rate property tax in the district (Payne, 2004), like those that have been used successfully in the redevelopment of Pittsburgh and other towns in Pennsylvania (Common Ground USA, 2004; Henry George Institute, 2004). Since Warwick already assesses the value of land and buildings separately (Geagan, 2004), the two-rate property tax would be simple to implement. Land value would simply be taxed at a high mill rate while the value of buildings and improvements would be taxed at a low mill rate. As land value in the area increases after the WITS is constructed, tax revenues would likely increase more than under conventional one-rate taxation.

This innovative tax structure would offer three advantages to the WSRD (Feldman, 2004). Most importantly, it would stimulate redevelopment by minimizing the financial disincentive to build improvements (Oates, 1996). It would also help facilitate Bulfinch’s efforts to acquire and assemble the land in the district by making low-profit land uses unfeasible in the district. Rising property taxes would work in favor of the economically “highest and best” land uses (Harriss, 2004). Lastly, it would recapture for the public some of the large increase in land value which will be “given” to land owners in the district by construction of the WITS (Harriss, 2004). This additional revenue could be used to pay for district improvements and contribute to the WITS facility operating costs.
POLICY RECOMMENDATION 7: DEVELOP PUBLIC-PRIVATE FINANCING PARTNERSHIPS

An intermodal transportation center is a very capital intensive project and will continue to have significant expenses during all of its years in operation. Since the benefits of the WITS thoroughly justify its costs, and since the benefits and drawbacks of the facility will be shared among both public and private stakeholders, it makes sense that the costs, revenues, and risks of the project should be shared also. As the financing plan of the Miami Intermodal Center illustrates, dividing costs among many contributors can make an expensive project feasible without putting an extreme burden on any one contributor (Parker, 2004).

The development of the rail connection to the Portland airport is another good example of the sharing of costs between the public sector and a private stakeholder. In this case, a partnership was formed between the regional transportation authority and Bechtel Enterprises, an international engineering, construction, and project management firm. Bechtel provided a quarter of the project's funding and was contracted to build the light rail extension to the airport. In return, Bechtel received the development rights to a 120 acre mixed-use commercial site located near the entrance to the airport. This cost sharing partnership meant that no federal appropriations, state general funds, or additional property taxes were needed to build the rail extension (TriMet, 2004).

Currently, the WITS project has successfully obtained sufficient funding from a number of sources to begin construction of the facility, but more funding will still be needed in order to construct side rails for a future Amtrak stop and possibly a dedicated rail line for a Providence-to-Warwick rail shuttle (Devine, 2004). The current financing plan has 90% of the operating costs of the facility being paid for by the Customer Facility Charge (CFC) on car rentals (Celona, 2004). We feel that this is an excessive burden to put on one contributor and that 75-85% would be more appropriate. Additional private partners should be sought to help contribute to these costs. Financing for the project should be arranged in such a way as to avoid placing major disincentives on the use of public transit. At the same time, this goal should be balanced against the goal of spreading and sharing the costs.

Some possible sources of contributions could include baggage cart rentals, parking, plane ticket facility charges, or a taxi usage fee. Most importantly, developers and businesses in the area immediately surrounding the station should be approached as possible partners. Density bonuses or air rights to develop buildings over the tracks could be offered as an incentive to contribute towards infrastructure costs. Establishing a benefit assessment area in the redevelopment district or a two rate property tax, as described in an earlier recommendation would be additional ways of channeling funds from area businesses to the transportation facility.
POLICY RECOMMENDATION 8: IMPLEMENT AND CONTINUE TO DEVELOP TRANSIT ORIENTED DESIGN

It is recommended that there be a well-defined gateway into the Warwick Intermodal District. This will allow the passenger to acknowledge the fact that he or she has entered or exited the district. Within the district, the planners should consider mixed land uses. By implementing mixed land uses one creates a more pedestrian-oriented district by bringing interest to the sidewalk through cafés, restaurants and shops on the bottom levels and offices or apartment on the upper levels (Morris, 1996). Through the implementation of mixed land uses one creates safer, more attractive, and interest oriented developments. Architecture within the district should be designed in a uniform and aesthetically pleasing manner. The signage, lighting and landscaping should be uniform throughout and it should be the element which gives the district a sense of place. Throughout the district there needs to be a continuous, direct and convenient linkage system which orients the pedestrian through the space. Attention should be given to the planning and design of public spaces within the district to make them pedestrian-friendly. Lastly, there should be design guidelines for parking garages and parking lots.

POLICY RECOMMENDATION 9: IMPLEMENT COMPREHENSIVE MONITORING AND EVALUATION PROGRAMS FOR NEGATIVE ENVIRONMENTAL EXTERNALITIES

It is important that any relationships between the operation of the Warwick Intermodal Station and negative environmental externalities that may be considered a function of the station be both recognized and addressed. This policy recommendation recognizes the value of post project monitoring as an important part of the planning process, and a necessary step for effective evaluation and resulting policy concerning the environmental effects of the Warwick Intermodal Station Project.

For this policy recommendation, the major effect of the Warwick Intermodal Train Station is viewed to be the redistribution of both surface (automobile, bus and train) and air vehicular traffic. The logic applied recognizes that one and or more of these types of vehicular traffic will be impacted by the operation of the Warwick Intermodal Train Station. These impacts may include the reduction, increase, and or change in character of one of the aforementioned types of vehicular traffic. Two specific negative environmental externalities related to the redistribution of air/surface vehicular traffic were identified: reduced air quality and increased noise pollution.

Redistribution of Air and Surface Vehicle Traffic

Redistribution of air/surface vehicle traffic could possibly lead to the reduction in the use of certain modes and/or the increase for other modes. The two important negative environmental externalities identified (air quality and noise pollution) may be considered a function of air/surface traffic redistribution. Monitoring the redistribution of air/surface vehicle traffic and any relationships to these negative environmental externalities in areas surrounding the Intermodal Station and the Airport is important to
help quantify benefits of the Intermodal Station.

Air and surface vehicular traffic monitoring can lead to informed policy-making and possibly increased public support for airport/intermodal facility initiatives. Monitoring of air and surface traffic redistribution helps to establish important data for the future study of the effectiveness of the Warwick Intermodal Train Station. Effective monitoring in turn enables evaluation of the services provided by the Warwick Intermodal Train Station and specifically how they affect traffic redistribution; this may lead to the development of modifications of services provided by the Intermodal Station and its associated transportation providers.

**Monitoring Air Quality**

Redistribution of air and surface traffic will have ramifications on air quality in the areas surrounding the Warwick Intermodal Train Station, and possibly the state of Rhode Island as a whole. Monitoring air quality surrounding the Intermodal Station, T.F. Green and associated transportation corridors (I-95 and NE Corridor) is important, because it will help to quantify the benefits, or lack thereof associated with the Intermodal Station. Any improvements in air quality related to the operation of the station can, and should be used to help generate public support and expand intermodal services. This quantification helps to place a tangible value on the reduced automobile emissions likely associated with the intermodal station and allows useful data for comparison to pre-Station pollution levels. Air quality monitoring and its relationship to air/surface vehicle traffic redistribution not only helps to determine major sources of air pollution - which areas need to be addressed, but could be used to initiate a rewards and incentives programs for participants with best management practices regarding air quality.
Monitoring Noise Pollution

The possible redistribution of air and surface traffic resulting from the operation of the Warwick Intermodal Train Station will also affect the levels of noise pollution in the areas surrounding the Warwick Intermodal Train Station, and possibly the state of Rhode Island as a whole. Noise pollution will remain a major issue with intermodal station and associated airport since they are both located within a residential use matrix. This calls for a comprehensive noise monitoring program for: train, ground traffic and flight track systems. This program would most effectively be carried out in partnership with RIDEM, RIDOT, RIAC, Amtrak, MBTA, RIPTA and surrounding communities; allowing participants to quantify noise emissions- sources and problem areas. The noise monitoring program should include multiple fixed and mobile noise monitoring stations to permit comprehensive and reliable measurement of noise levels. These stations should be placed strategically to effectively monitor noise levels from major sources. An effective monitoring and evaluation system for noise pollution could be used to:

- Develop a rewards and incentives program to encourage improvement among noise pollution generators; and
- Develop an abatement program to address serious continuing problems.

The noise monitoring program will allow the determination of the footprint developing from train station, vehicular and aircraft noise emissions associated with the Warwick Intermodal Train Station; to define spatial and temporal extent of unique noise footprints, "noise zones;" and provide policy guidance for appropriate uses in various noise level zones including residential; business; transportation and industrial.

Partnership Driven Monitoring and Evaluation

The need for comprehensive environmental monitoring and evaluation offers excellent opportunities for the development of functional relationships between the intermodal station, T.F. Green, local neighbors, RIDEM and other appropriate state and federal agencies. Partnerships between stakeholders encourage dialogue and create a transparent issue environment.

To improve its environmental reporting and public dialogue, the Intermodal Station and its partners should issue an annual air quality and noise pollution report. These reports will serve to maintain open public dialogue and help to establish the legitimacy of any long-term monitoring and evaluation projects.
POLICY RECOMMENDATION 10: ESTABLISH A PHYSICAL CONNECTION

The final recommendation is for a permanent physical connection between the Warwick Intermodal Train Station and the terminal at T.F. Green Airport. The proposed Automated People-Mover would provide this physical connection. The People-Mover should be visible and easily accessible to facilitate modal shifts from single-person automobile to high-occupancy transit, thereby helping to reduce local road and highway congestion in the immediate area. The easy connection for rail-air travelers over busy Post Road (U.S. Route 1) would be a major incentive for drivers to switch modes.
CONCLUSION
CONCLUSION

The research for this project was initiated when Dr. Farhad Atash, Chairman of the University of Rhode Island Community Planning Department, approached the University of Rhode Island Transportation Center (URITC) with a research proposal. The proposal entailed employing the 2004 Community Planning Studio to research the potential outcomes, both positive and negative, of the Warwick Intermodal Train Station (WITS) project.

In evaluating the project, the studio segmented their research into two parts. The first portion of the project included researching the background and history of the project, as well as identifying both domestic and international airports, with a focus on issues that related to the WITS project. The second segment was devoted to developing policy recommendations, based on knowledge gained through the research conducted in the first segment of the project. Upon finalizing their research, the studio presented its findings to a group of stakeholders on December 8, 2004 at the URITC facility. This final report is the culmination of the research and evaluation conducted by the 2004 Community Planning Studio.

The background and history of the project was researched through examining a multitude of articles from the Providence Journal and Warwick Beacon, beginning with the first article mentioning the project, published in July of 1997. This research allowed the studio to gain knowledge of the issues that had occurred previous to their involvement. The related airports that were examined included: Baltimore Washington International, Newark Liberty International, Portland, Oregon International, Miami International, Zurich International and Frankfurt International. These particular airports were chosen because each of them related in one way or another to issues that emerged in the WITS project. The studio studied these airports to gain an understanding of operating intermodal centers and how they have overcome intermodal issues.

Based on the research of the background and history of the WITS project, as well as the intermodal operations of other airports, the studio formulated policy recommendations. They identified important issues pertaining to the WITS project and used their newly gained knowledge to identify strategies to mitigate these issues.

The 2004 Community Planning Studio has identified a meaningful future for the WITS project, and has developed policy recommendations in accordance with the issues identified that pose a challenge for the progression of the project. In an attempt to mitigate these challenges, the studio has developed these policy recommendations in a manner that would allow them to be expanded upon in the future by the appropriate stakeholders involved. The studio recognizes that the scope of this study reaches far beyond their resources and encourages that further research and studies stem from this report.
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