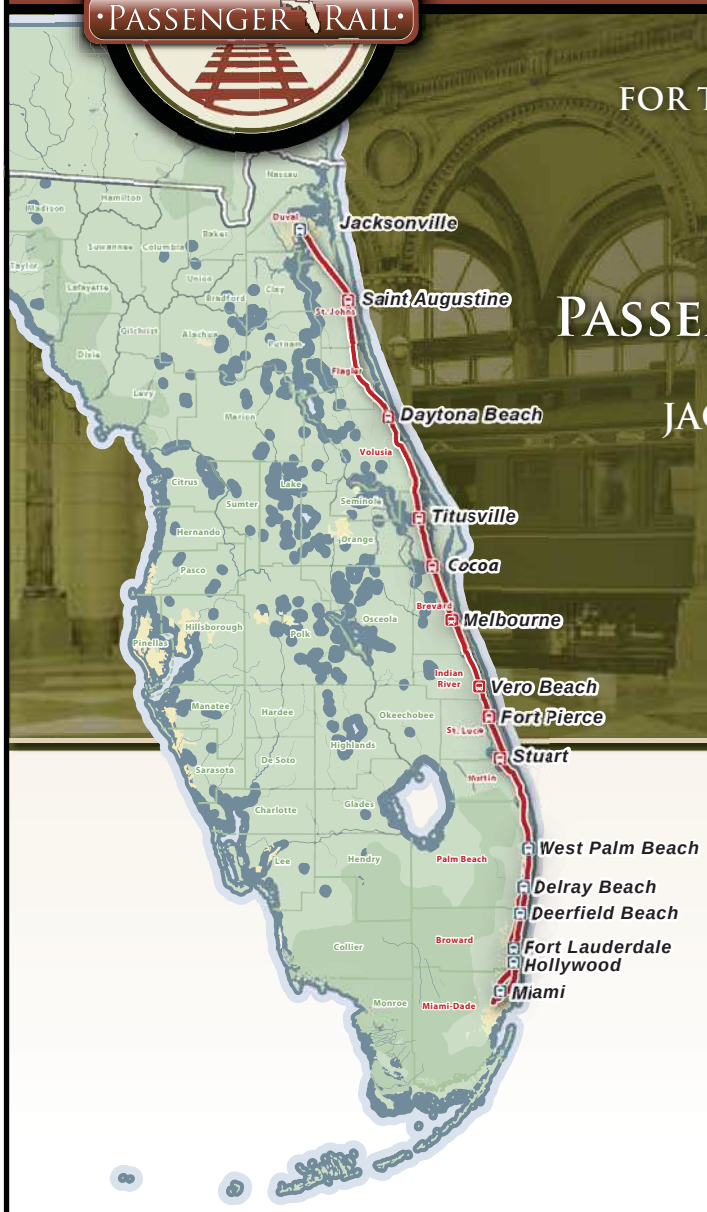
Service Development Plan

FEC AMTRAK® Passenger Rail

for the Florida East Coast (FEC) Corridor Amtrak Service High Speed Intercity Passenger Rail (HSIPR) Program

Jacksonville (Duval County) to Miami (Miami-Dade County), Florida



Prepared in accordance with Federal Register / Vol. 75, No. 126 / Thursday, July 1, 2010/ Notices Pg.38358 – Appendix 2: Additional Information on Stages of Project Development

August 2010

Federal Funding Opportunity Number: FR-HSR-10-004

TBG06141022338ORL

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Chapter 1

Purpose and Need

The primary purpose of the project, known as the Florida East Coast Corridor – Amtrak Service, is to provide intercity passenger rail service on Florida's east coast, from Jacksonville to Miami as part of the 2009 Florida Rail System Plan to improve connectivity for intercity and intermodal travel, enhance mobility of the transportation network, and stimulate economic development. Project goals and objectives include:

- Restoring intercity passenger rail service along nearly 350 miles of Florida's east coast to improve intercity mobility and access by filling a critical gap in the transportation network on Florida's east coast; connecting major tourist destinations along Florida's east coast; providing reliable, high-quality rail service connecting to the Northeast, Mid-Atlantic, Southeast and Midwest; and providing efficient, comfortable, safe and reliable intercity rail service;
- Augmenting ongoing redevelopment by promoting compact development patterns in historic downtowns; enhancing development opportunities to strengthen existing communities; increasing visitation for tourism, sporting events, business activities, and personal visits; preserving environmental quality; protecting Florida's sensitive human and natural environmental resources;
- Interfacing with airports, seaports, mass transit and Florida's highway by linking all major forms of transportation; providing better access to seaports and airports; interconnecting with local and mass transit services;
- Lightening capacity constraints on existing transportation systems by enhancing rail mobility and connectivity to Florida's east coast, expanding choices of transportation modes; providing predictable, consistent travel times; enhancing efficient operation of transportation facilities and service; and providing travel times that are comparable with air and automobile; and
- Stimulating the economy with new construction and transit-oriented development opportunities, including the creation of new employment opportunities.

The need for the Project stems from continued growth in long-distance travel to Florida's east coast cities; an incomplete, inconvenient, and overburdened transportation network; and depressed economic conditions.

Chapter 2

Rationale

The Florida East Coast Railway (FEC) is the transportation system that was primarily responsible for the development of Florida, south of Jacksonville, in the late Nineteenth and early Twentieth Centuries. Early development along the east coast of the state was concentrated around the FEC, and development continues to the present day in proximity to the railroad.

Transportation infrastructure in the FEC Corridor is dominated by highways, especially US1 and I95, which parallel the FEC over most of its length. In terms of public transportation alternatives, the endpoint cities of Miami and Jacksonville have large airports with frequent scheduled air service. Among the eight FEC Corridor cities in which a rail station is proposed to be located – St. Augustine, Daytona Beach, Cocoa, Titusville, Melbourne, Vero Beach, Fort Pierce, and Stuart, scheduled air service is available at only three – St. Augustine, Daytona Beach, and Melbourne. Among these eight cities, scheduled intercity bus service is available at five – St. Augustine, Daytona Beach, Titusville, Melbourne, and Fort Pierce. Local transit buses operate in numerous municipalities along the Corridor.

Population in Florida and in the Corridor is forecast to increase by some 70% between the years 2005 and 2040 as referenced in the *Florida Intercity Passenger Rail Vision Plan, Executive Summary, Pg.3* (FDOT, August 2006). The future will bring transportation challenges to the Corridor, including highway and airport congestion caused by continued growth, increasing transportation costs as the cost of oil increases over the long-term, and the aging of the population which in-turn increases a preference for and dependence upon public transportation modes. Annual intercity travel throughout the state is anticipated to double from 100 million to 200 million between 2005 and 2020, and increase further to 230 million trips by 2040; intercity trips between selected major markets statewide are forecasted to roughly triple from 35 million in 2000 to 113 million by 2040; the northeast Florida – Southeast corridor portion of those major market intercity trips is forecasted to increase from 1.30 million in 2000 to 2.28 million in 2020 and 3.76 million in 2040 as referenced in the *Florida Intercity Passenger Rail Vision Plan, Executive Summary, Pg.3* (FDOT, August 2006). The proposed Florida East Coast Corridor - Amtrak Service will provide a means for accommodating a portion of the anticipated growth, more cost effective than relying entirely upon the existing modes of highway and air. Reviving passenger rail in the Corridor also affords an opportunity to incrementally develop rail service in the corridor, carrying an ever greater number of travelers more efficiently than by auto or air in much the same way as the Pacific Coast Corridor in California has grown from a single daily Amtrak train in each direction to a dozen each way plus even more commuter rail service provided by Metrolink and Coaster. Development of the proposed Florida East Coast Corridor - Amtrak Service, as well as facilitation of future additional service development, is consistent with adopted plans on both the state and local levels in the Corridor, including the 2006 Florida Intercity Passenger Rail Vision Plan, and the 2009 Florida State Rail Plan. The proposed Florida East Coast Corridor - Amtrak Service is not only consistent with providing a transportation

alternative that is more cost effective and environmentally friendly than automobiles or airplanes, but promotes more geographically concentrated real estate development or re-development, which is more environmentally sustainable in the long term.

Chapter 3

Identification of Alternatives

In October 2009, a Programmatic Environmental Assessment (PEA) was completed using an appropriate level of environmental review needed to meet Service NEPA compliance. This PEA was deemed appropriate because the impacts from the project had not been fully evaluated and early scoping efforts suggested that impacts did not appear to be significant. The results of the Service NEPA study indicated that additional engineering and environmental evaluations were needed before further consideration of federal funding.

As such, a draft Environmental Assessement (EA) was completed in August 2010 to meet Project NEPA compliance and to analyze all reasonable alternatives that meet the purpose and need for the project. This Project NEPA-level review analyzed each of the project components, identified a preferrred alternative, and evaluated the environmental impacts.

The description of alternatives includes the No-Build Alternative, the Build Alternative and the Locally Preferred Alternative, which involve the FEC (from Jacksonville to West Palm Beach), the Northwood Crossover to the SFRC, and eight proposed stations (St. Augustine, Daytona Beach, Titusville, Cocoa, Melbourne, Vero Beach, Fort Pierce, and Stuart). As part of the Service NEPA-level in 2009, the cities where stations are proposed were determined based on an evaluation of ridership and population density studies conducted by Amtrak.

The No-Build Alternative: This alternative involves no changes to the transportation facilities within the study area beyond currently planned and programmed (tentatively funded) projects evaluated in this study. The No-Build Alternative would involve no infrastructure improvements to the existing FEC (from Jacksonville to the existing Northwood Crossover in West Palm Beach). The existing freight operations (and maintenance infrastructure) on the FEC would be maintained with the No-Build Alternative. The No-Build Alternative would include future planned and programmed roadway, transit, rail, air and other intermodal improvements within the study area. The No-Build Alternative would not meet the project purpose to provide intercity passenger rail service on Florida's east coast from Jacksonville to Miami or address the need to improve connectivity for intercity and intermodal travel. The No-Build Alternative also would not enhance mobility or stimulate economic development along Florida's east coast.

The Build Alternative consists of three distinct components – the FEC mainline, the Northwood Crossover, and eight proposed stations.

3.1 FEC Mainline

The Build Alternative was identified to provide intercity passenger rail service for Florida's east coast from Jacksonville to Miami. The Build Alternative would restore passenger service on the existing FEC from Jacksonville to West Palm Beach. In West Palm Beach, the alternative would use the Northwood Crossover diverge to the South Florida Railway Corridor (SFRC), which is an existing railway approximately 2,100 feet west of the FEC. The

Build Alternative would follow the existing Amtrak route on the SFRC from West Palm Beach to Miami. The segment of the FEC from Jacksonville to West Palm Beach is a single track

railroad while the segment of the SFRC from West Palm Beach to Miami is a double track railroad. The existing FEC freight corridor south of the Northwood Crossover was considered as an alternative alignment for the proposed passenger rail service from West Palm Beach to Miami. This alignment would require additional infrastructure and stations along the freight corridor within highly urbanized areas. This alternative alignment would involve substantially higher capital costs, right-of-way costs and environmental impacts as compared to the Preferred Alternative (the existing Amtrak route) and was therefore, eliminated from detailed analysis.

3.2 Northwood Crossover

An existing Amtrak route is located along the SFRC from West Palm Beach to Miami. A connection (or "crossover") from the FEC to the SFRC would be required to provide continuous intercity passenger rail service from Jacksonville to Miami. The existing Northwood Crossover from the FEC to the SFRC was evaluated. The Northwood Crossover is an existing track connecting the two railways in the Northwood section of West Palm Beach. This existing connector track located parallel to 27th Street is not usable for the proposed intercity passenger rail service because of a missing connection in the northeast quadrant leading to and from the FEC and points north. Rebuilding the existing Northwood Crossover to provide the missing northern connector track would impact the Shalow Memorial Park (Evergreen Cemetery), which is potentially eligible for listing on the National Register of Historic Places (NRHP). As a result of the potential social effects, cultural impacts, and community disruption associated with impacts to the historically significant Evergreen Cemetery, this alternative was eliminated from detailed study. The Build Alternative was identified to realign the Northwood Crossover just south of the existing alignment and generally parallel to (and north of) 25th Street.

3.3 Station Alternatives

There are no existing passenger stations in operation on the existing FEC Corridor. Eight new passenger stations along the FEC Railway between Jacksonville and Stuart are proposed as part of the project, at locations in the following cities:

- St. Augustine
- Daytona Beach
- Titusville
- Cocoa
- Melbourne
- Vero Beach
- Fort Pierce
- Stuart

The proposed stations involve construction of new station buildings or the remodeling of former station buildings. Station alternatives in each of these eight cities were identified for further evaluation.

The Locally Preferred Alternative: This alternative consists of restoring passenger service on the existing FEC from Jacksonville to West Palm Beach, with service continuing south to Miami on the existing SFRC via the proposed Northwood Crossover. The following

infrastructure improvements are included in the Locally Preferred Alternative to provide intercity passenger rail service and accommodate the passenger trains at speeds up to 90 mph.

FEC's freight service: The selection of eight (8) proposed stations; new platforms at each of the proposed stations approximately 1,000 feet long; proposed sidings at proposed stations to move Amtrak trains off the mainline railway service for the loading/unloading of passengers; approximately 29 miles of surface replacement track within existing horizontal curves from Jacksonville to West Palm Beach; track signal control upgrades at existing highway and pedestrian crossings to enhance safety; grade crossing modifications, including the addition of seven (7) new grade crossings at the Northwood Crossover; thirteen (13) grade crossing modifications to include a second rail track; three (3) grade crossing closures in Melbourne and Vero Beach; and the realignment of the Northwood Crossover.

Chapter 4

Planning Methodologies

4.1 Program Implementation Schedule

Design and procurement are planned to begin immediately after grant approval, with construction targeted to commence in January 2011. The construction duration has been preliminarily estimated at 34 months, resulting in a forecasted date of construction completion and service inauguration of October 2013. Rolling stock procurement requires approximately 36 months to complete, and this process is considered to be already in-progress based on the Amtrak programs to procure new long distance cars and to refurbish existing inoperative cars. This duration is consistent with an inauguration of service in October 2013. Further, procurement of new corridor equipment will not need to be completed until a date subsequent, consistent with the inauguration of corridor operations in Phase 2. Acquisition of non-railroad property to support station development may affect the implementation schedule, to the extent that one or more individual stations could be delayed if unforeseen problems are encountered relative to such property acquisition.

4.2 Public Involvement

Early and continual opportunities for involvement in project development have been provided to agencies, project stakeholders and the interested public as part of the NEPA process. In consultation with FRA, FDOT coordinated the public involvement program with participation from joint development partners FEC and Amtrak. The public involvement program includes extensive public outreach, coordination with local governments, and consultation activities with federal, state and local regulatory and resource agencies. Public involvement activities included Advance Notification, public meetings in each of the eight station cities, informational meetings, a project kick-off meeting, advertisements and notices, website posts and consultation with permitting and jurisdictional agencies.

Public outreach to date has been extensive yielding over 160 resolutions and letters of support for the Project being received from Governor Charlie Crist, congressional delegates, local governments, MPO boards, agencies, and state-wide organizations, including both public and private entities. Concurrence letters have been received from the State Historic Preservation Office (SHPO), US Fish and Wildlife Service (USFWS) and National Marines Fisheries Service (NMFS). Further, FDOT consulted with FRA personnel to ensure that the draft EA was considered "substantially complete" in support of this application. During the public involvement outreach for the project, other municipalities requested consideration of a proposed station within their jurisdiction. Amtrak representatives have indicated any additional stations would need to be considered in future development phases (subsequent to this proposed action) and would depend on projected ridership. Station alternatives in each of these eight cities were identified and evaluated to analyze satisfaction of purpose and need, ability to meet engineering design criteria and technical feasibility, and avoidance and minimization of environmental resource impacts.

4.3 Project Management

A preliminary Project Management Plan (PMP) has been prepared for the Florida East Coast Corridor – Amtrak Service implementation. The PMP for the proposed Project is consistent with PMPs applied successfully to other rail development projects throughout the U.S. and addresses a full range of standards, processes and procedures that will assure project quality while controlling costs and adhering to schedule. The PMP is provided as a separate attachment within the application package.

4.4 Organizational Plans

Because the proposed service is an expansion of the existing Amtrak network, the basics of the organizational structure at an institutional level are relatively simple – at least in terms of identification of relevant parties and their basic interrelationships; Amtrak will be the tenant rail operator, and FEC, FDOT, and CSXT will be the landlord rail line owners. At a functional level, existing and/or new personnel within the Amtrak organization would be responsible for the operations, and would interface with personnel at FEC, CSXT, SFRTA (Tri-Rail) and FDOT. Specific individuals have not been identified, but would be among the line personnel in place at the time implementation begins.

4.5 Financial Plans

Plans by which FDOT, Amtrak, FRA and other parties would share the capital and operating costs are presented in the application. Regarding operating and maintenance costs, a cost sharing agreement will be negotiated among all of the affected parties. However, without prejudice regarding the terms to be negotiated in such an agreement, FDOT has agreed to share with Amtrak the cost of the re-routed Silver Service. The methodology for cost sharing with Amtrak will be determined during subsequent negotiations. Recognizing the importance of this service to its citizens, FDOT is committed to funding its fair share of the operating deficit for the future Corridor trains.

4.6 Coordination with Other Rail Service Providers

The service plan and all aspects of the project design and implementation are being developed with the full knowledge of, and in coordination with, the affected freight carriers and passenger rail agencies. Specifically, Amtrak and FDOT have had discussions with FEC, SFRTA, and CSXT. The design and implementation of the proposed service reflects the careful attention of Amtrak and FDOT to the needs and concerns of the existing freight operators – FEC and CSXT – and to the minimization or avoidance of adverse impacts upon their operations and the service they provide to their freight customers. Similarly, the design and implementation of the proposed service will minimize or avoid adverse impacts upon the existing Tri-Rail commuter rail service in southeast Florida, and will attempt to anticipate the needs of other planned and proposed passenger services, such as commuter rail between Jacksonville and St. Augustine as currently being studied by the Jacksonville Transportation Authority (JTA)

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Chapter 5

Demand and Revenue Forecasts

5.1 Demand Forecasts

5.1.1 Methodology, Data Sources, and Travel Model

Demand forecasts for the Florida East Coast Corridor - Amtrak Service were provided to FDOT by Amtrak. The "Summary of Amtrak Travel Demand Forecasting Models" is provided in Attachment A. Since the Service Development Plan includes a combination of both long distance trains and corridor trains, a combination of the "Long Distance Train Model" and the "Best Practices Corridor Mode"" was used to determine the travel demand forecast. The data sources, structure of the model and model development process for both the long distance and corridor model are provided in Attachment A. Information on the existing improvements, proposed improvements, and existing freight train data was provided to Amtrak by FEC. This input was used to determine the travel demand forecasts and schedule development.

5.1.2 Study Area Definition

The Project Corridor involves approximately 280 miles of the FEC (existing freight rail) from Jacksonville to West Palm Beach and approximately 65 miles of the SFRC from West Palm Beach to Miami (existing freight and passenger rail). There is no passenger rail service on the FEC between Jacksonville and Miami along Florida's east coast. The Locally Preferred Alternative would enhance Amtrak passenger rail operations by providing new passenger rail service on the FEC from Jacksonville to West Palm Beach. Amtrak currently operates existing intercity passenger rail service between Jacksonville and Miami via the CSXT line that runs inland from Jacksonville to Orlando and continues southeastward from Orlando to West Palm Beach, with continuing service on the SFRC to Miami. The SFRC is generally parallel to, and west of, I-95 from West Palm Beach to Miami. Both Amtrak and Tri-Rail operate existing passenger rail service on the SFRC. The Preferred Alternative will not adversely affect existing Tri-Rail commuter service. In a project coordination letter dated Oct. 1, 2009, the SFRTA documented support for the Project and indicated the increased frequency of Amtrak trains would not significantly impact Tri-Rail service.

There are two existing freight operations within the study area: the FEC and CSXT operations. The Preferred Alternative would maintain the existing freight operations on the FEC and the SFRC. Surface replacement track work would be performed according to best management practices to result in minimal temporary impacts to existing freight rail operations during construction.

Throughout the approximately 350-mile study corridor, minimal impacts to existing road facilities would occur as a result of new or modified grade crossings, potential traffic impacts or the access to proposed stations. Given the overall shorter lengths and greater

acceleration/deceleration compared to freight trains, the proposed Amtrak trains would likely have less impact than current freight trains on the Corridor.

No impacts to airports or intercity bus terminals are anticipated, though the project does anticipate multimodal connections to airports, ports, and bus terminals along the study corridor.

5.1.3 Model Forecasts

Amtrak developed two versions of the proposed FEC Amtrak service for consideration, Options "D" and "E".

For Phase 1 of Florida East Coast Corridor -Amtrak Service development, options D and E were essentially the same service. Phase 1 would consist of the Silver Star being split in Jacksonville and routed onto the FEC railway and continue to Miami. This train would consist of one roundtrip daily or two trains per day. As part of Phase 1, one additional roundtrip corridor train would run daily between Jacksonville to Miami. This accounts for 7 roundtrips or 14 trains per week from Jacksonville to Miami along the FEC Corridor. Phase 1 service as described is the system proposed as part of the application. Forecast results for Phase 1, Options D and E are provided in Attachment B. Incremental ONs and OFFs by passenger stations are also provided in Attachment B. For Phase 1 (Options D and E), ridership is forecasted to be approximately 222,600 passengers per year.

For future consideration and expansion of the Florida East Coast Corridor – Amtrak Service system, Amtrak considered two additional phases for both Options D and E.

Phase 2 for Option D consisted of adding three roundtrip corridor trains to the FEC from Cocoa to Miami. These additional Corridor trains would run on a daily basis. Even though Phase 2 is not a part of this application, Amtrak provided travel demand and operational modeling results for consideration (see Attachment B). Phase 2 ridership for Option D was estimated at 312,400 passengers per year.

Phase 3 for Option D was developed as a place holder for future train maintenance at Hialeah Yard in South Florida and the construction of the Jacksonville Transportation Center (JTC). Phase 3 for Option D consisted of adding one roundtrip Corridor train between Jacksonville and Cocoa and would run Monday through Friday. No travel demand or operational modeling results were provided for Phase 3 by Amtrak.

Phase 2 for Option E consisted of one additional roundtrip and two additional weekday roundtrips between Miami and Vero Beach over the FEC Corridor. Even though Phase 2 is not a part of this application, Amtrak provided travel demand and operational modeling results for consideration. Phase 2 ridership for Option E was estimated at 276,800 passengers per year.

Phase 3 for Option E was developed as a place holder for future train maintenance at Hialeah Yard in South Florida. Phase 3 for Option E consisted of adding one roundtrip corridor train between Jacksonville and Vero Beach and would run Monday through Friday. No travel demand or operation modeling results were provided for Phase 3 by Amtrak

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5.1.4 Revenue Forecasts

Revenue forecasts for Options D and E Phases 1 and 2 were developed by Amtrak and are provided in Attachment B. Forecasted ticket revenues, ridership and passenger miles were provided by the Amtrak Market Research Department. Amtrak forecasts food and beverage revenue based on the per rider average for a comparable route. Food and beverage revenues for first class riders, where applicable (including sleepers) are adjusted for the food and beverage revenue transfer, which accounts for the food and beverage revenue being included in the ticket revenue forecast. As shown in Attachment B, ticket revenue (which includes food and beverage) is forecast for the Phase 1 (Options D and E) corridor train to be approximately $1.6 million per year. The total train revenues for Phase 1 services are expected to be approximately $10.1 million. For Phase 2, Option D ticket revenue for the FEC Corridor trains is estimated at $3 million per year and Option E is estimated at approximately $2.4 million per year. As indicated previously, Phase 3 revenue forecasts for Option D and E were not estimated.

Chapter 6

Operations Modeling

6.1 Modeling Methodologies

The preliminary timetables provided by Amtrak are based on a computer-based Train Performance Calculator (TPC) analysis. Three phases of the proposed Florida East Coast Corridor - Amtrak Service were developed for consideration for Options D and E. Phase 1 consists of splitting the Silver Star daily at Jacksonville (14 trips per week) and providing one additional daily roundtrip between Miami and Jacksonville over the FEC Corridor (14 trips per week). As stated previously, Phase I is the same for both Options D and E and is the subject of this application.

Phase 2 includes, in addition to Phase 1 service: The addition of three daily roundtrips (42 trips per week) between Miami and Cocoa (Option D); or the addition of one additional roundtrip and two additional weekday roundtrips between Miami and Vero Beach (Option E) over the FEC Corridor (34 trips per week).

Phase 3 would include one roundtrip weekday train from Jacksonville to Cocoa for Option D and one roundtrip weekday train from Jacksonville to Vero Beach for Option E.

It should be noted that no decisions have been made by FDOT on whether to implement Option D or Option E for Phases 2 and 3. However, for the purposes of this Service Development Plan, Option D modeling results will be shown.

Operations modeling methodologies as provided by Amtrak include the following:

6.1.1 Amtrak Service

Option D assumes Amtrak operates a section of the *Silver Star* over the FEC Corridor as an extension of its long distance network. The FEC section would carry intra-Florida passengers as well as long distance travel. Tri-Rail riders to/from points north of West Palm Beach would also be carried with stop restrictions, consistent with current operations between West Palm Beach and Miami.

6.1.2 FEC Corridor Service

FDOT and/or a regional authority(s) would sponsor intra-Florida corridor services between Miami and Jacksonville with an emphasis on service to the most densely populated, most heavily congested southern section of the corridor. Station stops along the "Treasure Coast" section between West Palm Beach and north are a primary market, allowing convenient travel from these points to West Palm Beach, Ft. Lauderdale, Miami Metro and the Miami Intermodal Center. These corridor trains are envisioned to supplement existing Tri-Rail service by operating as express trains between Miami and West Palm Beach and could also carry Tri-Rail riders in this section.

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6.1.3 Equipment

Amtrak provides Phase 1 equipment, including the Corridor train between Jacksonville and Miami via an interim reimbursement agreement. It is assumed Florida will acquire new Corridor equipment for all Phase 2 Corridor services, including Jacksonville to Miami.

6.1.4 Stations

All trains are assumed to operate from the Miami Intermodal Center (MIC). Amtrak's current station at Hialeah is closed but it continues to operate as a crew base and train layover / service facility. Trains serving Jacksonville will switch to the Jacksonville Transportation Center (JTC) when constructed. Intermediate FEC station locations have been determined by current planning activities and included in the draft Environmental Assessment. Existing Tri-Rail stations are assumed.

6.1.5 Infrastructure

FEC improvements, including stations, were determined by joint planning process. Assumes FDOT / authorities are responsible for all funding as included in this application. Modeling assumes new track connection between FEC and Tri-Rail routes at Northwood, in West Palm Beach allowing 20-30 mph head-on movements. Maximum speeds will permit 80 - 90 mph operations.

6.1.6 Corridor Investment Phasing Plan

FEC services are shown in two phases based on current planning efforts and resource availability. A third phase of corridor service is anticipated as part of the development of the future JTC. Funding for JTC construction and service is to be programmed separately.

6.1.7 Operating Timetables

Operating timetables as provided by Amtrak are provided in Attachment C for Option D Phases 1, 2, and 3. As shown in Attachment C, the end-to-end travel times are estimated to be 6:34 for long distance trains and 6:08 for corridor trains assuming an increase in the highest maximum authorized speeds (MAS) on the FEC to 90 MPH and one minute dwell times at each of thirteen intermediate stations.

6.2 Equipment Consists

Equipment consists for Option D Phases 1, 2, 3 were provided by Amtrak in Attachment C. As shown, the train consists include one locomotive and six cars. Annual total train miles for Phase 1 is estimated at 256,230, 644,310 for Phase 2 and 729,810 for Phase 3.

6.3 Rail Infrastructure Characteristics

Rail infrastructure characteristics are described in the Draft Environmental Assessment and the Preliminary Engineering Report submitted as part of this application.

In summary, the existing FEC along this 350 mile corridor consists mostly of a single track line within the 100-ft right of way. This track, which is maintained to Class IV standards (per CFR 49.213), runs on 132 lb. continuously-welded rails (CWR) on concrete ties. Along this corridor, the tracks traverse over 400 roadway crossings and four major water crossings (bridges), including St. Johns River, Sebastian River, St. Lucie River, and Jupiter River. In addition to this single track, there are 26 passing sidings, areas with double tracks for industrial commercial use, and several maintenance yards at strategic locations along the corridor (Bowden, Wilson, Fort Pierce, and West Palm Beach Yards). The FEC Railway currently services freight traffic only with a maximum operating speed of 60 mph. Phase 1 of this Corridor Service Development Program includes several mainline track improvements to allow for Amtrak passenger trains to operate along the Corridor with continued FEC freight service. The existing Class IV track will be upgraded to Class V and includes over 29 miles of track work at the existing horizontal curves to lengthen the spiral in the curve and increase superelevation to allow for trains to operate at the higher speeds; 90 mph for passenger trains. However, it should be noted that there are several areas along the Corridor, including other track curves that do not allow the higher speeds of operation without rebuilding bridges and incurring much higher costs. The FEC Track Charts included herein provide locations of the mainline track improvements proposed, existing FEC operating speed, and proposed Amtrak operating speed. Final Design Plans for construction of these improvements will be subsequently developed. As previously noted, the crossover between the FEC and SFRC corridors is proposed at West Palm Beach (Northwood). The Preferred Alternative for the Northwood Connection has been developed and is included in this document. The proposed track work at Northwood includes constructing double tracks adjacent to the existing single track in an east-west direction. Wyes are proposed at the tie-in points with FEC and SFRC for full movement and connectivity between both mainlines. However, double tracks are proposed for the north to west and west to south track connections to provide for higher rail traffic for exiting FEC freight service, proposed Amtrak service, and new extension of Tri-Rail service to Jupiter. Some right-of-way acquisition will be required for this connection.

6.4 Outputs

Operational modeling outputs as provided by Amtrak for Option D Phases 1, 2, and 3 are provided in Attachment C - Equipment and Train Crew Scheduling. Attachment C contains information on potential crew couplets for Option D Phases 1 and 2. This information was developed by Amtrak.

6.5 Terminal, Yard and Support Operations

For Phase 1, the crew base will be developed at Jacksonville. In addition, as indicated in the modeling methodology, Amtrak's current station at Hialeah is closed but it continues to operate as a crew base and train layover / service facility. Hialeah will be used to operate a crew base and train layover/service facility once the Florida East Coast Corridor - Amtrak Service is implemented for Phase 2.

Chapter 7

Station and Access Analysis

7.1 Station and Access Analysis

As a result of an Alternatives Analysis performed on the Project and agency/public input, eight new passenger station locations were selected for the Preferred Alternative at St. Augustine, Daytona Beach, Titusville, Cocoa, Melbourne, Vero Beach, Fort Pierce and Stuart. Three of these locations (Daytona Beach, Melbourne and Fort Pierce) will consist of new station buildings. The Preferred Alternative for Stuart would utilize a portion of the proposed Martin County transit center. The remaining four locations are anticipated to involve the renovation of existing buildings (three former historic train stations in St. Augustine, Titusville and Cocoa) and the addition of an ancillary structure for Amtrak operations adjacent to the historic railroad station building in Vero Beach. The northern terminus will be the existing Jacksonville Amtrak station, with an ultimate terminus at the planned Jacksonville Regional Transportation Center (JRTC). The southern terminus will be at the Miami Central Station, which is part of the MIC project at Miami International Airport, and is scheduled for completion by 2012. South of Stuart, the project will co-locate with existing stations currently served by Amtrak along the SFRC.

The station alternatives were identified based on an extensive agency and public involvement program which involved consultation with FEC, Amtrak, and each of the eight cities (local government jurisdictions) where the stations are proposed. Local agency and government meetings (open to the public) in each of the eight station cities were held to identify potential station location alternatives. As a result of the agency and public involvement, in each of the cities at least two potential station alternatives were identified for further evaluation. The potential environmental effects associated with each of the station alternatives in each city were evaluated using the potential effects and agency input provided through the FDOT's Efficient Transportation Decision Making (ETDM) process (which makes information available about proposed transportation projects, agency comments on a variety of environmental and sociocultural issues associated with those projects available for public review), additional desktop research, a review of GIS databases for environmental resources, and field surveys. In some cases, the station alternatives screened through the ETDM process were refined based on geometric criteria or use of historic stations. However, these modifications involved the same parcels that were screened through ETDM.

7.2 Station Operations

Five stations are designated small stations (Titusville, Melbourne, Vero Beach, Fort Pierce and Stuart); three are designated medium stations. The small stations would be unstaffed and consist of a platform, canopy, signage, lighting and a semi-enclosed shelter. The medium stations would be accessible to the public during necessary operating times based on the Amtrak route schedules. The proposed stations and parking areas would comply with the Americans with Disabilities Act (ADA). Any medium station involving Amtrak staffing is subject to a signed agreement.

The Preferred Alternative consists of new platforms at each of the proposed stations. The platforms are approximately 1,000 feet long, 8-inches above top of rail, and located adjacent to the proposed stations. In some cases, the platform length was reduced to 650 feet because of site constraints and geometric criteria. The typical platform width is 12 feet. The proposed platforms are generally located within the existing FEC Railway right-of-way. As part of the Preferred Alternative, new rail sidings or passing tracks are required at the proposed stations to move the Amtrak trains off the mainline railway to service the loading/unloading of passengers. The rail sidings consist of a single track (approximately 2,500 feet in length) parallel and connected to the mainline track. The sidings are generally located within the existing FEC right-of-way.

7.3 Intermodal Connectivity

Intermodal connections are planned at airports, passenger terminals at seaports, existing and planned commuter rail stations, local transit facilities, trolley and bus service, intercity bus terminals, and private taxi and shuttle services. The ultimate northern terminus in Jacksonville is planned to be at the JRTC, which will provide a connection to the JTA bus terminal, a JTA Skyway people mover station, bus rapid transit stations, a Greyhound bus terminal, two park-and-ride facilities, and a potential future commuter rail station.

In St. Augustine, connections will be provided to St. Augustine/St. Johns County Airport, a car rental facility at the airport, Sunshine Bus service, Old Town Trolley and future commuter rail. In Daytona Beach, intermodal connections are available to regional Votran bus service and a Greyhound bus terminal. In Titusville, intermodal connections are available to the Space Center Executive Airport, car rental at the airport, local bus service run by Space Coast Area Transit (SCAT), and private shuttle service to nearby Port Canaveral. In Cocoa, intermodal connections are available to local bus services operated by SCAT and private shuttle service to Port Canaveral. In Melbourne, intermodal connections are available to the Melbourne Airport, private shuttle service to Port Canaveral, and regional bus service provided by SCAT. In Vero Beach, intermodal connections are available to Indian River County's GoLine bus service. In Fort Pierce, intermodal connections are available to Treasure Coast Connector bus service. In Stuart, intermodal connections are available to the Stuart Shuttle and the Treasure Coast Connector bus service.

The southern terminus will be the Miami Central Station (MCS) at the MIC, which will provide connections to Miami International Airport (MIA) via the MIA Mover, an automated people mover system, Miami's Metrorail urban rapid rail system, a rental car facility, parking, local bus terminal for MetroBus, and a commuter rail station for existing and future Tri-Rail service.

7.4 Station Access

All of the proposed stations involve developed parcels with existing roadway access. Proposed driveway/access modifications are contemplated. Parking facilities are proposed at three of the new passenger stations (St. Augustine, Daytona Beach and Cocoa). Existing parking facilities (on-property or on adjacent parcels) in Titusville, Melbourne, Fort Pierce, Vero Beach and Stuart would be used to support the station operations. The existing and proposed parking facilities include ADA accommodations.

In addition, the location of the proposed St. Augustine station (within .5 miles of historic St. Augustine) will capitalize on the city's allure as a major tourist destination in Florida; the Daytona Beach station is walkable to the downtown area, provides additional on-street parking, has an existing closed grade-crossing for enhanced pedestrian safety, and is adjacent to a Greyhound bus terminal; the Titusville station is located in the city's historic downtown area and was the former location of a passenger rail station; the Cocoa station is similarly situated near the downtown area at the location of the former Cocoa passenger rail station; the Melbourne station was selected because of its proximity to the downtown area and several key redevelopment parcels; the Vero Beach station also is close to downtown and the station area would be adjacent to the historic Vero Beach Railroad Station, which is now the Historical Society museum and office; the Fort Pierce station site was selected because of its close proximity to the downtown area, the availability of nearby existing parking at a new municipal parking garage, and its proximity to existing commercial and retail developments; the Stuart station is located within a portion of the proposed Martin County Transit Depot (proposed for construction in 2011), a 4,000 square foot building planned to accommodate office spaces, existing bus transit, a planned Greyhound bus route and the proposed Florida East Coast Corridor - Amtrak Service.

Chapter 8

Conceptual Engineering and Capital Programming

8.1 Project Identification

The project identification is detailed throughout this Service Development Plan, specifically in Sections 6 and 7. In addition, detailed information on the project identification is provided in the Preliminary Engineering Materials (August 2010) attached to this application.

In summary, the following infrastructure improvements are proposed between Jacksonville and West Palm Beach to provide intercity passenger rail service, accommodate the passenger trains at speeds up to 90 mph and continue FEC Railway's freight service:

- Eight new stations between Jacksonville and Stuart (St. Augustine, Daytona Beach, Titusville, Cocoa, Melbourne, Vero Beach, Fort Pierce, and Stuart). Some of the stations involve former station buildings as described in Section 2.4.1.
- New platforms at each proposed station (approximately 1,000 feet long)
- New track sidings (double tracking approximately 2,500 feet in length) at the new stations
- Track signal control
- Twenty-nine (29) miles of surface replacement track work on the existing FEC Railway (from Jacksonville to West Palm Beach) within existing curves. This will involve adding 6 inches of grade to the rail bed to accommodate the increased speed.
- Upgrades at existing highway and pedestrian crossings on the FEC Railway corridor to enhance safety
- New railroad crossings at sidings only
- Realigned track at the Northwood Crossover in Palm Beach County

The proposed platforms, sidings and proposed curve track replacement are primarily located within the existing FEC right-of-way. Minimal right-of-way is anticipated for the proposed stations.

8.2 Project Cost Estimates

Capital cost estimates have been prepared to reflect the cost of implementation of Phase 1 of the proposed Florida East Coast Corridor - Amtrak Service. The estimated cost of infrastructure improvements for Phases 1 through 3 is $109 million. Rolling stock capital costs for Phase 1 are estimated at $110.250 million. Soft costs are estimated at $30.6 million, making the estimated overall cost $250 million, and leaving the capital costs to implement subsequent options to consist of essentially only additional rolling stock. Capital costs are shown in the summary table below and detailed cost estimates are included in Attachment D.

This infrastructure cost estimate includes construction costs organized by standard cost categories, real estate acquisition for ancillary property such as station sites, railroad force account work, rolling stock, professional services including survey, design and construction support, construction contingency of five percent, and interest charges during construction.

CAPITAL COST ESTIMATE		
STANDARD		
COST		UNIT
CATEGORIES	DESCRIPTION	COST
10 TRACK STRUCTURES AND TRACK		
	Total for Category 10	$17,839,000
20 STATIONS, TERMINALS, INTERMODAL		
	Total for Category 20	$28,688,000
40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS		
	Total for Category 40	$33,451,955
50 COMMUNICATIONS & SIGNALING		
	Total for Category 50	$29,111,000
	TOTAL CONSTRUCTION COSTS W/ PURCHASE OF REAL ESTATE	$109,089,955
	TOTAL CONSTRUCTION COSTS W/O PURCHASE OF REAL ESTATE	$79,651,955
TOTAL GENERAL CONTRACTOR CONSTRUCTION COSTS W/O PURCHASE OF REAL ESTATE		$32,701,955
TOTAL RR FORCE ACCOUNT CONSTRUCTION COSTS		$46,950,000
70 VEHICLES		
	Total for Category 70	$110,250,000
80 PROFESSIONAL SERVICES (applies to Cats. 10-60)		
	Total for Category 80	$21,027,165
90 UNALLOCATED CONTINGENCY		
	Total for Category 90	$7,965,196
100 FINANCE CHARGES		
	Total for Category 100	$1,593,039
	TOTAL	$249,925,354

The estimates include the investments necessary to accommodate all phases of any of the proposed versions; they do not include provision for future replacement of original system components, which will be addressed separately based on an assumed average service life of all infrastructure improvements and rolling stock.

The infrastructure estimate was developed using the bottom-up method, by which site-specific quantities were estimated and unit costs applied. Unit costs were taken from recent,

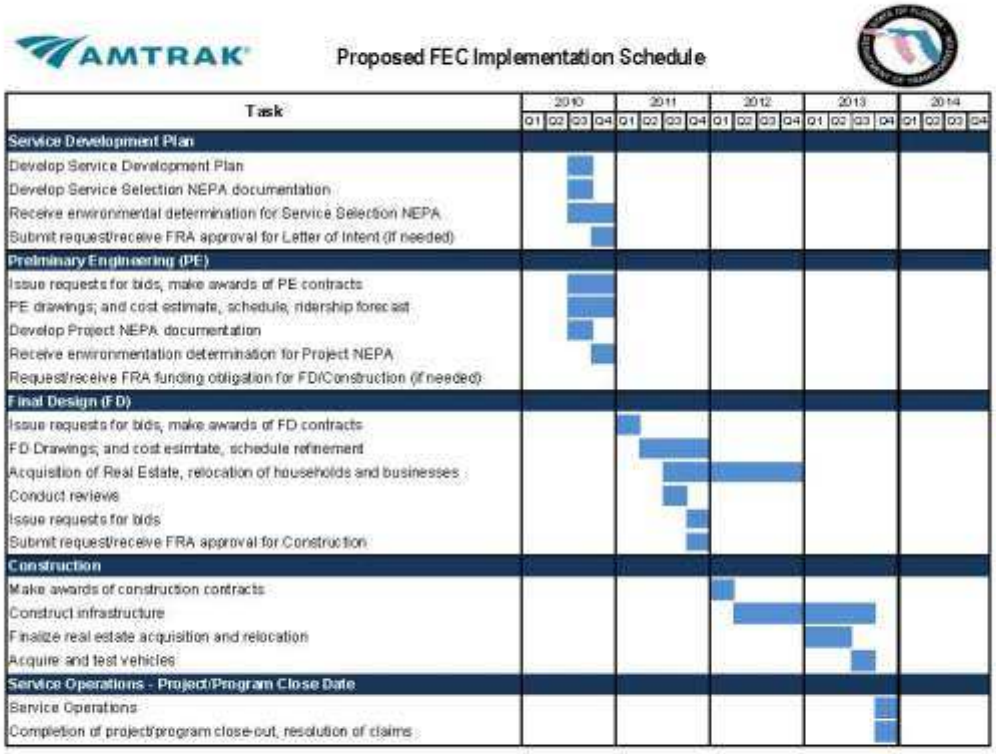
relevant in various parts of the U.S., including Florida. Adjustments to unit costs were made, where necessary, to reflect regional differences in costs.

Rolling stock requirements were analyzed by Amtrak, based on the preliminary timetables, including anticipated reliable equipment rotations and the need for spare vehicles. The equipment utilization analysis is provided as Attachment C. Rolling stock requirements, as shown in Attachment E for Phase 1 consist of 2 locomotives, 2 cab cars, 11 coaches, 1 food car, 4 sleeping cars, and 4 baggage cars for long distance and corridor service in Phase 1. For Phase 2, an additional 3 locomotives, 3 cab cars, 6 coaches and 3 food cars would be needed.

Estimated rolling stock costs assumed all new equipment, but the fleet ultimately deployed on the FEC will likely include both new and rehabilitated existing equipment. Specifically, at least three potential sources of equipment have been identified for the Florida East Coast Corridor - Amtrak Service: a planned procurement of new single-level, long distance cars; an anticipated, Amtrak-led procurement of a fleet of next-generation corridor cars and associated locomotives; and, refurbishment of existing Amtrak cars stored unserviceable. The new single-level equipment procurement is anticipated to include some 200 cars in a variety of configurations including baggage, coach, sleeper and diner; this procurement is the subject of a funding request separate from this application. The new corridor cars and associated locomotives are anticipated to be procured through the efforts of the Section 303 Equipment Committee, which was formed in response to Section 303 of the Passenger Rail Investment and Improvement Act of 2008 and which requires Amtrak to "establish a Next Generation Corridor Equipment Pool Committee to design, develop specifications for, and procure standardized next-generation corridor equipment." FDOT is subject to Florida law that may limit its ability to effectively participate in any joint procurement that may come out of the Section 303 Committee's efforts; however participation is being explored by FDOT to maximize the possibility of conforming the joint procurement process and the relevant Florida statutory requirements. Lastly, Amtrak's existing fleet includes approximately 70 cars previously stored unserviceable and now planned to be repaired for operation using funds to be obtained under a separate ARRA grant; some of these cars may be available to partially fulfill the Florida East Coast Corridor - Amtrak Service equipment requirements.

8.3 Project Schedule and Prioritization

The project schedule is identified below. Design and procurement are planned to begin immediately after grant approval, with construction targeted to commence in April 2011. The construction duration has been preliminarily estimated at 31 months, resulting in a forecasted date of construction completion and service inauguration of October 2013. Rolling stock procurement requires approximately 36 months to complete, and this process is considered to be already in-progress based on the Amtrak programs to procure new long distance cars and to refurbish existing inoperative cars. This duration is consistent with an inauguration of service in October 2013. Further, procurement of new corridor equipment will not need to be completed until a date subsequent, consistent with the inauguration of corridor operations in



FEC implementation schedule

Phase 2. Acquisition of non-railroad property to support station development may affect the implementation schedule, to the extent that one or more individual stations could be delayed if unforeseen problems are encountered relative to such property acquisition.

8.4 Conceptual Engineering and Design Documentation

Conceptual engineering and design documentation is detailed in the Preliminary Engineering Materials (August 2010) and has been attached to the application.

Chapter 9

Operating and Maintenance Costs and Capital Replacement Forecast

9.1 Costing Methodology and Assumptions

Amtrak provided the operating costing methodology and assumptions for Option D Phases 1 and 2.

9.1.1 Summary

This section summarizes the process that the Amtrak Financial Analysis Department follows in calculating the expected financial impact from proposed service changes to passenger rail service provided by Amtrak.

All estimates are based on specific information describing the proposed changes. This usually includes:

- The proposed schedule,
- The required additional equipment,
- The proposed changes to service, and
- Any proposed changes to operations.

Each proposal is reviewed by Finance employees familiar with Amtrak operations, data bases and financial systems. Each analysis is adapted to the specific intricacies of the request. Unit costs and averages used to calculate and allocate costs are specifically selected to fit the proposed service, schedule and operation.

Along with the forecasted change to riders, passenger miles, revenue, costs, net impact, and train miles, on most analyses, Amtrak also provides the cost recovery statistic and the cost per train mile to help facilitate the validation and understanding of the financial analysis.

9.1.2 Costs

Amtrak's process utilizes information provided by other Amtrak departments as well as average unit costs provided by APT, Amtrak's cost allocation system. Costs are calculated and allocated at a detailed level. We use unit costs that are selected specifically for the targeted cost area. Costs are inflated to the targeted reporting year, using specific inflation rates at the account level (e.g., wages, salaries, fuel, etc.). The unit cost that is listed below for each cost area.

Host Railroad costs: Host railroad costs are based on a per-train mile rate, provided by the Amtrak Host Railroad Department. The rate includes the access charge and the incentive charge.

Fuel Cost: Amtrak uses a fuel consumption model to estimate the required gallons. The model takes into account the weight of each car, the proposed schedule and the specific grade changes

of the track. The estimated required gallons are used to determine the percent change from the current gallons (of the targeted route). That percentage is used to calculate the change in current fuel costs.

T&E Labor Costs: T&E labor costs are provided by the Amtrak Crew Management Department. The estimate of these costs are based on the specific schedule and the current or proposed crew bases.

OBS Costs: OBS labor costs are provided by the Amtrak Crew Management Department. The estimate of these costs are based on the specific schedule and the current or proposed crew bases.

Commissary Costs: Two separate food and beverage commissary costs are forecasted: direct costs and allocated fixed costs. Direct commissary costs are based on the average direct cost per rider from a comparable route. Fixed costs are based on the proposed schedule and the endpoints juxtaposition to Amtrak's existing commissary facilities.

Yard Costs: If the proposed train operations require switching from diesel to electric, or include a large facility where yard expenses are incurred to transport equipment to a yard, yard costs are estimated using a cost per frequency average.

Transportation Management and Training Costs: Transportation management and training costs are based on unit trips.

Operations Management Costs: Operations management costs are based on unit trips.

Bus Costs: Bus cost estimates are provided by the Operations Support Department. The estimate of these costs is based on the proposed schedule and the appropriate bus rates.

Mechanical Costs:

- **Turnaround Costs:** Turnaround costs are based on the proposed change in turns and layovers.
- **Car and locomotive maintenance costs:** Maintenance costs are based on the proposed change in unit miles.
- **Back shop costs**: Back shop costs are based on the proposed change in unit miles.
- **MoE supervision and overhead:** MoE supervision and overhead costs are calculated based on the proposed change to mechanical direct costs.

Station Costs: Station costs are based on the forecasted change in riders.

Amtrak Maintenance of Way Costs: Amtrak maintenance of way costs are based on the proposed increase in train miles over Amtrak maintained track.

Sales and Marketing Costs: Sales and marketing costs are based on the forecasted change in passenger related revenues.

Commission Costs: Commission costs are based on the forecasted change in passenger related revenues.

Insurance Costs: Insurance costs are based on the forecasted change in passenger miles.

Passenger Inconvenience Costs: Passenger inconvenience costs are based on the forecasted change in passenger miles.

Police & Security / Environmental Safety Costs: Police & security / environmental safety costs are based on the forecasted change in unit trips.

9.2 Financial Results Summary

The financial impact from the proposed Florida East Coast Corridor - Amtrak Service was developed by Amtrak and is provided in Attachment E. As indicated previously, the proposed service plan for Phase 1 consists of splitting Amtrak's current Silver Star Service in Jacksonville and adding a corridor service train between Jacksonville and Miami. The Silver Star is a part of the National System operating since the 1970's. The new service would entail restored intercity passenger train service via the FEC Railway. Since the Silver Star is a part of the National Intercity Rail System, Amtrak will pay for the operating deficit for this train. The state of Florida will pay for the operating deficit for the corridor train in Phase 1. The state of Florida will be responsible for it's fair share of the designated operating deficits for the future state corridor service (Phases 2 and 3). The table provided below includes Amtrak's estimation of costs and deficits for the Phase 1 corridor train. The final Operating Plan between FDOT and Amtrak will define the allocation methodology. FDOT will allocate the required amount for the operating deficit for phase 1 through FDOT's 5-year Work Program. Maintenance at each of the eight stations will be paid by the local municipalities. Resolutions of support and a commitment to funding maintenance are included in the resolutions submitted as part of this application.

The financial analysis results as provided by Amtrak for Phase 1 and Phase 2 for Options D and E are provided below.

Financial Analysis Results

Allocated Financial Impact (1)	Phase 1, Option D/E			Phase 2 (2)	
	Star	Corridor	Total	Option D Corridor	Option E Corridor
Riders	135,800	86,800	222,600	190,300	150,100
Revenue (million)					
Ticket Revenue		$1.5		$3.0	$2.3
Food and Beverage Revenue		0.0		0.1	0.1
Total Revenue		$1.6		$3.1	$2.4
Expenses (million)					
Host Railroad		$2.0		$5.3	$4.0
Fuel		0.8		2.2	1.8
Power - Electric Traction		0.0		0.0	0.0
T&E (Labor & Support)		1.8		5.2	3.4
OBS (Labor & Support)		0.3		1.1	0.9
Commissary (F&B)		0.1		0.2	0.2
Yard Ops		0.0		0.0	0.0
Operations Management		0.3		1.3	1.3
Motor Coach		0.0		0.0	0.0
Maintenance of Equipment		0.9		4.7	4.7
Stations		0.4		0.8	0.8
Amtrak Maintenance of Way		0.0		0.0	0.0
Sales and Marketing		0.2		0.37	0.29
Commissions		0.0		0.1	0.1
Insurance		0.1		0.14	0.10
Passenger Inconvenience		0.0		0.02	0.01
Police, Environmental, and Safety		0.1		0.3	0.4
Sub-total Direct Operating Costs		$6.9		$21.8	$17.9
Net (Rev. – Dir. Op. Costs) (mil)		-$5.3		-$18.7	-$15.5
Cost Recovery (Rev/Dir Costs)		23%		14%	14%
Cost per Train Mile		$27		$32	$36

1) 2010 Dollars
2) Both Option D and Option E for Phase 2 are incremental to the Corridor portion of Phase 1
3) Amtrak absorbs operating costs for *Star*

Chapter 10

Public Benefits Analysis

Operational and Transportation Output Benefits – The FEC Corridor improvements will enable passenger trains to achieve 90 miles per hour through a significant portion of the FEC Corridor, resulting in better on-time performance and travel time savings. With the proposed project improvements, travel time savings have been modeled at approximately 3 hours and 37 minutes and ridership for Phase 1 is expected to attract an additional 222,600 passengers. Passenger miles travelled for Phase 1 is 78,350,000 per year.

10.1 User and Non-User Economic Benefits

Benefits are anticipated to accrue from the proposed Florida East Coast Corridor - Amtrak Service, both to users and non-users of the service. The identified benefits would increase as the volume of rail service usage grows in future years, beyond the initial implementation phases.

Benefits to users:

- Public transportation access to cities that are automobile dependent, having neither scheduled air nor bus service; and, a potentially more economical and/or comfortable public transportation option, than air and/or bus service where provided.

Benefits to non-users:

- Job creation – temporary design and construction jobs during implementation, and permanent jobs associated with the ongoing operation and maintenance of the proposed service.
- Economic development – potential stimulation of Transit Oriented Development in proximity to proposed station locations.
- Environmental benefits – reduced emissions and fossil fuel consumption per passenger mile, relative to automobiles and airplanes.

10.2 Benefits by Rail Service Type

The proposed service is anticipated to provide benefits to other rail services such as commuter rail and freight. The existing infrastructure owner and freight operator, FEC, would benefit from the construction of new passing sidings, improved grade crossing protection installations, and signal system improvements. Even though the proposed new sidings are needed to support intercity passenger train operation, they would be available to provide additional operating flexibility to freight trains as well. Similarly, new and/or expanded grade crossing protection equipment would increase the safety of freight as well as passenger train operations.

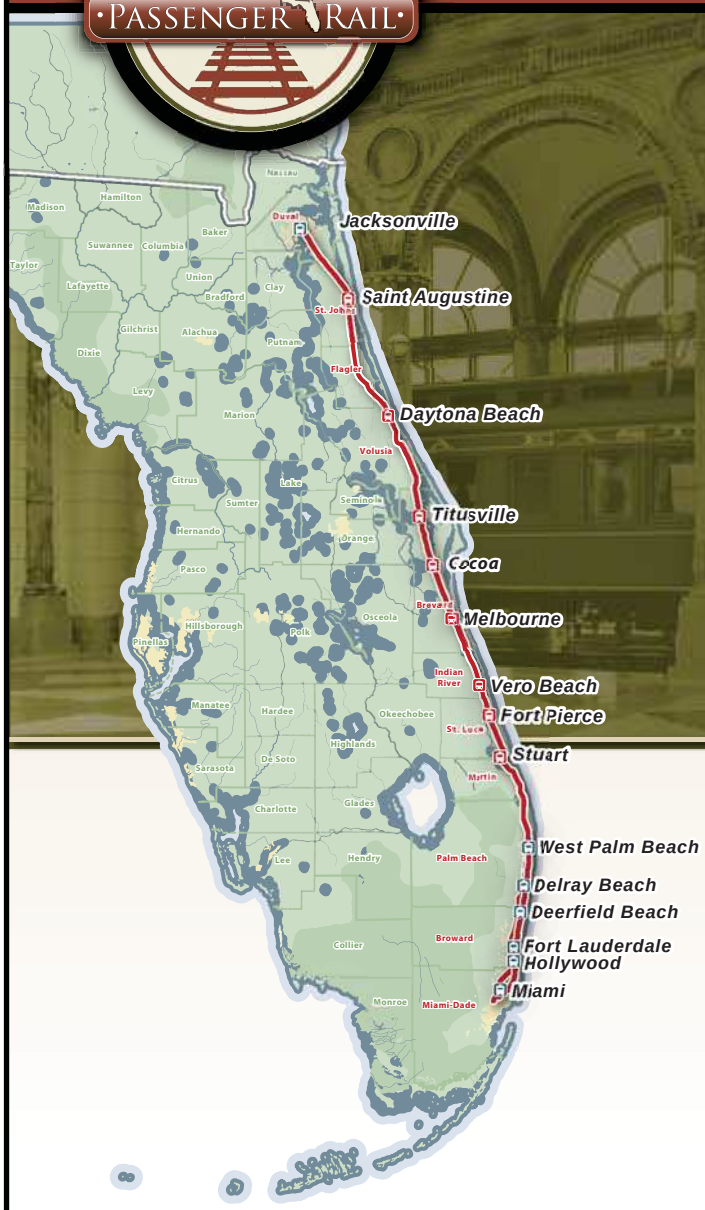
With regard to benefits to other passenger operations, there would be significant potential synergies between the proposed Amtrak service via the FEC and proposed commuter rail or

other transit services on the FEC in the vicinity of Jacksonville and Miami. The commuter rail service being studied by the JTA would potentially benefit from Amtrak's re-activation of the existing, former-FEC station in St. Augustine, as well as from grade crossing protection improvements as mentioned previously. Amtrak related signal system improvements; to the extent they advance installation of PTC, would also benefit future commuter rail operations. Similarly, the commuter rail / transit service being studied by FDOT in southeast Florida could potentially benefit from station, grade crossing, and signal system improvements in the segment between Jupiter and West Palm Beach where the proposed Amtrak service and commuter rail service would overlap, depending upon the technology ultimately selected in the transit study. The realignment of the Northwood connection will facilitate extending Tri-Rail commuter services north from West Palm Beach to Jupiter.

ATTACHMENT A

SUMMARY OF AMTRAK TRAVEL DEMAND FORECASTING MODELS

FEC AMTRAK® PASSENGER RAIL



Federal Funding Opportunity Number: FR-HSR-10-004

TBG0614102323390RL

Summary of Amtrak Travel Demand Forecasting Models

April 2010

Contents

- **Long Distance Train Model** **3**
- **Northeast Corridor (NEC) Model** **11**
- **California Intercity Rail Model** **34**
- **Best Practices Corridor Model** **63**

Overview of
Long Distance Train Model

June 2005

Data Sources & Basis

- **New Market Research**
  - Focus on FY04 Long Distance Train Customers
  - Nearly 5,500 complete surveys

- **Adjusted FY04 Ridership & Ticket Revenue Baseline**
  - By Route
  - By Class
  - By Market

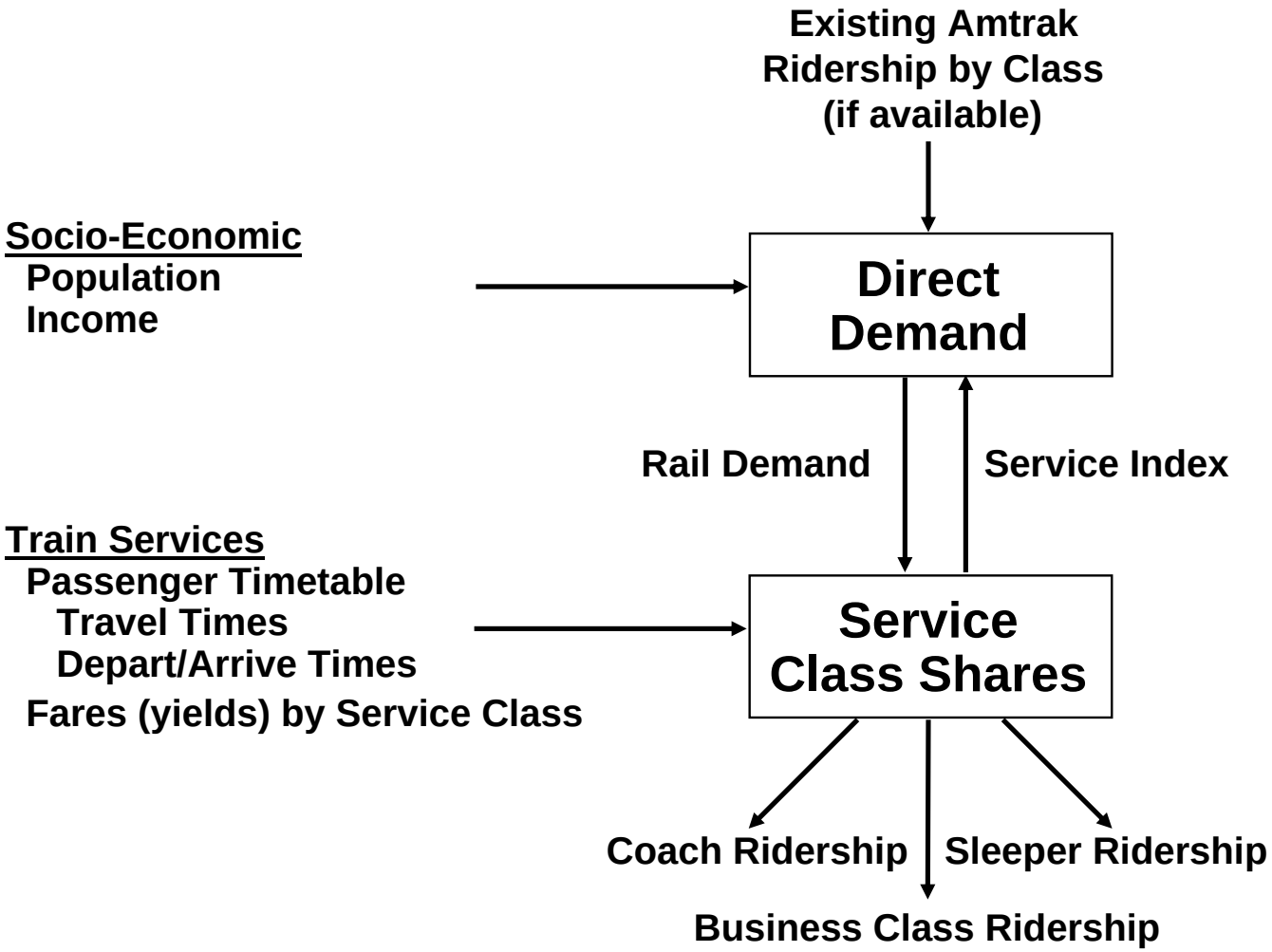
- **Observed Ridership & Ticket Revenue Trends**
  - Early FY05 versus FY04 performance
  - Impact of changes in slotting / spacing of trains in the Southeast

New Market Research

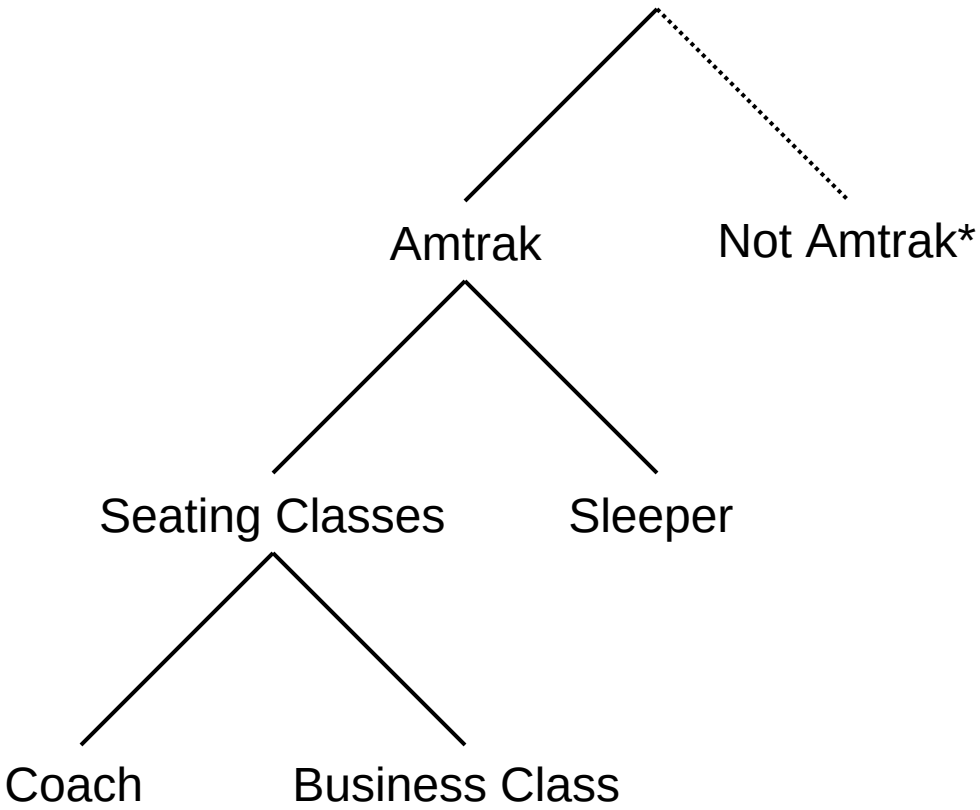
- **Class / Choice Trade-Offs**
  - Choice of …
    - Coach
    - Business Class
    - Sleeper
    - NOT Amtrak
  - Changes in …
    - Pricing of each Service Class
    - Travel Time
    - Departure/Arrival Time-of-Day

- **Other Impacts on Amtrak Usage**
  - “Unexpected” Delay (late with respect to customer tolerances)
  - Train-to-Train Transfers
  - Less than Daily Service (i.e., tri-weekly)

Structure of the Model



Class Choice Structure



*conceptual “choice” including travel by other modes and not making a trip; note that model does not estimate total market size or total non-users

Key Drivers

- **Existing Amtrak Demand (ridership), if available**

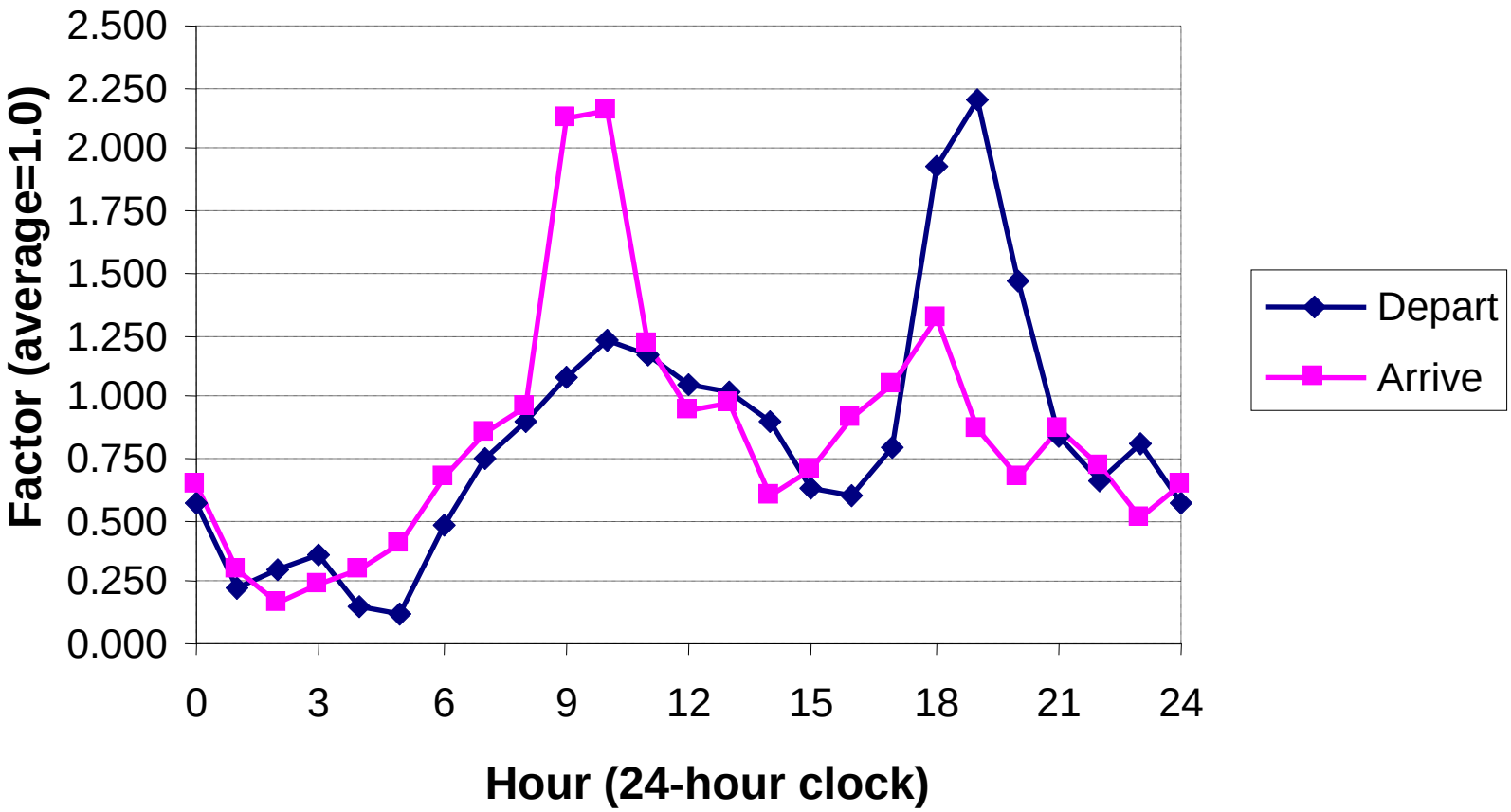
- **Socio-Economic Data/Forecasts**
  - Total Income (Population * Per Capita Income)
  - Per Capita Income (scales fare/price sensitivities)

- **Service Characteristics (for each train/route)**
  - Timetable
    - Frequency (daily, tri-weekly, etc.)
    - Classes of Service (coach, business, sleeper)
    - Depart/Arrive Times of Day
      - travel times
      - number of nights
      - spacing between trains
    - Mileposts
      - trip length (miles)
  - Fares (Average Yields) by Class of Service

Key Sensitivities of Demand
(average across all markets)

	Coach	Sleeper
Travel Cost / Fare Elasticity	-0.75	-0.69
Travel Time Elasticity	-0.68	-0.68
Frequency Elasticity (less than daily service)	+1.0 to +0.6 **(varies by trip length, not class)**	
Percent Change for “Unacceptable” Delay	-34%	-34%
Percent Change if Transfer Required	-50%	-57%
Percent Change for each Night of Travel	NA	+53%
Departure / Arrival Time of Day Factors	as shown by graph	

Time of Day Factors



Summary of New Amtrak Northeast Corridor (NEC) Travel Demand Forecasting Model

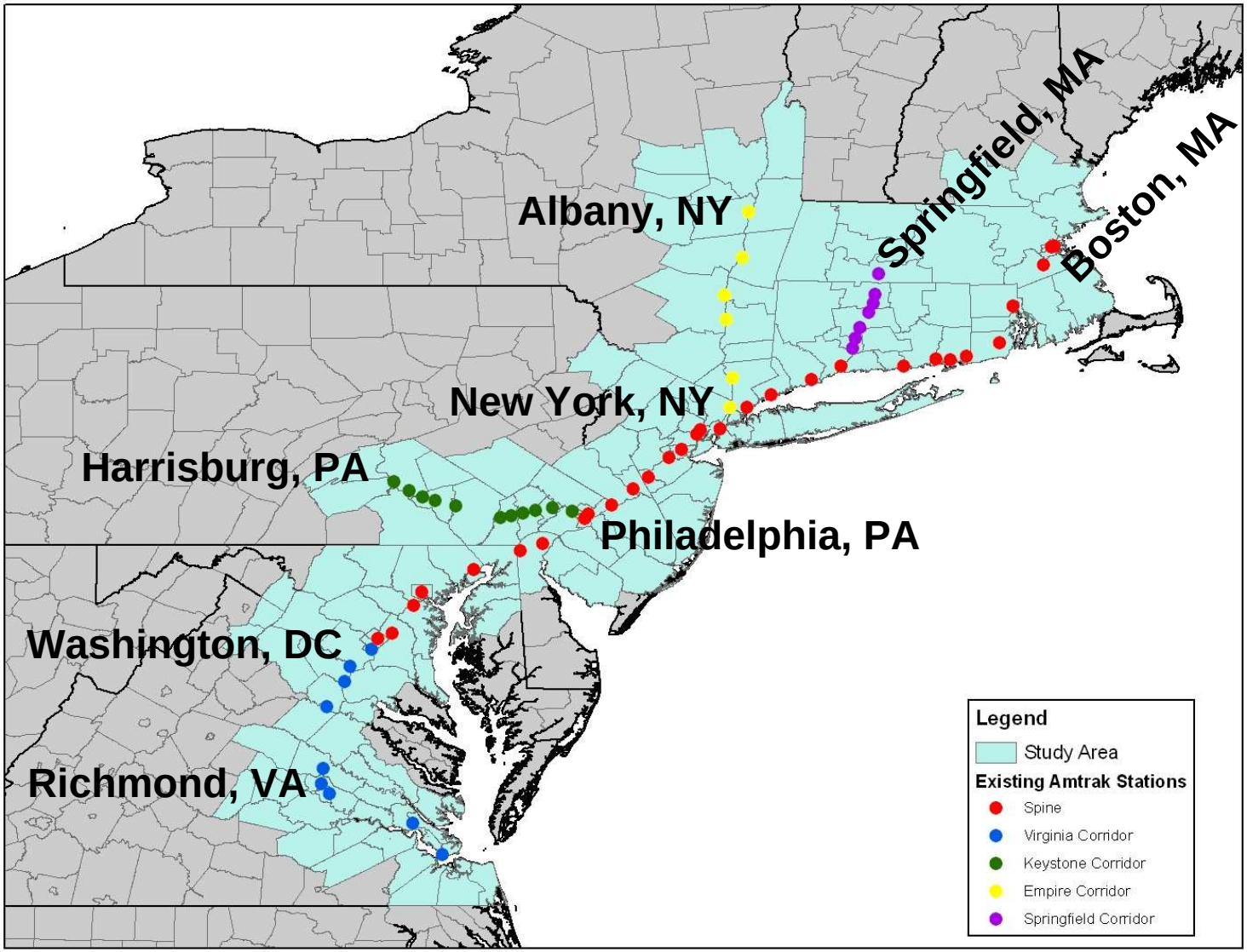
May 2007

Purpose and Scope

- **Objectives**
  - Understand existing and predict future intercity passenger travel within the Northeast
  - Develop multi-modal passenger travel demand forecasting model system tool
  - Prepare ridership and ticket revenue forecasts for future Amtrak service scenarios and pricing

- **Scope**
  - Intercity passenger travel
    - Auto, air, and intercity bus
    - Premium (Acela) and Regular (Regional) rail
  - Study area
    - NEC Spine (Washington, D.C. – New York – Boston)
    - Corridors branching from the Spine serving Virginia, Harrisburg, Albany, and Hartford/Springfield

Study Area


Albany, NY
Springfield, MA
Boston, MA
New York, NY
Harrisburg, PA
Philadelphia, PA
Washington, DC
Richmond, VA
Legend
Study Area
Existing Amtrak Stations
Spine
Virginia Corridor
Keystone Corridor
Empire Corridor
Springfield Corridor

Travel Market Data Sources

- **Passenger/Vehicle Counts**
  - Amtrak Data Warehouse
  - Air passengers
    - FAA 10 percent sample
    - Commuter data
  - Highway traffic counts

- **New Travel Surveys**
  - Highway origin-destination surveys in Maryland, New Jersey, and Massachusetts
  - Telephone survey of Amtrak customers
  - Telephone survey of random NEC travelers

Travel Survey Program

- **Highway O-D Surveys (4,638 completed mail-back surveys)**
  - I-95 in Maryland
  - New Jersey Turnpike
  - Massachusetts Turnpike

- **Telephone Survey of Amtrak Customers (5,001 completed interviews)**
  - Acela, Regional, Virginia, Keystone, Empire, and Springfield services

- **Telephone Survey of Random NEC Travelers (10,015 completed interviews)**
  - Auto, air, and intercity bus travelers

Highway Survey

- **Sample Size**
  - 4,638 completed mail-back surveys

- **Survey Purpose**
  - Develop an estimate of origin-destination trips by auto within the NEC
  - Used to adjust data from the random traveler telephone survey to account for under-reporting of auto trips

- **Observed Trip Data**
  - Origin and destination
  - Trip purpose
  - Group size
  - Trip duration

- **Household Demographic Data**
  - Household size, auto ownership, and income

Telephone Survey of Amtrak Customers

- **Sample Size**
  - 5,001 completed interviews
- **Survey Purpose**
  - Develop an origin-destination trip table by purpose for Amtrak trips within the NEC
  - Determine sensitivity of Amtrak customers to travel time, frequency, fare/cost, on-time performance, and other characteristics of NEC modes
- **Observed Trip Data**
  - Current Amtrak Class of Service (Acela First Class, Acela Business Class, Regional Business Class, or Regional Coach Class)
  - Origin and destination
  - Trip purpose
  - Group size
- **Future Stated Travel Intentions**
  - Modes (Acela, Regional, auto, air, or intercity bus)
  - Varied levels of service (travel time, frequency, fare/cost, on-time performance)
- **Household Demographic Data**
  - Household size, auto ownership, and income

Telephone Survey of Random Travelers

- **Sample Size**
  - 10,015 completed interviews
- **Survey Purpose**
  - Develop an origin-destination trip table by purpose for auto, air, and intercity bus trips within the NEC
  - Determine sensitivity of random travelers to travel time, frequency, fare/cost, and on-time performance of NEC modes
- **Observed Trip Data**
  - Current mode (auto, air, intercity bus)
  - Origin and destination
  - Trip purpose
  - Group size
- **Future Stated Travel Intentions**
  - Modes (Acela, Regional, auto, air, or intercity bus)
  - Varied levels of service (travel time, frequency, fare/cost, on-time performance)
- **Household Demographic Data**
  - Household size, auto ownership, and income

Summary of Travel Market Data

- **Developed an origin-destination person trip table by mode and purpose for annual trips in the NEC**

- **Combined the trip tables developed from the Amtrak Customer and Random Traveler surveys**
  - Amtrak Customer survey weighted to reflect total FY06 Amtrak ridership on Acela, Regional, Virginia, Keystone, Empire, and Springfield services
  - Random Traveler surveys weighted to reflect the total (non-Amtrak) intercity traveling population in the NEC

- **Random traveler survey auto trips were adjusted to account for under-reporting of auto trips in telephone recall surveys**
  - Adjustment based on the auto person trip table developed from the highway surveys

Summary of Travel Market Data: 2006 Person Trips by Mode

Metro Area Pair	Auto	Air	Bus	Acela	Regional	Total
Boston - New York	13,563,377	2,499,698	1,223,674	465,902	374,405	18,127,056
Boston - Philadelphia	2,382,853	541,760	98,224	14,329	42,610	3,079,776
Boston - Washington	1,632,061	2,102,639	64,256	18,914	37,969	3,855,839
New York - Philadelphia	31,715,504	45,644	1,451,467	301,768	976,337	34,490,720
New York - Baltimore	7,664,755	206,834	958,002	154,393	386,516	9,370,500
New York - Washington	13,844,102	1,427,551	756,048	510,833	1,095,630	17,634,164
Philadelphia - Baltimore	9,186,058	89,361	217,967	21,876	119,276	9,634,539
Philadelphia - Washington	8,355,977	45,884	137,539	194,101	475,046	9,208,546

Summary of Travel Market Data: 2006 Person Trips by Purpose

Metro Area Pair	Business	Non Business	Total
Boston - New York	4,080,235	14,046,821	18,127,056
Boston - Philadelphia	533,050	2,546,726	3,079,776
Boston - Washington	1,494,585	2,361,254	3,855,839
New York - Philadelphia	9,140,351	25,350,369	34,490,720
New York - Baltimore	989,685	8,380,815	9,370,500
New York - Washington	2,580,857	15,053,307	17,634,164
Philadelphia - Baltimore	3,019,953	6,614,586	9,634,539
Philadelphia - Washington	1,805,900	7,402,646	9,208,546

Socio-Economic Data & Forecasts

- **Measures**
  - Population
  - Employment
  - Per Capita Income

- **Sources**
  - Economy.com data and projections by county
  - U.S. Census for allocations to sub-county areas

Population by Metro Area

Metro Area	2006 (millions)	2010 (millions)	Change 2006-2010
Washington	5.103	5.342	4.7%
Baltimore	2.904	2.985	2.8%
Wilmington	0.848	0.882	4.0%
Philadelphia	5.417	5.470	1.0%
New York including New Jersey	18.854	19.096	1.3%
New Haven	0.849	0.864	1.8%
Trenton	0.368	0.377	2.5%
Providence	1.193	1.211	1.5%
Boston	6.062	6.157	1.6%

Employment by Metro Area

Metro Area	2006 (millions)	2010 (millions)	Change 2006-2010
Washington	2.909	3.115	7.1%
Baltimore	1.412	1.488	5.4%
Wilmington	0.418	0.441	5.4%
Philadelphia	2.609	2.699	3.5%
New York including New Jersey	8.432	8.757	3.9%
New Haven	0.380	0.402	5.8%
Trenton	0.242	0.255	5.4%
Providence	0.531	0.550	3.6%
Boston	3.102	3.224	3.9%

Per Capita Income by Metro Area

Metro Area	2006 (ths/2006$)	2010 (ths/2006$)	Change 2006-2010
Washington	52.16	56.08	7.5%
Baltimore	43.12	47.42	10.0%
Wilmington	39.89	44.84	12.4%
Philadelphia	42.51	45.18	6.3%
New York including New Jersey	48.11	52.72	9.6%
New Haven	42.25	45.68	8.1%
Trenton	50.34	54.54	8.3%
Providence	36.64	39.10	6.7%
Boston	47.12	51.15	8.6%

Highway (Auto) Service

- **Distance and Travel Time**
  - Highway network links
    - New York Metropolitan network for New York area
    - Oak Ridge National Laboratory Highway Network for rest of study area
  - Highway link speeds
    - Used New York Metro area speeds in New York
    - Assigned based on facility type for Oak Ridge Network
    - Adjustments made in urban areas

- **Travel Cost**
  - Operating cost per mile
    - Business – Fully allocated (43.5 cents per mile)
    - Non-Business – Incremental (18 cents per mile)
  - Tolls/Other Costs

Summary of Service Characteristics: Washington – New York

	Auto	Air	Bus	Acela Express	Regional
Line Haul					
Distance (miles)	236	214	236	226	226
Travel Time (hours)	4.4	1.2	4.8	2.8	3.4
Travel Cost *	$133/$58	$125	$37	$156	$82
Frequency (avg./day)		38	21	15	21
Access/Terminal					
Distance (miles)		15.58	5.41	5.84	5.84
Travel Time (hours)		0.41	0.23	0.25	0.25

* Auto Cost Includes Tolls and is Presented as Business / Non Business Costs

Summary of Service Characteristics: New York – Boston

	Auto	Air	Bus	Acela Express	Regional
Line Haul					
Distance (miles)	208	185	208	231	231
Travel Time (hours)	3.82	1.2	5	3.6	4.2
Travel Cost	$110/$44	$121	$37	$107	$68
Frequency (avg./day)		40	21	9	9
Access/Terminal					
Distance (miles)		14.64	5.22	5.65	5.65
Travel Time (hours)		0.44	0.20	0.22	0.22

* Auto Cost Includes Tolls and is Presented as Business / Non Business Costs

Travel Demand Model Components

- **Integrated Two-Stage Approach**

- **Total Travel Market – Total Volume of Travel Between Two Areas**
  - Existing Market Size
  - Future Market Growth

- **Mode Share – Market Share of Trips Between Two Areas Captured by Each Mode of Travel**
  - Amtrak
    - Premium Service – Acela Express (by class)
    - Regular Service – Regionals/Empire/Keystone (by class)
  - Auto
  - Air
  - Intercity Bus

Model Development Process

- **Market Segmentation**
  - Business Trips
  - Non-Business Trips

- **Model Structure/Form – Nested Logit**

- **Independent Variables**
  - Level of Service
  - Travel Time (Line Haul & Access)
  - Departure Frequency & Time Slot
  - On-Time Performance (OTP)
  - Travel Cost / Income

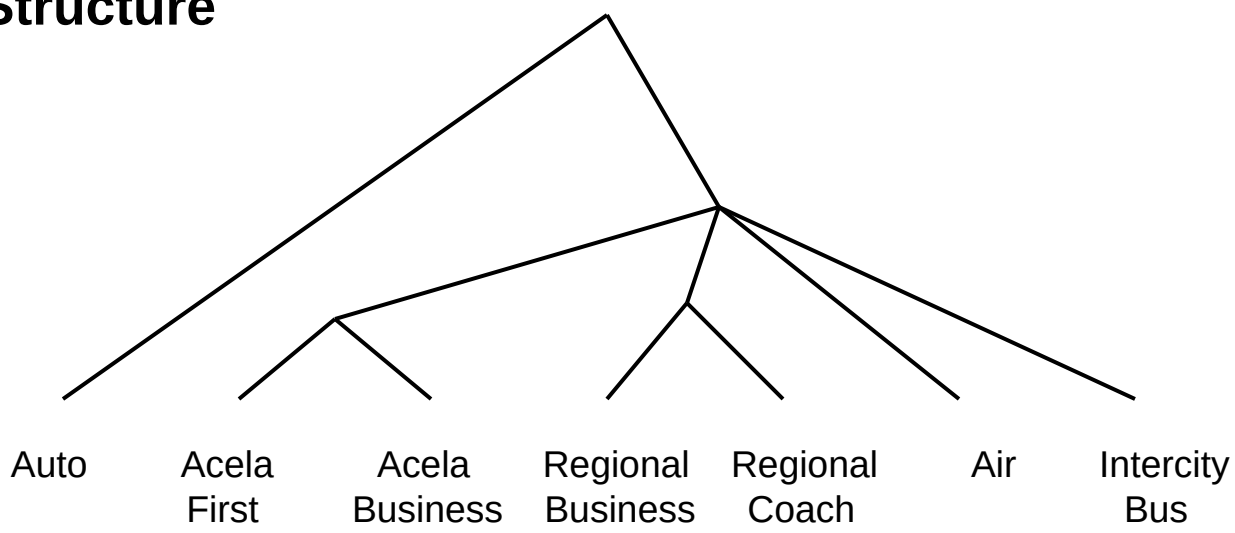
Model Structure

- **Logit Equation**

$$P(m) = \exp(U(m)) / \sum_{m} \exp(U(m))$$

where:
P(m) - probability or share for mode m
U(m) - utility for mode m

- **Nested Structure**



Model Development Process

- **Statistical analysis of Preference Surveys**
  - Trade-off/substitution behavior among available modes
  - Sensitivities to changes in key characteristics of modes
    - Travel time
    - Travel cost
    - Frequency / schedule slotting
    - On-Time Performance (OTP)
    - Transfers/Connections
  - Market segmentation – differential sensitivities by trip purpose

- **Application and Validation**
  - Current market and service characteristics
  - Actual travel volume data (ridership/revenue)
  - Adjust/calibrate model to match observed actuals

Key Line Haul Sensitivities (Elasticities) of Demand

(average across all NEC Markets)

	Acela	Regional
First Class Cost	-0.64	-
Business Class Cost	-0.65	-0.60
Coach Class Cost	-	-0.85
Travel Time	-1.40	-1.24
Frequency	0.35	0.34
OTP (@ 80%)	0.63	0.34
Impact of Transfer/Connection	-40%	-32%

- Fare elasticity of -0.65 means that a 10% *increase* in fare will result in a 6.5% *decline* in demand (ridership); after applying the increased fare yield (of +10%) this results in a net revenue *increase* of about 3.5%
- Travel Time elasticity of -1.4 means that a 10% *reduction* in travel time will result in a 14.0% *increase* in demand (ridership or revenue)
- Frequency elasticity of 0.35 means that a 10% *increase* in frequency will result in a 3.5% *increase* in demand (ridership or revenue)
- OTP elasticity of 0.63 means that a 10% *increase* in OTP, from 80% to 88%, will result in a 6.3% *increase* in demand (ridership or revenue)

Caltrans/Amtrak

California Intercity Rail Ridership/Revenue Forecasting Model

February 2007

Introduction

- **Purpose**
  - The California Intercity Rail Ridership/Revenue Forecasting Model is designed to provide accurate and consistent ridership and ticket revenue forecasts in support of short and long term route planning
- **Features**
  - Key input is provided by over 100,000 completed rail and auto surveys with data on trip origin/destination, departure/arrival times, trip purpose, and traveler demographics
  - Data on departure/arrival times and trip lengths from thousands of rail trips in California as well as throughout the Amtrak system is reflected in the model's parameters
  - Forecasts are based on consumer travel choices, historical data of actual rail travel, & travel market size/composition (business/leisure)
- **Participants**
  - Amtrak & Caltrans – provide funding & oversight of model
    - Original data collection and model development
    - Ongoing program of model updates/revisions & survey research
  - AECOM – responsible for developing, maintaining, & applying the model

California Demand Model

- **Model is used to address changes in …**
  - Station stop locations
  - Train travel times
  - Train departure/arrival times/time-of-day
  - Frequency (number of trains)
  - Rail fares/yields
  - Competing auto travel time & cost
  - Future growth rates
- **Model parameters derived from …**
  - Extensive travel survey data
  - In-depth analysis of historical data & trends
- **Key model inputs provided by …**
  - Amtrak/Caltrans train timetables & fares
  - Statewide highway network, for access to/from stations and for competing auto travel
  - Population data & forecasts from State of California

Model Scope

- **Corridors**
  - Northern & Central California
    - San Joaquins (Bay Area / Sacramento – Bakersfield)
    - Capitol Corridor (San Jose – Auburn)
  - Southern California
    - Pacific Surfliner (San Diego – Los Angeles – San Luis Obispo)
  - Linking Northern and Southern California
    - Coast Route (via San Luis Obispo)
    - San Joaquin Route (via Bakersfield)
  - Includes major thruway bus connections

- **Modes**
  - Intercity passenger rail
  - Auto (private vehicle)
  - Air (relevant for Northern – Southern California market)

Model Dimensions

- **Travel market growth variable**
  - Population
  - Income
  - Employment

- **Travel Market Share Variables**
  - Travel time
    - line haul
    - access/egress
  - Travel cost
  - Frequency (number of trains & departure/arrival times-of-day)

- **Trip purpose market segments**
  - Commute, business, recreation & other

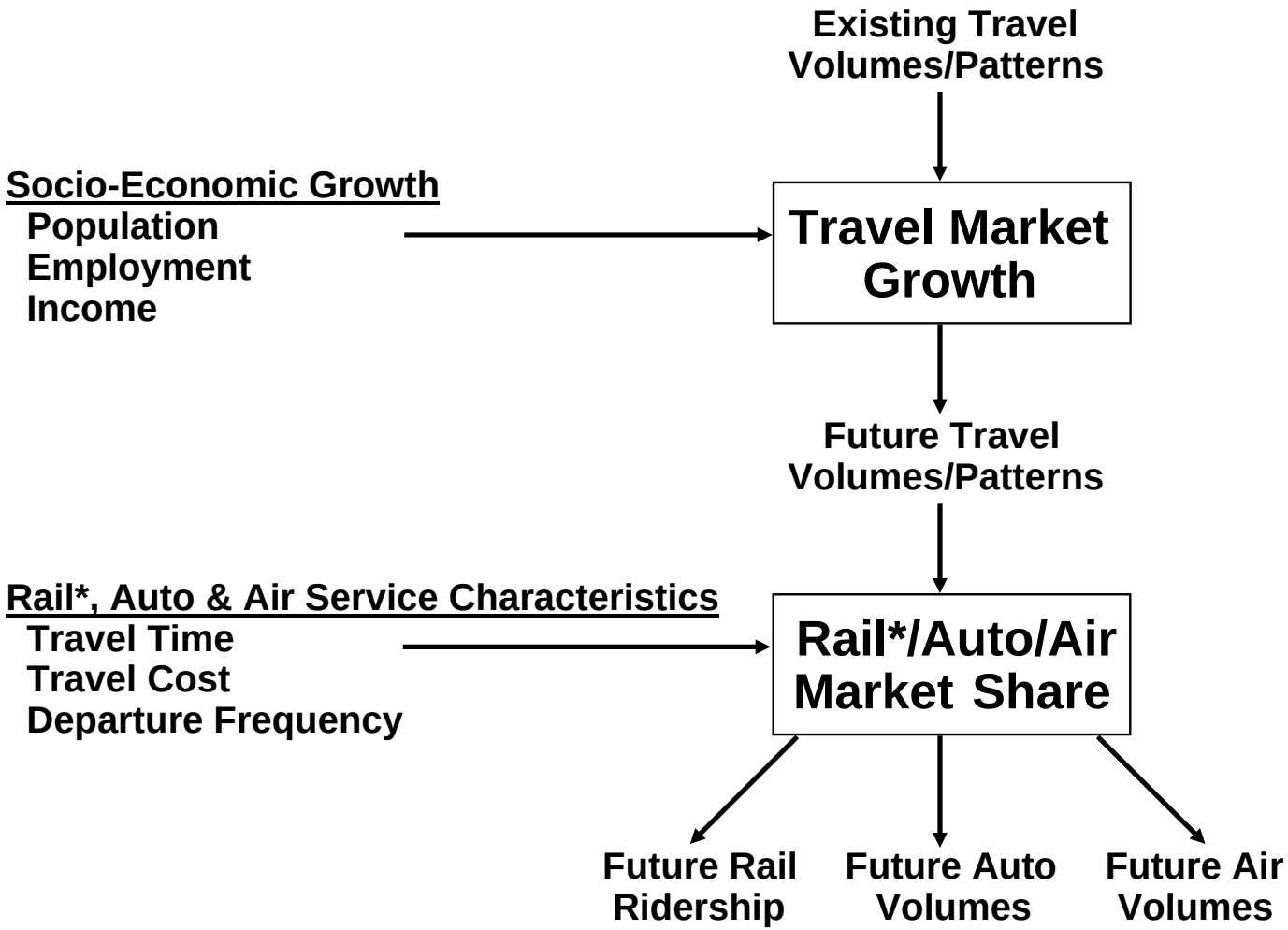
- **Each origin-destination market is analyzed with a separate set of calculations by trip purpose**

Key Model Components

- **Model Development Steps**
  - Conduct travel surveys
  - Input socio-economic data / survey data
  - Develop service parameters/assumptions
  - Run travel demand models

- **Key Inputs**
  - Rail service characteristics
    - Train schedules
      - travel time
      - frequency (departure/arrival times-of-day)
    - Revenue yield/fares
    - Station access (highway time & cost)
  - Competing auto & air service characteristics
  - Socio-economic data & forecasts
    - Population from California Department of Finance
    - Employment & income from various local & state sources

Structure of the Model



* includes Thruway Bus

Highway Survey Methodology

- **License Plate Survey Technique**
  - Videotape license plates
  - Reduce data and enter observed plates
  - Obtain addresses from California DMV & mail surveys
  - Completed surveys returned by mail & key-entered
  - Or, respondent option to complete survey by internet

- **Rest Area Survey Technique**
  - Interview travelers in a rest area
  - Data collected and entered during the interview
  - Best suited for lower volume semi-rural locations where local traffic is not as significant

- **Over 100,000 completed surveys of auto travelers**

Rail Survey Methodology

- **Distribute self-administered survey forms to passengers on-board Amtrak California Trains**
  - San Joaquins
  - Capitol Corridor
  - Pacific Surfliner

- **Collect Completed Surveys on-board**

- **Key-enter Completed Surveys**

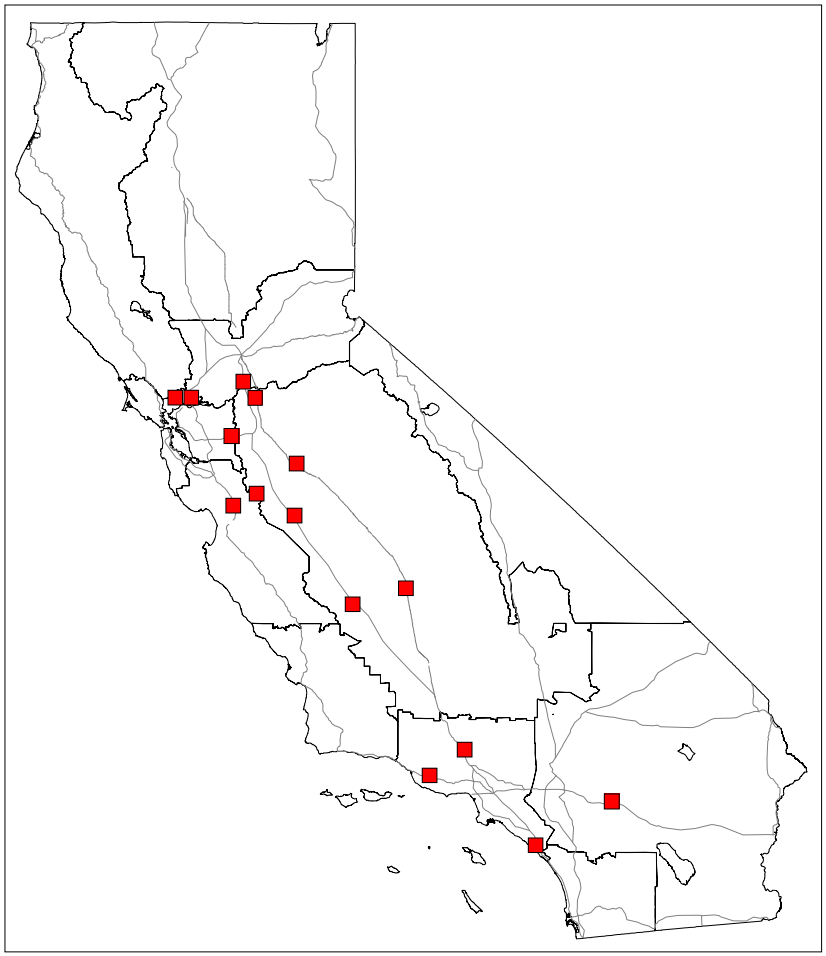
- **Over 25,000 completed surveys from rail travelers**

Highway & Rail Survey Content

- **Origin & Destination**
  - Location (5-digit zip code)
  - Type/trip purpose
  - Departure/arrival times
- **Group Size / Vehicle Occupancy**
- **Trip Frequency**
- **Traveler Characteristics**
  - Age & gender
- **Household Characteristics**
  - Size
  - Number of vehicles
  - Annual income

Highway Survey Locations

- **Northern/Central California**
  - I-80/680 in Solano County
  - I-580 near Altamont Pass
  - Route 152 near Pacheco Pass
  - US 101 south of Gilroy
  - I-5 & Route 99 near Lodi (Sacramento-Stockton)
  - Rest Areas on I-5 & Route 99 within the Central Valley



- **Southern California**
  - I-5 near Santa Clarita
  - US 101 near Camarillo
  - Rest Areas on US 101
  - I-5 near Oceanside
  - I-15 near Mission Rd, San Diego Co.
  - I-10 near Beaumont

Supporting Market Analysis & Data

- **Other Amtrak market research & analysis**
  - Analysis of historical demand elasticities of price & frequency changes in California as well as nationwide
  - Study of parking, on-time performance & Business Class on the Pacific Surfliner

- **Amtrak ridership & ticket revenue**
  - By station pair, train & route
  - Includes connecting train & Thruway Bus riders
  - Provides a complete universe of frequencies, schedules and travel times

- **Air Passenger Data**

Travel Market Growth Drivers

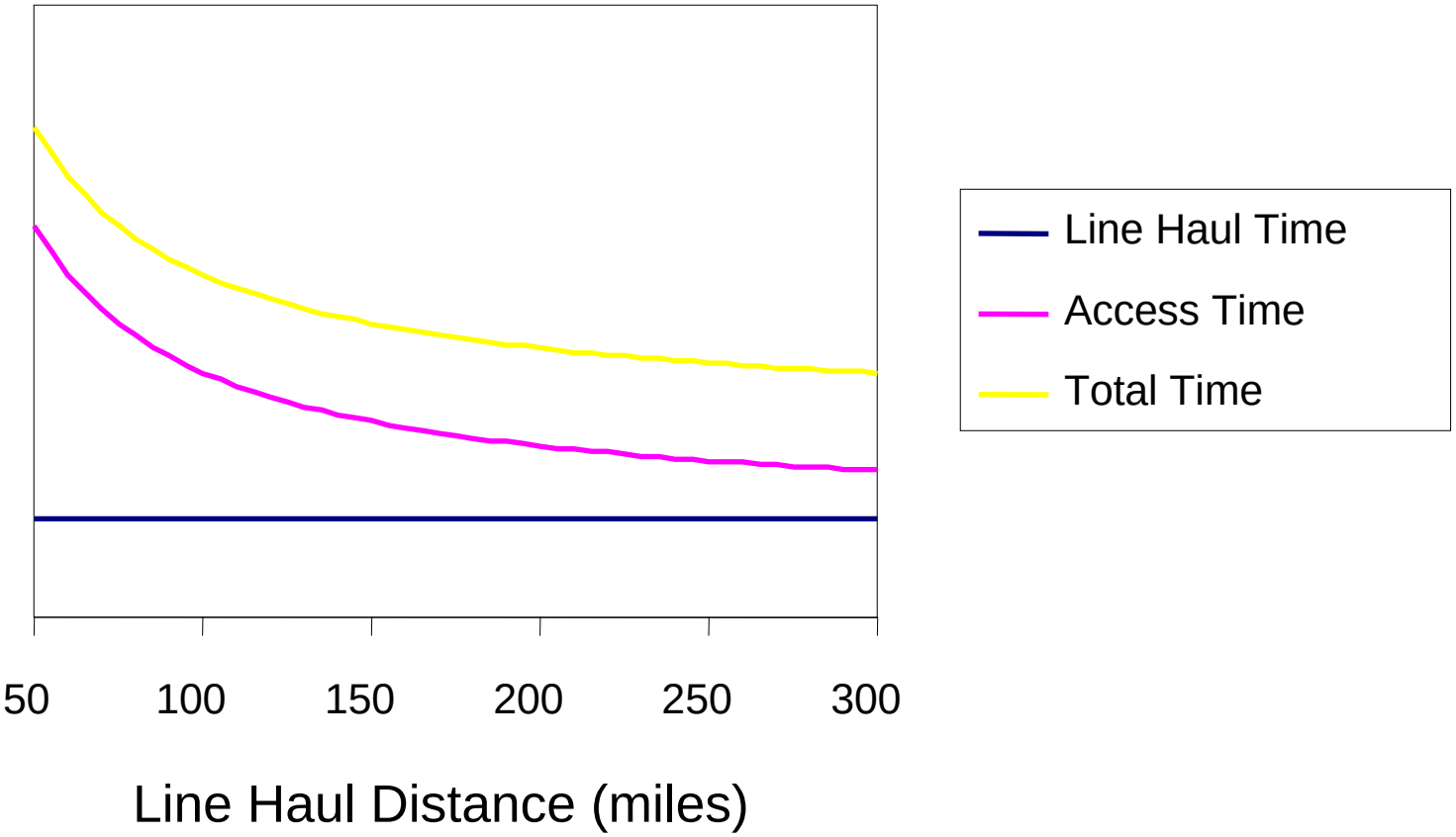
	Trip Purpose Segment			
Variables	**Commute**	**Business**	**Recreation**	**Other**
Population (home)	X	X	X	X
Population (non-home)				X
Income			X	
Employment	X	X	X	X

Travel Market Share Drivers

- **Variables**
  - Travel Time (weighted by component)
    - Line Haul
    - Access/Egress
  - Travel Cost
  - Frequency (departure/arrival time-of-day)

- **Trip Purpose Segments**
  - Commute
  - Business
  - Recreation
  - Other

“Weighted” Travel Time



Travel Cost and Frequency Elasticities

	Trip Purpose Segment			
Variables	Commute	Business	Recreation	Other
Travel Cost	-1.0	-0.5	-0.9	-0.7
Frequency	0.9	0.8	0.7	0.7

Derived from analysis of historical Amtrak trends

Schedule Time-of-Day Sensitivity

- **Initial Model Based on Daily Train Frequencies**
  - All train departures and arrivals treated equally
  - Not sensitive to changes in scheduled departure/arrival times

- **Revised Model Sensitive to Changes in Train Departure/Arrival Times**
  - Uses new time-of-day factors
    - Departure time from origin station
    - Arrival time at destination station
    - Train spacing/coverage
  - Replace daily train frequency variable
  - Travel time and fare sensitivities not affected

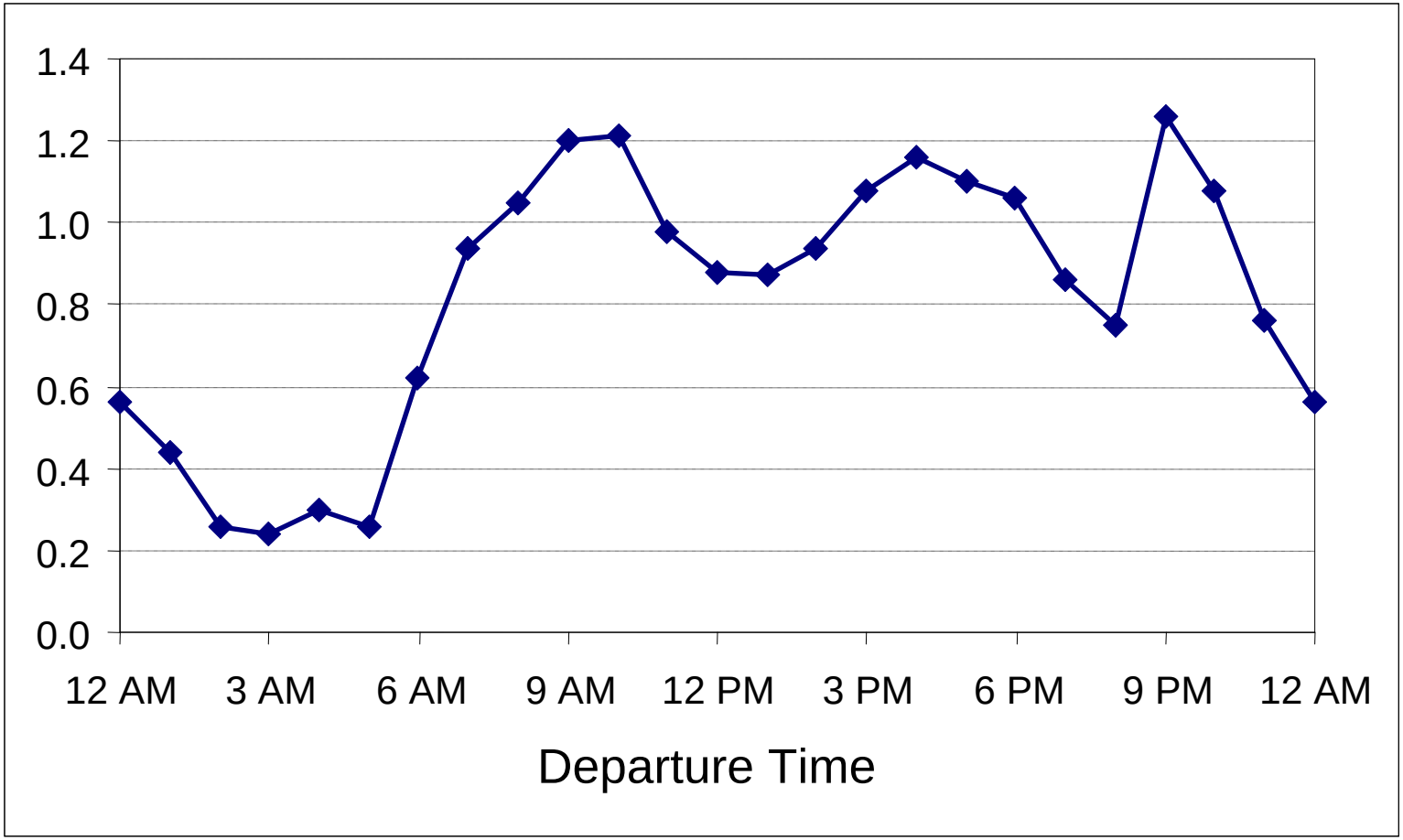
Time-of-Day Analysis Approach

- **Assemble Historical Train Ridership & Schedules**
  - Pacific Surfliner (formerly San Diegans)
  - Central California (Capitols & San Joaquins)

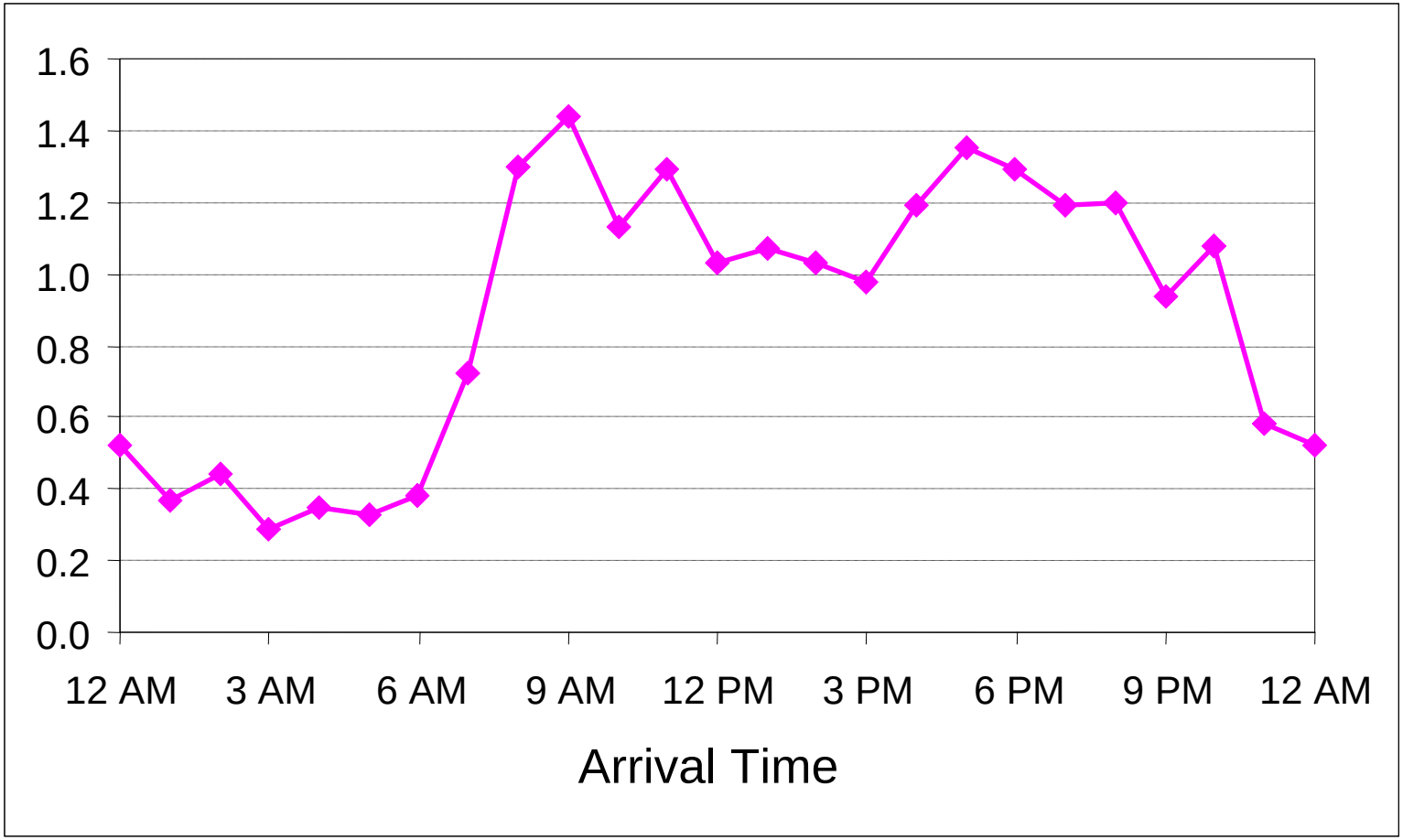
- **Compute Departure/Arrival Time-of-Day Factors**
  - Based on observed train ridership at specific times of the day relative to average train ridership over day

- **Transform Frequency Variable in Terms of Train Spacing/Coverage over Entire Day**
  - Revised model produces same result as old model if train spacing (headway) is uniform

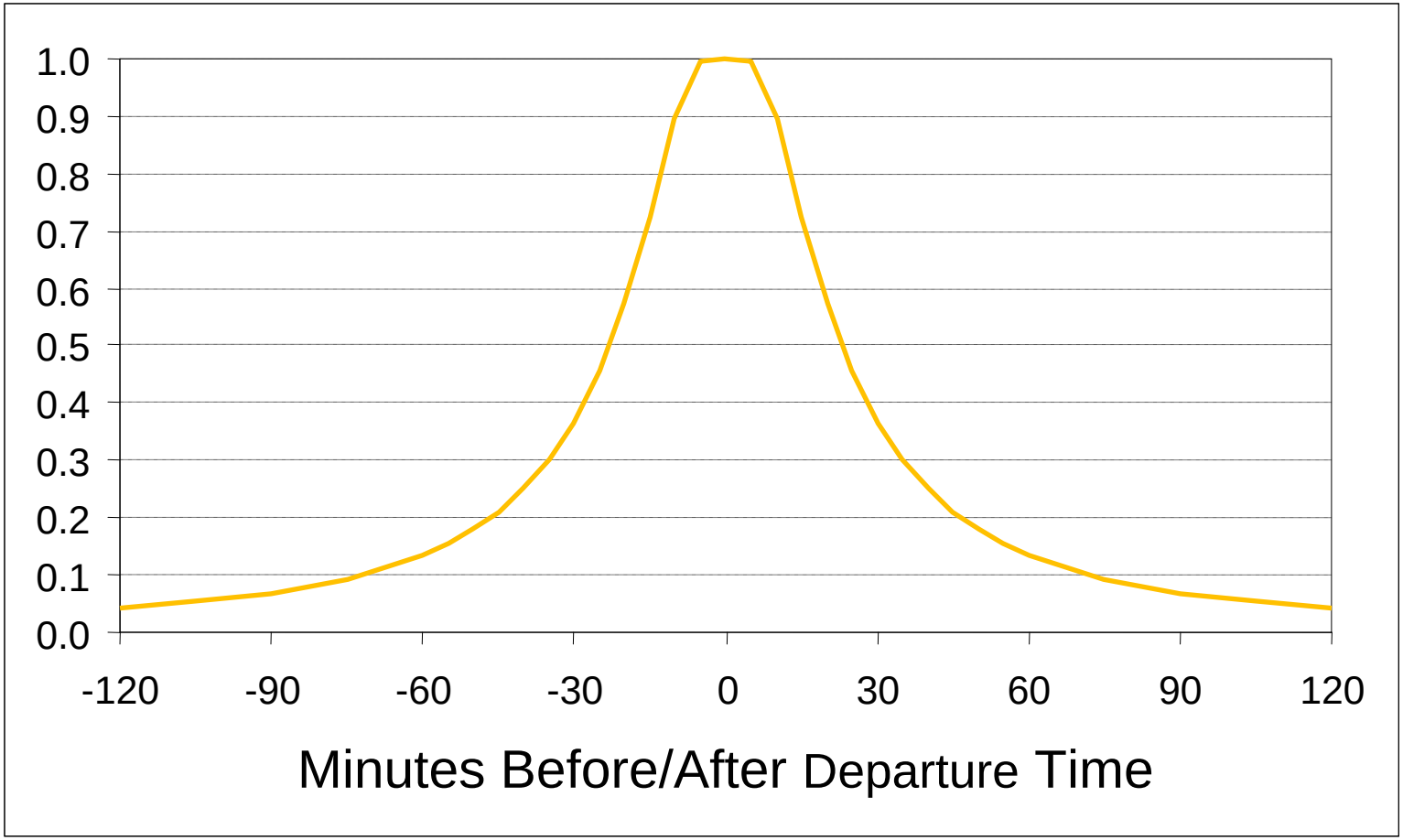
Computed Departure Factors



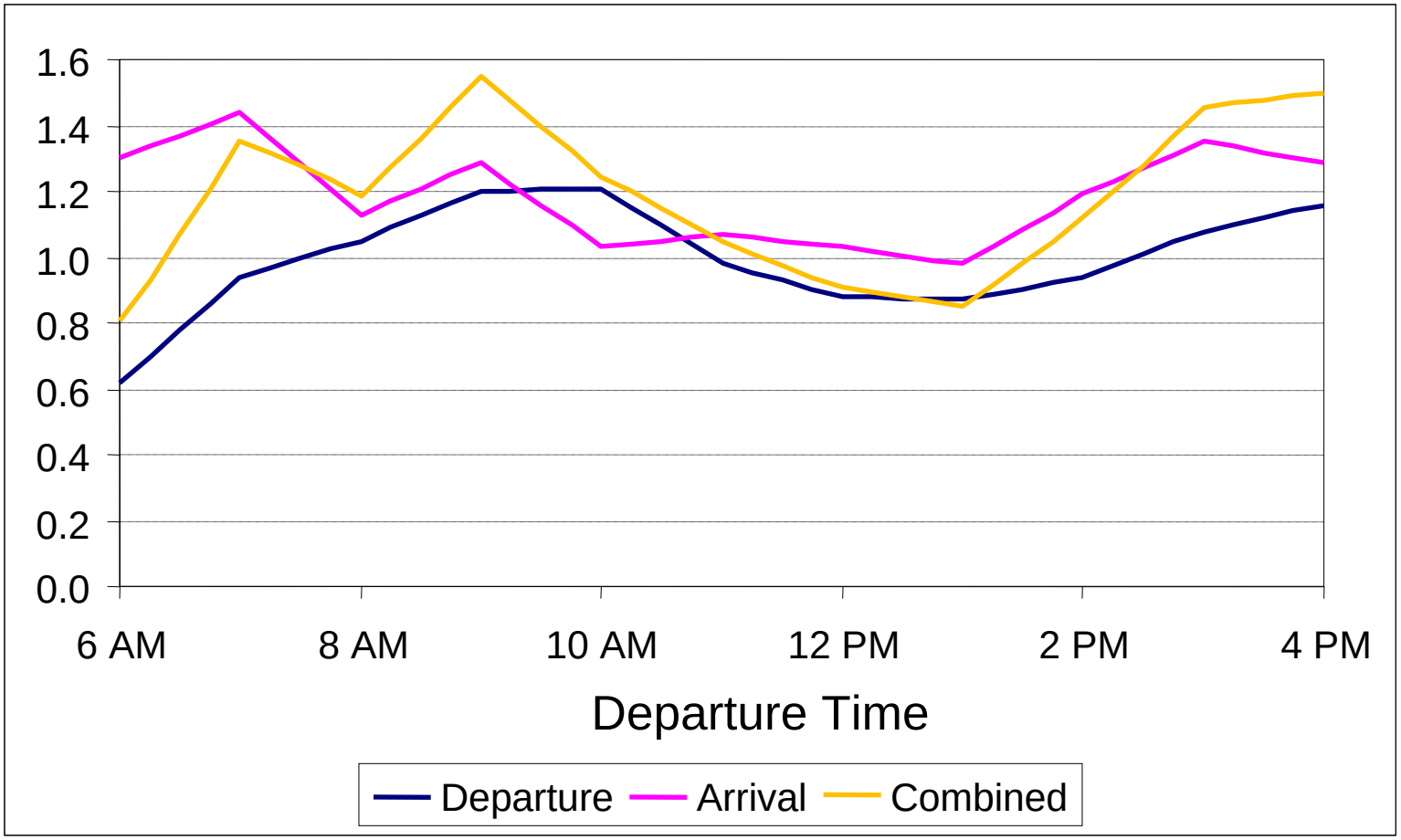
Computed Arrival Factors



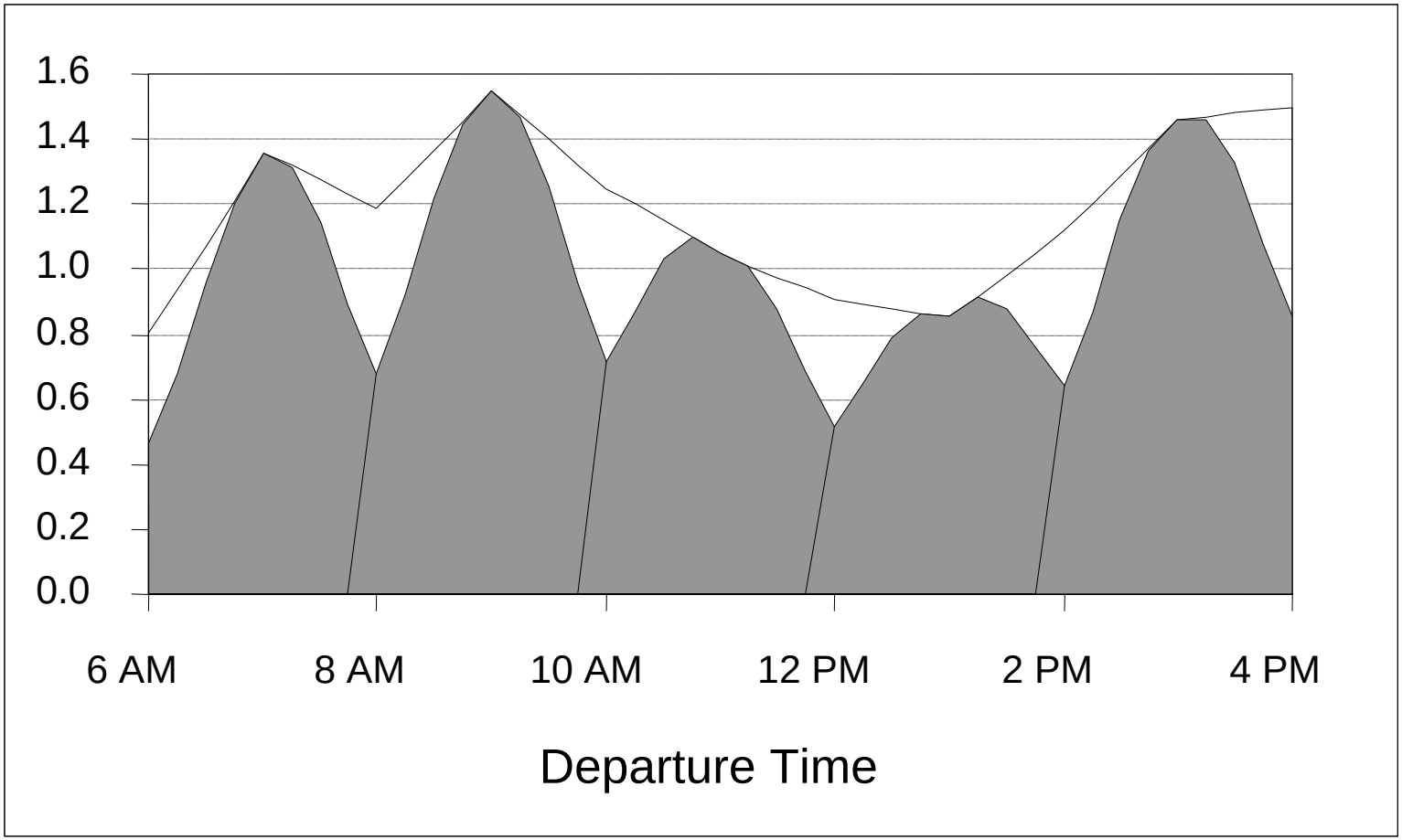
Train Spacing/Coverage Curve



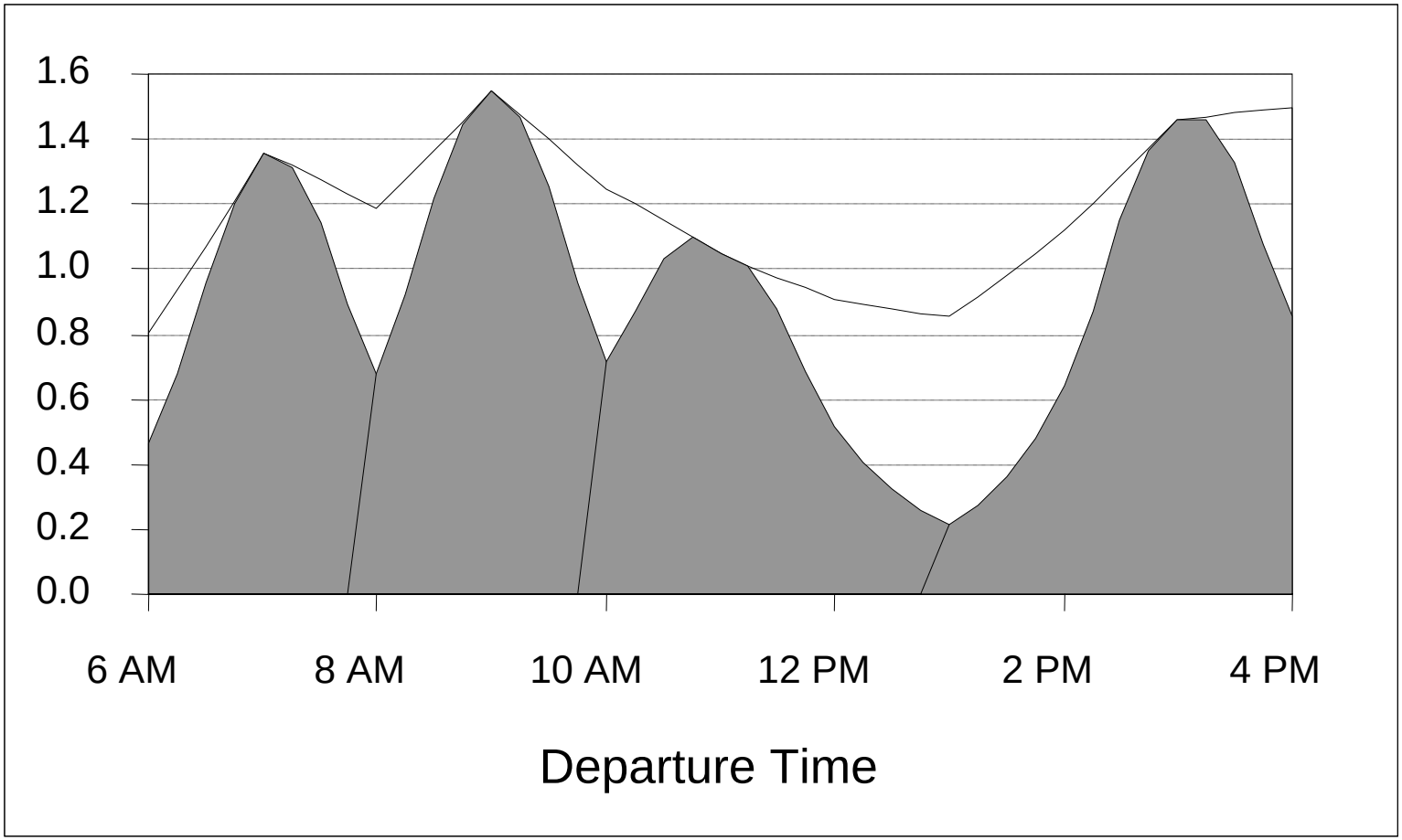
Example – Two Hour Market: Combined Departure/Arrival Factors



Example – Two Hour Market: Departures Every 2 Hours



Example – Two Hour Market: Departures Every 2 Hours, Except 1PM



Thruway Bus Sensitivity

- **Initial Model Represented Thruway Bus along with other modes of Rail access/egress**
  - Not sensitive to changes in Thruway Bus service
  - Could not report/check Thruway Bus ridership

- **Revised Model Explicitly Addresses Thruway Bus Service in Rail Schedules**
  - Includes Major Thruway Bus Connections
    - Los Angeles – Bakersfield
    - Sacramento – Stockton
    - San Francisco – Emeryville
    - San Jose – Oakland
  - Included with Trains on Schedule Input
    - Directional branches/extensions of trains

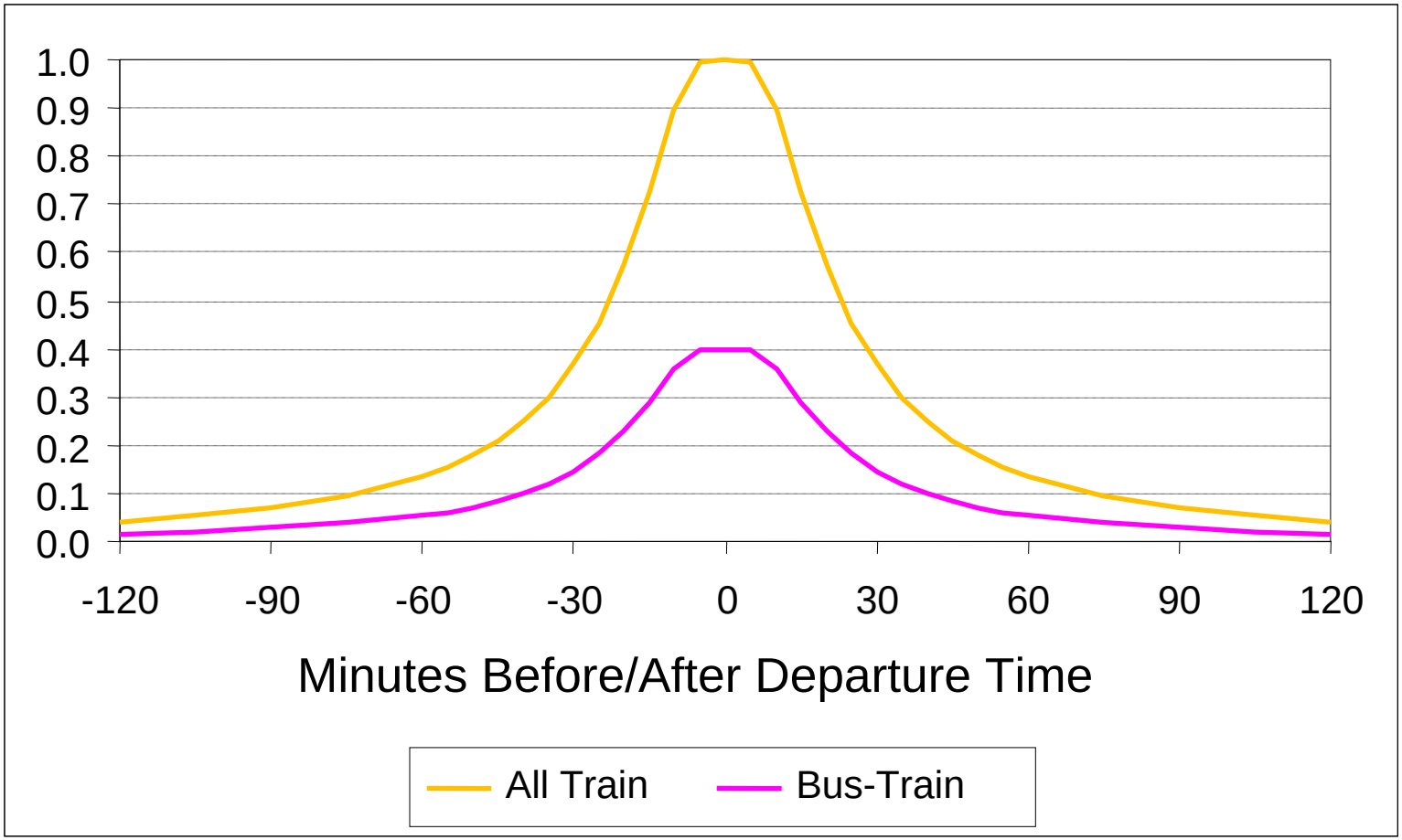
Thruway Bus Analysis Approach

- **Assemble Parallel Bus and Train Ridership Data**
  - Sacramento – Oakland
  - Santa Barbara – Los Angeles

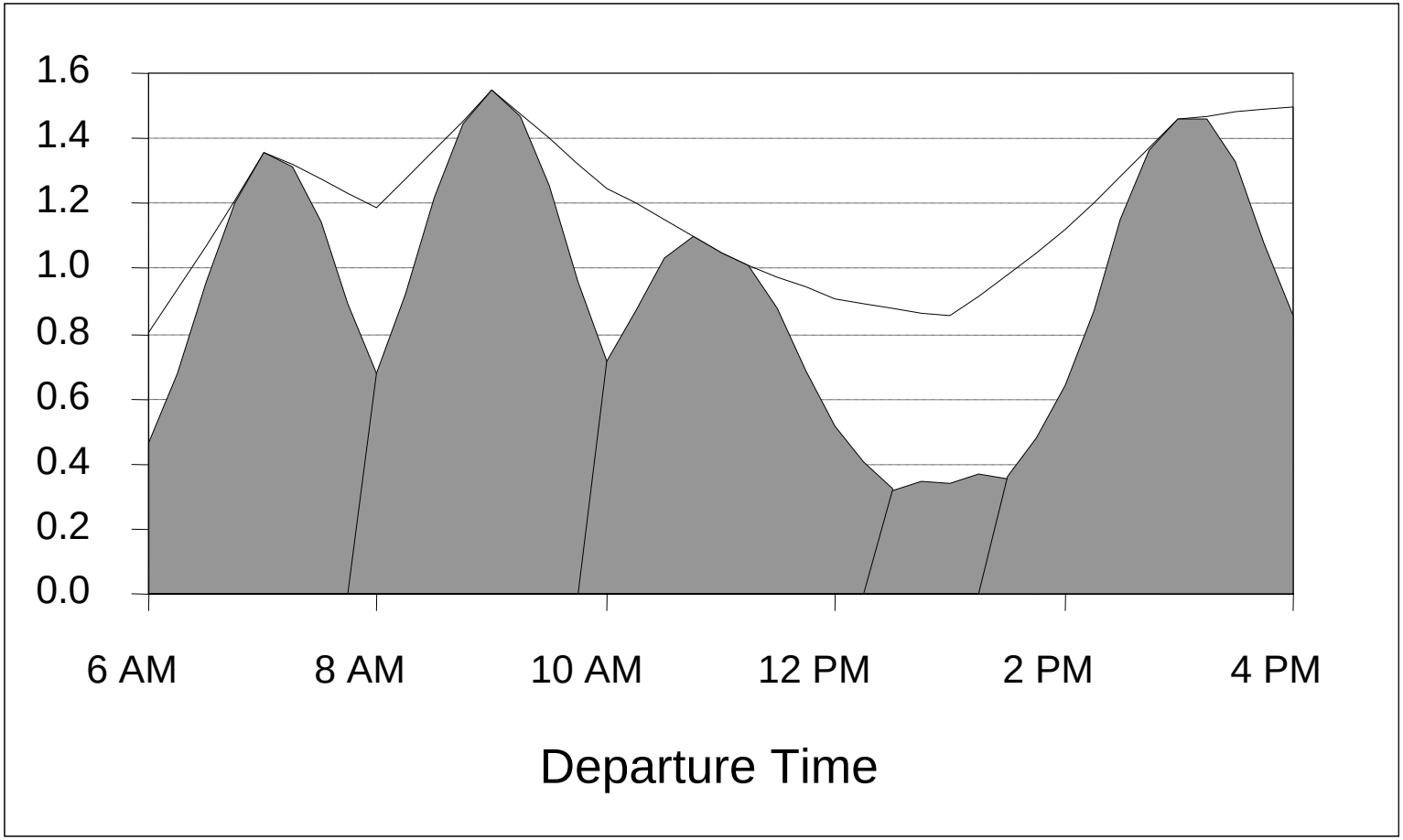
- **Analyze Data and Derive Bus-Train Factor**

- **Add Major Thruway Bus Stops to Rail Schedule**
  - Directional branches/extensions of trains
    - Bus stop only to receive passengers
    - Bus stop only to discharge passengers

Derived Spacing/Coverage Curves Bus Train versus All Train



Example – Two Hour Market: Departures Every 2 Hours, 1PM Bus



Uses of the Model

- **Amtrak/Caltrans business planning tool**
  - Amtrak: annual budget development
  - Caltrans: yearly Corridor Business Plans
  - Caltrans: California State Rail Plan (10-year horizon)

- **Evaluation of service options on existing routes**
  - Changes in train schedules
    - Travel times
    - Stopping patterns
    - Frequency
  - Changes in pricing

- **Evaluation of proposed service on new routes**
  - New corridors/markets
  - Extensions of existing corridors

Best Practices Corridor Model

June 2003

Amtrak Corridor Model

- **Market Share Focus**

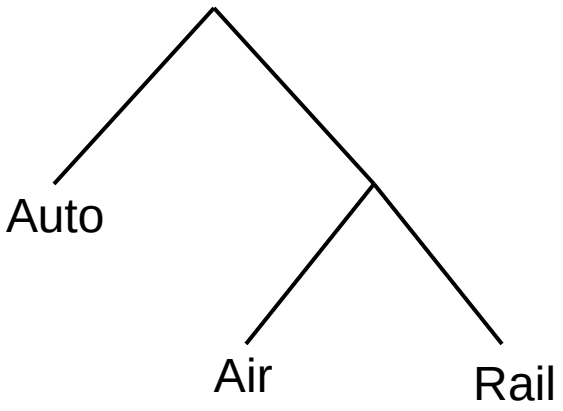
- **Total Market Size**
  - Existing Data/Models
    - Local Sources
    - FAA 10 percent sample
    - FRA/Volpe auto travel model
    - American Travel Survey (ATS)

Amtrak Corridor Model (con'd)

- **Mode Share Model**
  - Composite of Existing Corridor Models
    - Amtrak NEC
    - Southeast Corridor
    - Amtrak/Caltrans
    - Chicago-Milwaukee
    - FRA Forecasting Models
  - Key Variables
    - Travel Time (in-vehicle & out-of-vehicle)
    - Travel Cost (Fares)
    - Service Frequency
    - Trip Distance

Amtrak Corridor Model (con'd)

- **Mode Share Model (con'd)**
  - Nested Model Structure



Amtrak Corridor Model (con'd)

- **Mode Share Model (con'd)**
  - Development Approach
    - Review & Evaluate Existing Models
      - Structure
      - Independent Variables
      - Functional Forms
      - Implied Relationships
        - » elasticities
        - » values of times
    - Identify Preferred Model Structure & Specification
    - Establish Ranges for Parameter Values
    - Calibrate to Match Observed Shares for Selected City Pairs
    - Validate Model for different Corridor Markets

Amtrak Corridor Model (con'd)

- **Mode Share Model (con'd)**
  - Application Approach
    - Assemble Existing Market Data
      - Travel Volumes by Mode
      - Socio-Economic Data (population, etc.)
    - Assemble Existing Service Data
      - Travel Impedances (times, costs, frequencies) by Mode
    - Adjust Model to Match Existing Conditions
      - Rail Shares/Volumes (if an existing corridor)
      - Auto/Air Shares/Volumes
    - Apply Adjusted Model to New Service Inputs
      - Future Rail Impedances (times, costs, frequencies)

Amtrak Corridor Model (con'd)

- **Elasticity Summaries for key variables in model**

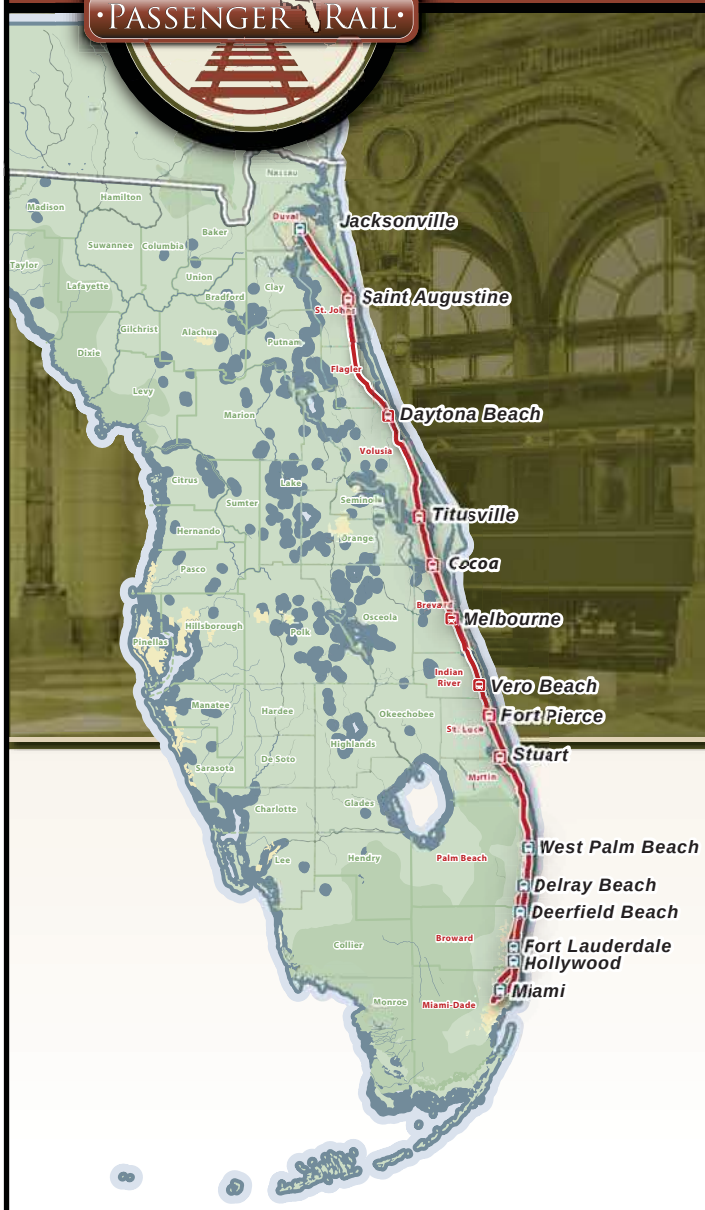
	Business			Non Business		
Variable Level	**100 Miles**	**200 Miles**	**300 Miles**	**100 Miles**	**200 Miles**	**300 Miles**
Total Travel Time	-1.34	-1.95	-2.66	-1.07	-1.56	-2.13
Trip Cost	-0.53	-0.60	-0.74	-0.62	-0.70	-0.86
Frequency Level	**4**	**8**	**12**	**4**	**8**	**12**
Trip Frequency	0.61	0.51	0.43	0.53	0.45	0.38

- **Values of Time**
  - Auto $29/hr (business) $20/hr (non-business)
  - Air $54/hr (business) $37/hr (non-business)
  - Rail $31/hr (business) $21/hr (non-business)

ATTACHMENT B

FORECAST RESULTS FOR PROPOSED NEW FEC SERVICE OPTIONS

FEC AMTRAK® PASSENGER RAIL



Federal Funding Opportunity Number: FR-HSR-10-004

TBG0614102323390RL

Forecast Results for Proposed new FEC Service Options
(prepared 06/14/10)

Route	Annual Totals FY10 Baseline*			Annual Increments for Schedule Option D**					
				Phase I			Phase II		
	Ridership	Ticket Revenue	Passenger Miles	Ridership	Ticket Revenue	Passenger Miles	Ridership	Ticket Revenue	Passenger Miles
Silver Star									
Main Section									
Coach	367,100	$22,431,000	184,150,000	(4,200)	($366,000)	(4,140,000)	(4,200)	($366,000)	(4,140,000)
Sleeper	25,300	$6,232,000	22,200,000	(3,900)	($1,168,000)	(4,820,000)	(3,900)	($1,168,000)	(4,820,000)
SUBTOTAL	392,400	$28,663,000	206,350,000	(8,100)	($1,534,000)	(8,960,000)	(8,100)	($1,534,000)	(8,960,000)
FEC Section									
Coach	0	$0	0	132,700	$6,954,000	66,440,000	119,300	$6,767,000	65,140,000
Sleeper	0	$0	0	15,800	$3,919,000	14,720,000	15,500	$3,911,000	14,690,000
SUBTOTAL	0	$0	0	148,500	$10,873,000	81,160,000	134,800	$10,678,000	79,830,000
TOTAL	392,400	$28,663,000	206,350,000	140,400	$9,339,000	72,200,000	126,700	$9,144,000	70,870,000
Silver Meteor									
Coach	310,600	$23,917,000	177,440,000	(3,500)	($362,000)	(3,300,000)	(3,500)	($362,000)	(3,300,000)
Sleeper	39,500	$11,021,000	37,150,000	(1,100)	($370,000)	(1,390,000)	(1,100)	($370,000)	(1,390,000)
TOTAL	350,100	$34,938,000	214,590,000	(4,600)	($732,000)	(4,690,000)	(4,600)	($732,000)	(4,690,000)
New FEC Corridor Service	NO SERVICE			86,800	$1,514,000	10,840,000	190,300	$2,969,000	20,970,000
GRAND TOTAL	**742,500**	**$63,601,000**	**420,940,000**	**222,600**	**$10,121,000**	**78,350,000**	**312,400**	**$11,381,000**	**87,150,000**

Route	Annual Totals FY10 Baseline*			Annual Increments for Schedule Option E**					
				Phase I			Phase II		
	Ridership	Ticket Revenue	Passenger Miles	Ridership	Ticket Revenue	Passenger Miles	Ridership	Ticket Revenue	Passenger Miles
Silver Star									
Main Section									
Coach	367,100	$22,431,000	184,150,000	(4,200)	($366,000)	(4,140,000)	(4,200)	($366,000)	(4,140,000)
Sleeper	25,300	$6,232,000	22,200,000	(3,900)	($1,168,000)	(4,820,000)	(3,900)	($1,168,000)	(4,820,000)
SUBTOTAL	392,400	$28,663,000	206,350,000	(8,100)	($1,534,000)	(8,960,000)	(8,100)	($1,534,000)	(8,960,000)
FEC Section									
Coach	0	$0	0	132,700	$6,954,000	66,440,000	123,800	$6,835,000	65,710,000
Sleeper	0	$0	0	15,800	$3,919,000	14,720,000	15,600	$3,915,000	14,710,000
SUBTOTAL	0	$0	0	148,500	$10,873,000	81,160,000	139,400	$10,750,000	80,420,000
TOTAL	392,400	$28,663,000	206,350,000	140,400	$9,339,000	72,200,000	131,300	$9,216,000	71,460,000
Silver Meteor									
Coach	310,600	$23,917,000	177,440,000	(3,500)	($362,000)	(3,300,000)	(3,500)	($362,000)	(3,300,000)
Sleeper	39,500	$11,021,000	37,150,000	(1,100)	($370,000)	(1,390,000)	(1,100)	($370,000)	(1,390,000)
TOTAL	350,100	$34,938,000	214,590,000	(4,600)	($732,000)	(4,690,000)	(4,600)	($732,000)	(4,690,000)
New FEC Corridor Service	NO SERVICE			86,800	$1,514,000	10,840,000	150,100	$2,365,000	16,030,000
GRAND TOTAL	**742,500**	**$63,601,000**	**420,940,000**	**222,600**	**$10,121,000**	**78,350,000**	**276,800**	**$10,849,000**	**82,800,000**

These forecasts are based solely upon information available to AECOM Consult as of 6/14/10.
These forecasts are provided for the sole use of Amtrak. They are not intended for disclosure in a financial offering statement.

Notes: * FY10 Budget Estimate (prepared April 2010)
** Proposed FEC Schedule Options D & E (provided by Amtrak 6/01/10)

Forecast Results for Proposed new FEC Service Options
(forecasts prepared 6/14/10)

	Incremental ONs & OFFs by Option & Phase*			
	Option D		Option E	
	Phase I	Phase II	Phase I	Phase II
New York, NY	18,169	18,169	18,169	18,169
Newark , NJ	3,123	3,123	3,123	3,123
Philadelphia, PA	3,997	3,997	3,997	3,997
Washington, DC	7,742	7,742	7,742	7,742
Richmond , VA	2,121	2,121	2,121	2,121
Raleigh, NC	10,434	10,434	10,434	10,434
Columbia , SC	5,982	5,982	5,982	5,982
Fayetteville, NC	(19)	(19)	(19)	(19)
Charleston , SC	(141)	(141)	(141)	(141)
Savannah, GA	3,490	3,490	3,490	3,490
Jacksonville, FL (Clifford Lane)	11,990	11,990	11,990	11,990
Palatka, FL	(2,688)	(2,688)	(2,688)	(2,688)
Deland, FL	(930)	(930)	(930)	(930)
Winter Park , FL	(62)	(62)	(62)	(62)
Orlando, FL	126	126	126	126
Kissimmee, FL	247	247	247	247
Lakeland, FL	205	205	205	205
Tampa, FL	336	336	336	336
Winter Haven, FL	361	361	361	361
Sebring, FL	241	241	241	241
Okeechobee, FL	(33)	(33)	(33)	(33)
St. Augustine, FL	11,531	11,531	11,531	11,531
Daytona Beach, FL	18,788	18,788	18,788	18,788
Titusville, FL	11,936	11,936	11,936	11,936
Cocoa Beach, FL	26,962	36,538	26,962	26,962
Melbourne, FL	33,785	46,189	33,785	33,785
Vero Beach, FL	30,103	47,404	30,103	43,609
Ft. Pierce, FL	36,520	58,642	36,520	53,799
Stuart, FL	45,821	79,820	45,821	70,995
Palm Bch Gardens, FL	4,340	6,766	4,340	6,060
West Palm Beach, FL	26,788	40,258	26,788	36,041
Delray Beach, FL	8,003	12,642	8,003	11,111
Deerfield Beach, FL	26,157	42,283	26,157	37,599
Fort Lauderdale, FL	26,217	39,812	26,217	34,658
Fort Lauderdale Airport, FL	1,625	2,600	1,625	2,275
Hollywood, FL	23,893	37,342	23,893	31,542
Miami, FL -- NO FUTURE SERVICE	(85,250)	(85,250)	(85,250)	(85,250)
Miami MetroRail, FL	3,027	10,581	3,027	6,182
Miami, FL (MIC)	120,659	132,623	120,659	127,682
Other Affected Stations**	9,604	9,604	9,604	9,604
TOTAL	445,200	624,800	445,200	553,600

These forecasts are based solely upon information available to AECOM Consult as of 6/14/10.
These forecasts are provided for the sole use of Amtrak. They are not intended for disclosure in a financial offering statement.

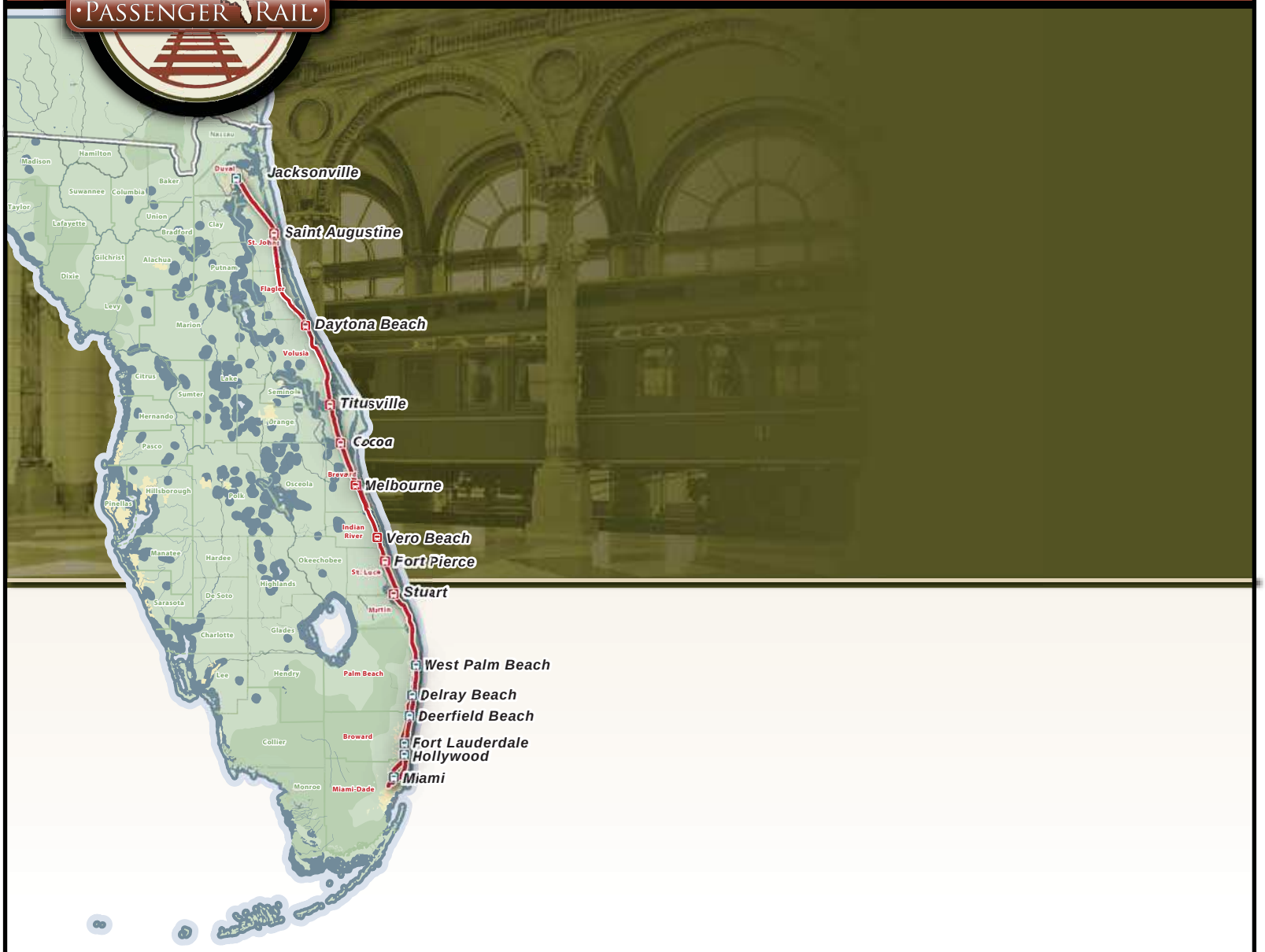
Notes:

* Proposed Schedule Options D & E by Phase (provided by Amtrak 6/01/10)

** Other markets served by the Silver Star and the Silver Meteor between New York and Jacksonville

ATTACHMENT C

OPERATING TIMETABLES



Federal Funding Opportunity Number: FR-HSR-10-004

TBG0614102323390RL

PROPOSED FEC CORRIDOR SERVICE DEVELOPMENT PLAN BETWEEN MIAMI, COCOA AND JACKSONVILLE

OPTION 'D' - Includes split of *Silver Star* and *Silver Meteor* at Jacksonville and intra-Florida corridor services over the FEC Corridor

SOUTHBOUND - Read Down								Station Information				NORTHBOUND - Read Up							
Daily	Daily	Daily	Daily	Daily	Daily	Daily	Mon-Fri	READ DOWN	Miles Fr New York * = via Orlando	Direction	READ UP	Mon-Fri	Daily	Daily	Daily	Daily	Daily	Daily	Daily
881	**883**	**91**	**991**	**885**	**97**	**877**	**869**			**Train Number**		**860**	**870**	**98**	**880**	**992**	**92**	**884**	**886**
FEC Corridor	*FEC Corridor*	*Silver Star*	*Silver Star*	*FEC Corridor*	*Silver Meteor*	*FEC Corridor*	*FEC Corridor*			**Route**		*FEC Corridor*	*FEC Corridor*	*Silver Meteor*	*FEC Corridor*	*Silver Star*	*Silver Star*	*FEC Corridor*	*FEC Corridor*
Phase II	Phase II	Existing	Phase I	Phase II	Existing	Phase I	Phase III			**Phase**		Phase III	Phase I	Existing	Phase II	Phase I	Existing	Phase II	Phase II
		6:55 A		Potential use of Tri-Rail equip.	*9:23 A*			Ar	977	**JACKSONVILLE**	Lv			*5:33 P*	Potential use of Tri-Rail equip.		*10:29 P*		
		7:15 A	**7:25 A**		**9:48 A**	**4:00 P**		Lv	977	**Clifford Lane**	Ar		**12:28 P**	**5:10 P**		**9:49 P**	**10:09 P**		
JTC Phase III		*7:00 A*			*9:28 A*			Ar	983	JACKSONVILLE	Lv			*5:25 P*			*10:24 P*	JTC Phase III	
		7:25 A	7:35 A		9:53 A	4:10 P	5:30 P	Lv	983	Transp. Center	Ar	8:53 A	12:18 P	5:00 P		9:39 P	9:59 P		
			8:04 A			4:37 P	5:57 P	Lv	1012	St. Augustine, FL	Lv	8:21 A	11:46 A			9:05 P			
			8:58 A			5:28 P	6:48 P	Lv	1070	**Daytona Beach, FL**	Lv	7:30 A	10:55 A			8:12 P			
			9:43 A			6:10 P	7:30 P	Lv	1115	Titusville, FL	Lv	6:47 A	10:12 A			7:26 P			
5:30 A	8:45 A	Runs via Tampa	10:02 A	2:20 P	Runs via Orlando	6:28 P	7:48 P	Lv	1131	**Cocoa, FL**	Lv	6:30 A	9:55 A	Runs via Orlando	12:35 P	7:07 P	Runs via Tampa	7:35 P	8:50 P
5:52 A	9:07 A		10:25 A	2:42 P		6:50 P		Lv	1153	Melbourne, FL	Lv		9:28 A		12:08 P	6:38 P		7:08 P	8:23 P
6:24 A	9:39 A		11:00 A	3:14 P		7:22 P		Lv	1188	Vero Beach, FL	Lv		8:59 A		11:39 A	6:07 P		6:39 P	7:54 P
6:39 A	9:54 A		11:16 A	3:29 P		7:37 P		Lv	1202	Ft. Pierce, FL	Lv		8:44 A		11:24 A	5:50 P		6:24 P	7:39 P
6:59 A	10:14 A		11:38 A	3:49 P		7:57 P		Lv	1222	Stuart, FL	Lv		8:24 A		11:04 A	5:27 P		6:04 P	7:19 P
7:24 A	10:39 A		----	4:14 P		8:22 P		Lv	1248	Palm Bch. Gardens, Fl	Lv		7:59 A		10:39 A	----		5:39 P	6:54 P
7:44 A	10:59 A	4:13 P	12:26 P	4:34 P	4:54 P	8:42 P		Lv	1324*	**West Palm Bch, FL**	Lv		7:41 A	10:17 A	10:21 A	4:44 P	12:59 P	5:21 P	6:36 P
8:02 A	11:17 A	4:32 P	12:45 P	4:52 P	5:13 P	9:00 P		Lv	1342*	Delray Beach, FL	Lv		7:23 A	9:52 A	10:03 A	4:22 P	12:37 P	5:03 P	6:18 P
8:15 A	11:30 A	4:46 P	12:59 P	5:05 P	5:27 P	9:13 P		Lv	1353*	Deerfield, Beach, FL	Lv		7:10 A	9:38 A	9:50 A	4:08 P	12:23 P	4:50 P	6:05 P
8:29 A	11:44 A	5:03 P	1:16 P	5:19 P	5:44 P	9:27 P		Lv	1367*	**Ft. Lauderdale, FL**	Lv		6:57 A	9:24 A	9:37 A	3:54 P	12:09 P	4:37 P	5:52 P
8:35 A	11:50 A	----	----	5:25 P	----	9:33 P		Lv	1371*	Ft. Laud. Airport, FL	Lv		6:50 A	----	9:30 A	----	----	4:30 P	5:45 P
8:44 A	11:59 A	5:18 P	1:31 P	5:34 P	5:59 P	9:42 P		Lv	1375*	Hollywood, FL	Lv		6:42 A	9:07 A	9:22 A	3:37 P	11:52 A	4:22 P	5:37 P
9:02 A	12:17 P	----	----	5:52 P	----	10:00 P		Lv	1389*	**Miami MetroRail, FL**	Lv		6:25 A	----	9:05 A	----	----	4:05 P	5:20 P
9:10 A	**12:25 P**	**5:47 P**	**2:00 P**	**6:00 P**	**6:28 P**	**10:08 P**		Ar	1393*	**MIAMI, FL (MIC)**	Lv		**6:20 A**	**8:45 A**	**9:00 A**	**3:15 P**	**11:30 A**	**4:00 P**	**5:15 P**
Trains 91, 991, 97 Discharge Passengers Only between West Palm Beach and Miami												Trains 98, 992, 92 Receive Passengers Only between West Palm Beach and Miami							

ALL RUNNING TIMES AND SCHEDULES ARE CONCEPTUAL - SUBJECT TO FURTHER ADJUSTMENT AND CARRIER AGREEMENTS

NOTES / ASSUMPTIONS

1) Trains 91/92, 97/98, 991/992 operate from Clifford Lane station in Phases I, II
2) All trains operate from Jacksonville Transportation Center in Phase III
3) All trains operate from Miami Intermodal Center in Phases I, II & III
4) Assumes 3 tracks at Jacksonville and Miami stations capable of holding 12 car trains
5) FEC Corridor Trains between Miami and Jupiter crosshonor Tri-Rail tickets
6) FEC running times based on Sept 2009 FEC "Track Chart" provided by FEC
7) Assumes Cocoa Beach opened as Crew Base with "Respite" assignments
8) Assumes Cocoa Beach station co-located with Tampa - Orlando HSR station

FEC CORRIDOOR PROGRAM - OPTION 'D' - EQUIPMENT MANIPULATIONS

Train Consist (Sets) — Initial Terminal: ORL, JAX, CCB, MIA — Final Terminal: ORL, JAX, CCB, MIA

5:00 AM, :30, 6:00 AM, :30, 7:00 AM, :30, 8:00 AM, :30, 9:00 AM, :30, 10:00 AM, :30, 11:00 AM, :30, 12:00 PM, :30, 1:00 PM, :30, 2:00 PM, :30, 3:00 PM, :30, 4:00 PM, :30, 5:00 PM, :30, 6:00 PM, :30, 7:00 PM, :30, 8:00 PM, :30, 9:00 PM, :30, 10:00 PM, :30, 11:00 PM, :30, 12:00 AM, :30, 1:00 AM, :30, 2:00 AM

Option 'D' - Phase I - Silver Meteor and Jacksonville to Miami Intermodal Center corridor service

Train	Initial Terminal ORL	JAX	CCB	MIA	Schedule	Final Terminal ORL	JAX	CCB	MIA
Silver Star - Amtrak responsibility					991				
					992				
FEC Cor				1	870 ----- JAX ------ 877				1
Starts	0	0	0	1		0	0	0	1

Silver Star - Amtrak responsibility (Reimburseable to Amtrak)

FDOT responsibility

Total Sets = 1 Total Locomotives (Sets + 1 spare) = 2 Total Cars (Sets @ 4 cars each + Spare Cab Car, Coach) = 6

Annual Total Train Miles = 256,230 Annual Total Locomotive Miles = 256,230 Annual Total Car Miles = 1,024,920

Option 'D' - Phase II - Add Cocoa to Miami Intermodal Center corridor services

Train	Initial Terminal ORL	JAX	CCB	MIA	Schedule	Final Terminal ORL	JAX	CCB	MIA
Silver Star - Amtrak responsibility					991				
					992				
FEC Cor				1	870 ----- JAX ------ 877				1
FEC Cor			1		881 -------- MIA -------- 884			1	
FEC Cor			1		883 -------- MIA -------- 886			1	
FEC Cor				1	Option 'A' 880 CCB 885 Potential use of Tri-Rail equipment				1
Starts	0	0	2	2		0	0	2	2

Silver Star - Amtrak responsibility

FDOT responsibility

Total Sets = 4 Total Locomotives (Sets + 1 spare) = 5 Total Cars (Sets @ 4 cars each + Spare Cab Car, Coach) = 18

Annual Total Train Miles = 644,310 Annual Total Locomotive Miles = 644,310 Annual Total Car Miles = 2,577,240

Option 'D' - Phase III - Add Cocoa to Jacksonville Transportation Center service (requires construction of JTC)

Train	Initial Terminal ORL	JAX	CCB	MIA	Schedule	Final Terminal ORL	JAX	CCB	MIA
Silver Star - Amtrak responsibility					991				
					992				
FEC Cor				1	870 ----- JAX ------ 877				1
FEC Cor			1		881 -------- MIA -------- 884			1	
FEC Cor			1		883 -------- MIA -------- 886			1	
FEC Cor				1	Option 'A' 880 CCB 885 Potential use of Tri-Rail equipment				1
FEC Cor			1		860 ----- JAX - SEE NOTE ------ 869			1	
Starts	0	0	3	2		0	0	3	2

Silver Star - Amtrak responsibility

FDOT responsibility

Total Sets = 5 Total Locomotives (Sets + 1 spare) = 6 Total Cars (Sets @ 4 cars each + Spare Cab Car, Coach) = 22

Annual Total Train Miles = 729,810 Annual Total Locomotive Miles = 729,810 Annual Total Car Miles = 2,919,240

NOTE: Identification of Tr 860 - 869 for establishing layover facility requirements only. Jacksonville service is anticipated to be developed seperately in conjunction with potential commuter services. Not accouted for in FEC costing work sheets.

Mileage Assumptions: All Trains run Daily — SFD - ORL = 17 mi. JAX - ORL = 141 mi. JAX - CCB = 171 mi. CCB - MIA = 198 mi. JAX - MIA = 351 mi. HIA - MIA = 4 mi.

FEC CORRIDOOR PROGRAM - OPTION 'D' - POTENTIAL CREW COUPLETS

Initial Terminal / Crew Base	ORL	JAX	CCB	MIA
Starts	0	3	0	3
Extra Board	0.0	0.8	0.0	0.8
Total	0	4	0	4

Option 'D' - Phase I - Initial FEC Service - Silver Star / corridor trains 870/877

Assumes Amtrak / FDOT share equally in base crew requirements and costs (LD OBS excluded)

Crew Base	SATURDAY M 6a N 6p	SUNDAY M 6a N 6p	MONDAY M 6a N 6p	TUESDAY M 6a N 6p	WEDNESDAY M 6a N 6p	THURSDAY M 6a N 6p	FRIDAY M 6a N 6p	SATURDAY M 6a N 6p	SUNDAY M 6a N 6p
Miami 1		870 JAX 991	----- RD -----	----- RD -----		870 JAX 991	----- Opt -----		
Miami 1		----- RD -----	870 JAX 991		870 JAX 991		----- Opt -----	----- RD -----	
Miami 1			----- Opt -----	870 JAX 991		----- RD -----	----- RD -----	870 JAX 991	
MIA ExBd							870 JAX 991		
Jacksonville 1		877 MIA 992		877 MIA 992					
Jacksonville 1			877 MIA 992		877 MIA 992				
Jacksonville 1						877 MIA 992		877 MIA 992	
JAX ExBd 0							877 MIA 992		

Total Crew Starts	6	Number of train crews required to meet service demand
Extra Board Staff	6	Based on 25%. Extra Board personnel split between crew bases
Total Crew Staff	30	Based on 4 person standard crew (Engr., Cond., Asst Condr., FSA)

Option 'D' - Phase II - Initial FEC Service plus Cocoa-Miami trains

Assumes Amtrak / FDOT share equally in base crew requirements and costs (LD OBS excluded)

Crew Base	SATURDAY M 6a N 6p	SUNDAY M 6a N 6p	MONDAY M 6a N 6p	TUESDAY M 6a N 6p	WEDNESDAY M 6a N 6p	THURSDAY M 6a N 6p	FRIDAY M 6a N 6p	SATURDAY M 6a N 6p	SUNDAY M 6a N 6p
Miami 1		870 JAX 991	----- RD -----	----- RD -----		870 JAX 991	----- Opt -----		
Miami 1		----- RD -----	870 JAX 991		870 JAX 991		----- Opt -----	----- RD -----	
Miami 1			----- Opt -----	870 JAX 991		----- RD -----	----- RD -----	870 JAX 991	
Miami 1		880 CCB 881		----- RD -----	----- RD -----		880 CCB 881		
Miami 1			----- RD -----	----- RD -----	880 CCB 881			886 CCB 885	
Miami 1		----- RD -----	----- RD -----	880 CCB 881		880 CCB 881			
Miami 1			----- RD -----	----- RD -----	884 C 883		870 JAX 991		
Miami 1		884 C 883		884 C 883		----- RD -----	----- RD -----		
Miami 1			884 C 883		----- RD -----	----- RD -----	884 C 883		
Miami 1				----- RD -----	----- RD -----	884 C 883		884 C 883	
Miami 1		886 CCB 885		886 CCB 885		----- RD -----	----- RD -----		
Miami 1			886 CCB 885		886 CCB 885		----- RD -----	----- RD -----	
Miami 1				----- RD -----	----- RD -----	886 CCB 885		886 CCB 885	
Miami 1			880 CCB 881		----- RD -----	----- RD -----	886 CCB 885		
Jacksonville 1		877 MIA 992		877 MIA 992		----- RD -----	----- RD -----		
Jacksonville 1			877 MIA 992		877 MIA 992		----- RD -----	----- RD -----	
Jacksonville 1				----- RD -----	----- RD -----	877 MIA 992		877 MIA 992	
JAX ExBd 0							877 MIA 992		

Total Crew Starts	17	Number of train crews required to meet service demand
Extra Board Staff	17	Based on 25%. Extra Board personnel split between crew bases
Total Crew Staff	85	Based on 4 person standard crew (Engr., Cond., Asst Condr., FSA)

FEC CORRIDOR SOUTHBOUND RUN TIME ASSUMPTIONS FOR SCHEDULE DEVELOPMENT

Based on FEC Rwy provided Speed Chart of 9/11/09 and Amtrak 'TPC' analysis of 10/15/09

FEC CORRIDOR STATIONS		*SILVER STAR* SOUTHBOUND			
		ELAPSED TIME		AVERAGE SPEED	
JAX-Clifford Lane	Dp	0		-	
ST. AUGUSTINE	Dp	0:39	hr:min	55.2	mph
DAYTONA	Dp	1:33	hr:min	65.2	mph
TITUSVILLE	Dp	2:18	hr:min	59.6	mph
COCOA	Dp	2:37	hr:min	54.9	mph
MELBOURNE	Dp	3:00	hr:min	56.9	mph
VERO BEACH	Dp	3:35	hr:min	57.7	mph
FT. PIERCE	Dp	3:51	hr:min	55.0	mph
STUART	Dp	4:13	hr:min	53.9	mph
PALM BCH GARDEN	PASS	4:38	hr:min	62.6	mph
CSXT Connection	PASS	4:52	hr:min	41.1	mph
WEST PALM BEACH	Dp	5:01	hr:min	16.4	mph
DELRAY BEACH	Dp	5:20	hr:min	54.2	mph
DEERFIELD BEACH	Dp	5:34	hr:min	46.3	mph
FT. LAUDERDALE	Dp	5:51	hr:min	48.7	mph
FT. LAUD. AIRPORT	PASS	5:57	hr:min	40.0	mph
HOLLYWOOD	Dp	6:06	hr:min	37.6	mph
MIAMI METRO	PASS	6:23	hr:min	42.9	mph
MIAMI (MIC)	Ar	6:34	hr:min	15.3	mph
SUMMARY		6:34		53.5	mph
		90 mph MAS, 4" Eu - 7 Amfleet, 1 P42			

FEC CORRIDOR STATIONS		*CORRIDOR TRAINS* SOUTHBOUND			
		ELAPSED TIME		AVERAGE SPEED	
JAX-Clifford Lane	Dp	0		-	
ST. AUGUSTINE	Dp	0:37	hr:min	58.2	mph
DAYTONA	Dp	1:28	hr:min	69.0	mph
TITUSVILLE	Dp	2:10	hr:min	63.9	mph
COCOA	Dp	2:28	hr:min	57.9	mph
MELBOURNE	Dp	2:50	hr:min	59.5	mph
VERO BEACH	Dp	3:22	hr:min	63.1	mph
FT. PIERCE	Dp	3:37	hr:min	58.6	mph
STUART	Dp	3:57	hr:min	59.2	mph
PALM BCH GARDEN	Dp	4:22	hr:min	62.6	mph
CSXT Connection	PASS	4:35	hr:min	44.3	mph
WEST PALM BEACH	Dp	4:42	hr:min	21.0	mph
DELRAY BEACH	Dp	5:00	hr:min	57.3	mph
DEERFIELD BEACH	Dp	5:13	hr:min	49.8	mph
FT. LAUDERDALE	Dp	5:27	hr:min	59.2	mph
FT. LAUD. AIRPORT	Dp	5:33	hr:min	40.0	mph
HOLLYWOOD	Dp	5:42	hr:min	37.6	mph
MIAMI METRO	Dp	6:00	hr:min	40.5	mph
MIAMI (MIC)	Ar	6:08	hr:min	21.0	mph
SUMMARY		6:08		57.2	mph
		90 mph MAS, 4" Eu - 7 Amfleet, 1 P42			

FEC CORRIDOR NORTHBOUND RUN TIME ASSUMPTIONS FOR SCHEDULE DEVELOPMENT

Based on FEC Rwy provided Speed Chart of 9/11/09 and Amtrak 'TPC' analysis of 10/15/09

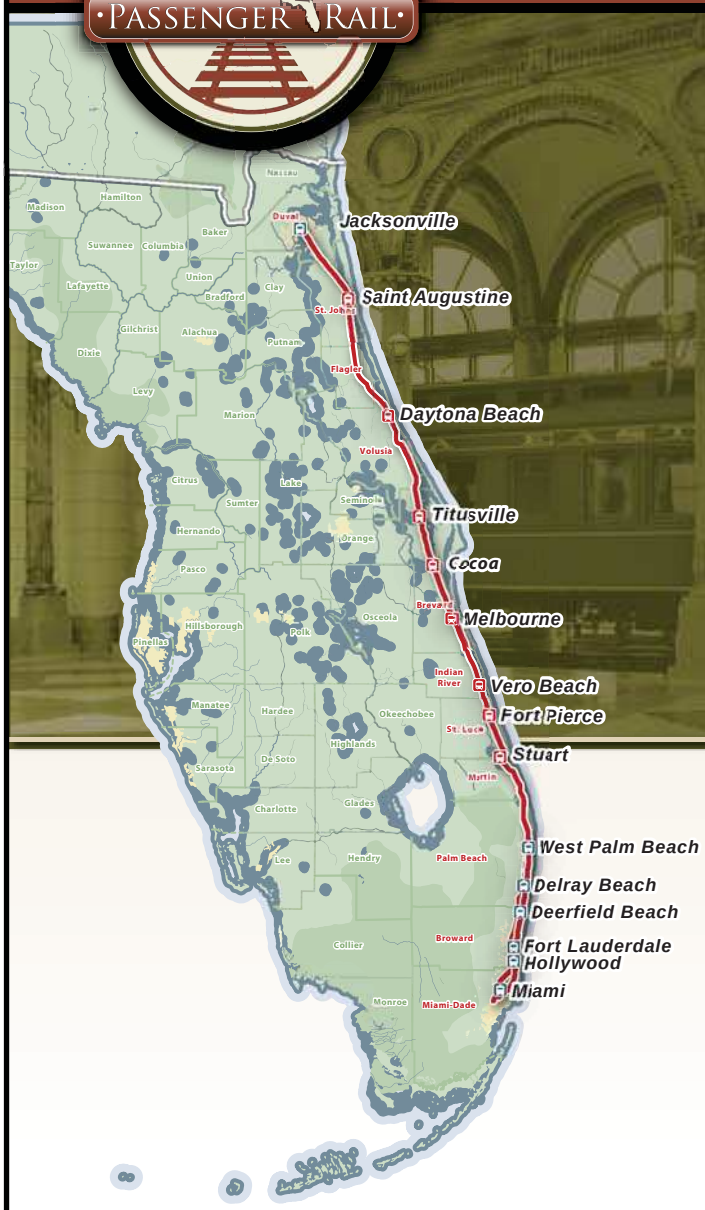
FEC CORRIDOR STATIONS		*SILVER STAR* NORTHBOUND			
		ELAPSED TIME		AVERAGE SPEED	
MIAMI (MIC)	Dp	0		-	
MIAMI METRO	PASS	0:04	hr:min	42.1	mph
HOLLYWOOD	Dp	0:22	hr:min	40.5	mph
FT. LAUD. AIRPORT	PASS	0:29	hr:min	48.3	mph
FT. LAUDERDALE	Dp	0:39	hr:min	24.0	mph
DEERFIELD BEACH	Dp	0:53	hr:min	59.2	mph
DELRAY BEACH	Dp	1:07	hr:min	46.3	mph
WEST PALM BEACH	Dp	1:29	hr:min	46.8	mph
CSXT Connection	PASS	1:36	hr:min	21.0	mph
PALM BCH GARDEN	PASS	1:46	hr:min	57.6	mph
STUART	Dp	2:12	hr:min	60.2	mph
FT. PIERCE	Dp	2:35	hr:min	51.5	mph
VERO BEACH	Dp	2:52	hr:min	51.7	mph
MELBOURNE	Dp	3:23	hr:min	65.1	mph
COCOA	Dp	3:52	hr:min	45.1	mph
TITUSVILLE	Dp	4:11	hr:min	54.9	mph
DAYTONA	Dp	4:57	hr:min	58.3	mph
ST. AUGUSTINE	Dp	5:50	hr:min	66.4	mph
JAX-Clifford Lane	Ar	6:34	hr:min	48.9	mph
SUMMARY		6:34		53.5	mph
		90 mph MAS, 4" Eu - 7 Amfleet, 1 P42			

FEC CORRIDOR STATIONS		*CORRIDOR TRAINS* NORTHBOUND			
		ELAPSED TIME		AVERAGE SPEED	
MIAMI (MIC)	Dp	0		-	
MIAMI METRO	Dp	0:05	hr:min	33.6	mph
HOLLYWOOD	Dp	0:22	hr:min	42.9	mph
FT. LAUD. AIRPORT	Dp	0:30	hr:min	42.3	mph
FT. LAUDERDALE	Dp	0:37	hr:min	34.3	mph
DEERFIELD BEACH	Dp	0:50	hr:min	63.7	mph
DELRAY BEACH	Dp	1:03	hr:min	49.8	mph
WEST PALM BEACH	Dp	1:21	hr:min	57.3	mph
CSXT Connection	PASS	1:28	hr:min	21.0	mph
PALM BCH GARDEN	Dp	1:39	hr:min	52.3	mph
STUART	Dp	2:04	hr:min	62.6	mph
FT. PIERCE	Dp	2:24	hr:min	59.2	mph
VERO BEACH	Dp	2:39	hr:min	58.6	mph
MELBOURNE	Dp	3:08	hr:min	69.6	mph
COCOA	Dp	3:35	hr:min	48.5	mph
TITUSVILLE	Dp	3:52	hr:min	61.3	mph
DAYTONA	Dp	4:35	hr:min	62.4	mph
ST. AUGUSTINE	Dp	5:26	hr:min	69.0	mph
JAX-Clifford Lane	Ar	6:08	hr:min	51.2	mph
SUMMARY		6:08		57.2	mph
		90 mph MAS, 4" Eu - 4 Amfleet, 1 P42			

ATTACHMENT D

CAPITAL COST ESTIMATE

FEC AMTRAK® PASSENGER RAIL



Federal Funding Opportunity Number: FR-HSR-10-004

TBG061410232339ORL

HIGH-SPEED INTERCITY PASSENGER RAIL (HSIPR) PROGRAM			DATE:	15-Jul-10
TRACK 2 CORRIDOR PROGRAM			EST. BY:	C. Deeb
			Check	H. Gutierrez
ENGINEERS OPINION OF CAPITAL COST				
STANDARD				
COST				**UNIT**
CATEGORIES	**DESCRIPTION**	**QTY**	**UNIT**	**COST**
10 TRACK STRUCTURES AND TRACK				
10.03	Track structure: Undergrade Bridges	1	LS	$0
10.06	Track structure: At-grade (grading and subgrade stabilization)	1	LS	$28,000
10.09	Track new construction: Conventional ballasted	1	LS	$7,627,000
10.11	Track rehabilitation: Ballast and surfacing	1	LS	$6,113,000
10.14	Track: Special track work (switches, turnouts, insulated joints)	1	LS	$4,071,000
	Total for Category 10			**$17,839,000**
20 STATIONS, TERMINALS, INTERMODAL				
20.01	Station buildings: Intercity passenger rail only	1	LS	$4,516,000
20.03	Platforms	1	LS	$18,924,000
20.04	Elevators, Escalators			$3,000,000
20.06	Pedestrian / bike access and accommodation, landscaping, parking lots	1	LS	$2,248,000
	Total for Category 20			**$28,688,000**
40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS				
40.01	Demolition, clearing, site preparation	1	LS	$1,083,000
40.02	Site utilities, utility relocation	1	LS	$540,000
40.06	Temporary facilities and other indirect costs during construction	1	LS	2,390,955
40.07	Purchase or lease of real estate	1	LS	29,438,000
	Total for Category 40			**$33,451,955**
50 COMMUNICATIONS & SIGNALING				
50.01	Wayside signaling equipment	1	LS	$9,621,000
50.06	Grade crossing protection	1	LS	$19,490,000
	Total for Category 50			**$29,111,000**
	TOTAL CONSTRUCTION COSTS W/ PURCHASE OF REAL ESTATE			**$109,089,955**
	TOTAL CONSTRUCTION COSTS W/O PURCHASE OF REAL ESTATE			**$79,651,955**
TOTAL GENERAL CONTRACTOR CONSTRUCTION COSTS W/O PURCHASE OF REAL ESTATE				**$32,701,955**
	TOTAL RR FORCE ACCOUNT CONSTRUCTION COSTS			**$46,950,000**
70 VEHICLES				
70.03	Vehicle Acquistion: Diesel Multiple Unit	1	LS	$0
70.04	Vehicle Acquistion: Loco-hauled passenger cars and locomotives	1	LS	$110,250,000
	Total for Category 70			**$110,250,000**
80 PROFESSIONAL SERVICES (applies to Cats. 10-60)				
	General Contractor Work (Stations)			
80.01	Service Development Plan/Service Environmental	1	LS	
80.02	Preliminary Engineering/Project Environmental	1	LS	$1,308,078
80.03	Final design	1	LS	$3,270,196
80.04	Project management for design and construction	1	LS	$654,039
80.05	Construction administration & management	1	LS	$2,779,666
80.06	Professional liability and other non-construction insurance	1	LS	$1,635,098
80.07	Legal; Permits; Review Fees by other agencies, cities, etc.	1	LS	$654,039
80.08	Surveys, testing, investigation	1	LS	$327,020
80.09	Engineering inspection	1	LS	$490,529
80.10	Start up	1	LS	$3,805,000
	Sub-Total			**$14,923,665**
	Railroad Force Account Work			
80.01	Service Development Plan/Service Environmental	1	LS	
80.02	Preliminary Engineering/Project Environmental	1	LS	$939,000
80.03	Final design	1	LS	$2,817,000
80.04	Project management for design and construction	1	LS	$939,000
80.05	Construction administration & management	1	LS	$939,000
80.06	Professional liability and other non-construction insurance	1	LS	$0
80.07	Legal; Permits; Review Fees by other agencies, cities, etc.	1	LS	$0
80.08	Surveys, testing, investigation	1	LS	$469,500
80.09	Engineering inspection	1	LS	$0
80.10	Start up	1	LS	
	Sub-Total			**$6,103,500**
	Total for Category 80			**$21,027,165**
90 UNALLOCATED CONTINGENCY				
	Total for Category 90			**7,965,196**
100 FINANCE CHARGES				
	Total for Category 100			**$1,593,039**
	TOTAL			**$249,925,354**

10 TRACK STRUCTURES AND TRACK								
10.03 Track structure: Undergrade Bridges								
Cost Reference	**DESCRIPTION**	**COST ID**	**TOTAL QUANTITIES**	**UNIT**	**UNIT COST**	**BASE COST**	**ALLOCATED CONTINGENCY**	**TOTAL COST**
	General Contractor Work							
	St Augustine Realignment							
	Small Creek Crossing (50-ft)							
	Concrete Deck/ Pre-stressed Girder		0	SF	$700	$0	25.00%	$0
	Total							**$0**

10 TRACK STRUCTURES AND TRACK

10.06 Track structure: At-grade (grading and subgrade stabilization)

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	RR Force Account							
	Bowden Yard							
Unit Price - FEC	Site Preparation (Clearing, Grubbing, Grading & Drainage)		1	LS	$25,000	$25,000	10.00%	$28,000
	Total							**$28,000.00**

10 TRACK STRUCTURES AND TRACK

10.09 Track new construction: Conventional ballasted

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	RR Force Account							
	Bowden Yard							
	Lead Track to Reba St							
	New Track Construction (4000-ft)							
Unit Price - FEC	Track Material: 136# Rail w/ new crossties		4,000	TF	$120.00	$480,000	5.00%	$504,000
Unit Price - FEC	Install Track - Labor & Equipment		4,000	TF	$55.00	$220,000	5.00%	$231,000
	Sub-Total							**$735,000**
	Station Tracks (8 locations @ 2,500 ft each)							
Unit Price - FEC	Track Material: 136# Rail w/ new crossties		20,000	TF	$120.00	$2,400,000	5.00%	$2,520,000
Unit Price - FEC	Install Track - Labor & Equipment		20,000	TF	$55.00	$1,100,000	5.00%	$1,155,000
Unit Price - FEC	Surface Track No 24 Turnout		16	EA	$1,000.00	$16,000	5.00%	$17,000
	Sub-Total							**$3,692,000**
	Northwood Connection (Single Track w/wyes)							
Unit Price - FEC	Track Material: 136# Rail w/ new crossties		4,900	TF	$120.00	$588,000	5.00%	$617,000
Unit Price - FEC	Install Track - Labor & Equipment		4,900	TF	$55.00	$269,500	5.00%	$283,000
	Sub-Total							**$900,000**
	MIC							
	Platform Tracks		1	LS	$2,300,000.00	$2,300,000		$2,300,000
	Total		**28,900**	TF				**$7,627,000**
Rail (CWR)								
ft	yd	lb	lb	**TONS**				
57,800	19,267	136	2,620,267	1,310				
12" Ballast Section								
CY per mile		# of Miles	Total CY					
7,200		5	39,409					
12" Subballast Section								
CY per mile		# of Miles	Total CY					
8,475		5	46,388					
Concrete Crossties 24" Centers								
# of ties per 39' @ 24" C-C		TF	Total # of Ties					
24		28,900	14,450					

10 TRACK STRUCTURES AND TRACK

10.11 Track rehabilitation: Ballast and surfacing

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	RR Force Account							
	Bowden Yard							
Unit Price - FEC	Ballast Rock		14	Cars	$2,450.00	$34,300	5.00%	$36,000
Unit Price - FEC	Surface Track No 20 Turnout		5	EA	$1,000.00	$5,000	5.00%	$5,000
Unit Price - FEC	Surface Track No 10 Turnout		2	EA	$750.00	$1,500	5.00%	$2,000
	Sub-Total							**$43,000**
	Curve Modifications							
Unit Price - FEC	Ballast Rock		1,500	Cars	$2,450.00	$3,675,000	5.00%	$3,859,000
Unit Price - FEC	Surface Curves to increase speeds (2-passes)		316,800	TF	$6.50	$2,059,200	5.00%	$2,162,000
	Sub-Total							**$6,021,000**
	Northwood Connection							
Unit Price - FEC	Ballast Rock		16	Cars	$2,450.00	$39,200	5.00%	$41,000
Unit Price - FEC	Surface Track No 10 Turnout		2	EA	$750.00	$1,500	5.00%	$2,000
Unit Price - FEC	Surface Track No 20 Turnout		6	EA	$1,000.00	$6,000	5.00%	$6,000
	Sub-Total							**$49,000**
	St Augustine Station							
Unit Price - FEC	Realign Existing FEC Track		0	TF	$55.00	$0	5.00%	$0
	Sub-Total							**$0**
	Total							**$6,113,000**

10 TRACK STRUCTURES AND TRACK

10.14 Track: Special track work (switches, turnouts, insulated joints)

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	RR Force Account							
	Bowden Yard							
Unit Price-FEC	No 20 Universal Crossover - 136# (Material)		1	EA	$199,500	$199,500	5.00%	$209,000
Unit Price-FEC	Labor to Install No 20 Universal Crossover		1	EA	$65,000	$65,000	5.00%	$68,000
Unit Price-FEC	No 20 Turnout - 136# (Material)		1	EA	$98,115	$98,115	5.00%	$103,000
Unit Price-FEC	Labor to Install No 20 Turnout		1	EA	$30,000	$30,000	5.00%	$32,000
Unit Price-FEC	No 10 Turnout - 136# (Material)		2	EA	$54,000	$108,000	5.00%	$113,000
Unit Price-FEC	Labor to Install No 10 Turnout		2	EA	$18,000	$36,000	5.00%	$38,000
Unit Price-FEC	No 24 Turnout - 136# (Replace Existing Switch to increase speed)		1	EA	$125,000	$125,000	5.00%	$131,000
	Sub-Total		4	EA				**$694,000**
	Station Tracks							
Unit Price-FEC	No 24 Powered Turnout 136#		16	EA	$125,000	$2,000,000	5.00%	$2,100,000
Unit Price-FEC	Labor to Install No 24 Turnout		16	EA	$35,000	$560,000	5.00%	$588,000
	Sub-Total		16	EA				**$2,688,000**
	Northwood Connection Single Track w/wyes)							
Unit Price-FEC	No 10 Turnout - 136# (Material)		2	EA	$54,000	$108,000	5.00%	$113,000
Unit Price-FEC	Labor to Install No 10 Turnout		2	EA	$18,000	$36,000	5.00%	$38,000
Unit Price-FEC	No 20 Turnout - 136# (Material)		4	EA	$98,115	$392,460	5.00%	$412,000
Unit Price-FEC	Labor to Install No 20 Turnout		4	EA	$30,000	$120,000	5.00%	$126,000
	Sub-Total		6	EA				**$689,000**
	Total		26	EA				**$4,071,000**

20 STATIONS, TERMINALS, INTERMODAL

20.01 Station buildings: Intercity passenger rail only

Cost Reference	DESCRIPTION	COST ID	TOTAL QUANTITIES	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	General Contractor Work							
	DAYTONA BEACH AMTRAK STATIONS							
	Medium Size - Partially Staffed							
	Alt. #1 - South of International Speedway Blvd. (Magnolia Avenue Station)		1	EA	$1,211,000	$1,211,000	10.00%	$1,332,000
	TITUSVILLE AMTRAK STATIONS							
	Sheltered, Unstaffed							
	Alt. #2 - North of Pine Street (Historic station)		1	EA	$216,000	$216,000	10.00%	$238,000
	COCOA AMTRAK STATIONS							
	Medium Size - Staffed							
	Alt. #2 - South of Rosa L. Jones Boulevard		1	EA	$1,211,000	$1,211,000	10.00%	$1,332,000
	MELBOURNE AMTRAK STATIONS							
	Sheltered, Unstaffed							
	Alternative 3 - North of E. Strawbridge Avenue (U.S. 192)		1	EA	$216,000	$216,000	10.00%	$238,000
	ST. AUGUSTINE OPTION 1							
	Medium Size - Staffed							
	Alt. #1 - U.S. 1 at San Marco Avenue (Historic Rail Turnaround)		1	EA	$1,211,000	$1,211,000	10.00%	$1,332,000
	VERO							
	Sheltered, Unstaffed							
	Alt. #3 - North of 23rd Street		1	EA	$216,000	$216,000	10.00%	$238,000
	FORT PIERCE							
	Sheltered, Unstaffed							
	Alt. #1 - South of Orange Avenue		1	EA	$216,000	$216,000	10.00%	$238,000
	STUART							
	Sheltered, Unstaffed							
	Alt. #3 - Stypmann Boulevard		1	EA	$216,000	$216,000	10.00%	$238,000
	MIC							
	Headhouse Building		1	LS	$900,000	$900,000		$900,000
	Total							**$4,516,000**

20 STATIONS, TERMINALS, INTERMODAL

20.03 Platforms (12' x 1,000')

Platform Canopy included under station building Cost. For the platforms at the MIC, canopy is included

Cost Reference	DESCRIPTION	COST ID	TOTAL QUANTITIES	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	General Contractor Work							
	DAYTONA BEACH AMTRAK STATIONS							
	Alt. #1 - South of International Speedway Blvd. (Magnolia Avenue Station)		12,000	SF	$30	$360,000	10.00%	$396,000
	TITUSVILLE AMTRAK STATIONS							
	Alt. #2 - North of Pine Street (Historic station)		12,000	SF	$30	$360,000	10.00%	$396,000
	COCOA AMTRAK STATIONS							
	Alt. #2 - South of Rosa L. Jones Boulevard		12,000	SF	$30	$360,000	10.00%	$396,000
	MELBOURNE AMTRAK STATIONS							
	Alternative 3 - North of E. Strawbridge Avenue (U.S. 192)		10,680	SF	$30	$320,400	10.00%	$352,000
	ST. AUGUSTINE OPTION 1							
	Alt. #1 - U.S. 1 at San Marco Avenue (Historic Rail Turnaround)		12,000	SF	$30	$360,000	10.00%	$396,000
	VERO							
	Alt. #3 - North of 23rd Street		12,000	SF	$30	$360,000	10.00%	$396,000
	FORT PIERCE							
	Alt. #1 - South of Orange Avenue		12,000	SF	$30	$360,000	10.00%	$396,000
	STUART							
	Alt. #3 - Stypmann Boulevard		12,000	SF	$30	$360,000	10.00%	$396,000
	MIC							
	Platform includes signage, seating, CCTV		1	LS	$1,800,000	$1,800,000		$1,800,000
	Platform Canopy includes 2 escalator/stair chutes		1	LS	$14,000,000	$14,000,000		$14,000,000
	Total							**$18,924,000**

20 STATIONS, TERMINALS, INTERMODAL

20.04 Elevators, escalators

Cost Reference	DESCRIPTION	COST ID	TOTAL QUANTITIES	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	MIC							
	2 Elevators, 2 Escalators, and 2 Stairs		1	LS	$3,000,000	$3,000,000		$3,000,000
	Total							**$3,000,000**

20 STATIONS, TERMINALS, INTERMODAL

20.06 Pedestrian / bike access and accommodation, landscaping, parking lots

Cost Reference	DESCRIPTION	COST ID	TOTAL QUANTITIES	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	Site Layout - Parking Lots, Acess Roads and Site Work							
	General Contractor Work							
	DAYTONA BEACH AMTRAK STATIONS							
	International Speedway Blvd. South (Magnolia Avenue Station)		1	EA	$255,530	$255,530	10.00%	$281,000
	TITUSVILLE AMTRAK STATIONS							
	Historic station (Pine St. to Main St.)		1	EA	$255,530	$255,530	10.00%	$281,000
	COCOA AMTRAK STATIONS							
	SR 520/FEC		1	EA	$255,530	$255,530	10.00%	$281,000
	MELBOURNE AMTRAK STATIONS							
	Alternative 3 - North of E. Strawbridge Ave.		1	EA	$255,530	$255,530	10.00%	$281,000
	ST. AUGUSTINE OPTION 1							
	Historic Rail Turnaround		1	EA	$255,530	$255,530	10.00%	$281,000
	VERO							
	Alternative 1		1	EA	$255,530	$255,530	10.00%	$281,000
	FORT PIERCE							
	Alternative 2		1	EA	$255,530	$255,530	10.00%	$281,000
	STUART							
	Alternative 1		1	EA	$255,530	$255,530	10.00%	$281,000
	Total							**$2,248,000**

40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS

40.01 Demolition, clearing, site preparation

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	Bowden Yard							
	Track Removal							
	Remove No 20 Turnouts		1	EA	$15,000	$15,000	5.00%	$16,000
	Remove Existing Crossover		1	EA	$5,000	$5,000	5.00%	$5,000
	Sub-Total							**$21,000**
	Northwood Connection							
	Clear & Grub - Light - Medium Vegitation		0.78	MI	$15,000	$11,700	5.00%	$12,000
	Demolition (Existing Buildings)		1	LS	$1,000,000	$1,000,000	5.00%	$1,050,000
	Sub-Total							**$1,062,000**
	Total							**$1,083,000**

40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS

40.02 Site Utilities, Utility relocations

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	General Contractor Work							
	Stations							
			8	EA	$50,000.00	$400,000	20.00%	$480,000
	Northwood Connection							
			1	LS	$50,000.00	$50,000	20.00%	$60,000
	Total							**$540,000**

40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS

40.06 Temporary facilities and other indirect costs during construction

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor Work Only							
			General Requirements							
			Mobilization		6%			$1,902,420		$1,902,420
			Contractor Temporary Facilities		1	LS	$300,000	$300,000	10.00%	$330,000
			Remove Temporary Facilities and Site Clean-Up		0.50%			$158,535		$158,535
			TOTAL							**$2,390,955**

40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS

40.07 Purchase or lease of real estate

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	STATIONS							
	DAYTONA BEACH AMTRAK STATION							
	Alt. #1 - South of International Speedway Blvd. (Magnolia Avenue Station)		63,984	SF	$49.17	$3,146,093	0.00%	$3,146,000
	TITUSVILLE AMTRAK STATIONS							
	Alt. #2 - North of Pine Street (Historic station)		10,178	SF	$15.15	$154,197	0.00%	$154,000
	COCOA AMTRAK STATIONS							
	Alt. #2 - South of Rosa L. Jones Boulevard		48,132	SF	$39.23	$1,888,218	0.00%	$1,888,000
	MELBOURNE AMTRAK STATIONS							
	Alternative 3 - North of E. Strawbridge Avenue (U.S. 192)		10,500	SF	$25.17	$264,285	0.00%	$264,000
	ST. AUGUSTINE							
	Alt. #1 - U.S. 1 at San Marco Avenue (Historic Rail Turnaround)		66,950	SF	$30	$2,008,500	10.00%	$2,209,000
	VERO							
	Alt. #3 - North of 23rd Street		100	SF	$30	$3,000	0.00%	$3,000
	FORT PIERCE							
	Alt. #1 - South of Orange Avenue		8,400	SF	$30	$252,000	0.00%	$252,000
	STUART							
	Alt. #3 - Stypmann Boulevard		3,944	SF	$50	$197,200	0.00%	$197,000
	Sub-Total							**$8,113,000**
	NORTHWOOD CONNECTION							
	50-ft Right of way		1	LS	$21,325,321	$21,325,321	0.00%	$21,325,000
	Sub-Total							**$21,325,000**
	Total							**$29,438,000**

50 COMMUNICATIONS AND SIGNALING

50.01 Wayside signaling equipment

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	RR Force Account							
	Bowden Yard							
Unit Price FEC	Universal Control Point		1	LS	$512,520	$512,520	10.00%	$564,000
Unit Price FEC	Immediate Signal		4	EA	$95,000	$380,000	10.00%	$418,000
Unit Price FEC	Control Point 5.4		1	LS	$340,400	$340,400	10.00%	$374,000
Unit Price FEC	Control Point 9.7 (Replace Existing CP)		1	LS	$362,650	$362,650	10.00%	$399,000
Unit Price FEC	Reba Street Control Point		1	LS	$362,650	$362,650	10.00%	$399,000
Unit Price FEC	Electric Lock		2	EA	$70,000	$140,000	10.00%	$154,000
Unit Price FEC	Adjust Grade Crossing Approaches		4	LS	$30,000	$120,000	10.00%	$132,000
	Sub-Total							**$2,440,000**
	Station Tracks							
Unit Price FEC	Control Point		16	EA	$362,650	$5,802,400	10.00%	$6,383,000
	Sub-Total							**$6,383,000**
	Northwood Connection							
Unit Price FEC	Control Point		2	EA	$362,650	$725,300	10.00%	$798,000
	Sub-Total							**$798,000**
	Total							**$9,621,000**

50 COMMUNICATIONS AND SIGNALING

50.06 Grade crossing protection

Cost Reference	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	RR Force Account							
	Stations							
	Modify Crossing Gate Locations for 2nd Track							
	DAYTONA BEACH AMTRAK STATIONS							
	Alt. #1 - South of International Speedway Blvd. (Magnolia Avenue Station)							
			2	EA	$50,000	$100,000	10.00%	$110,000
			100	TF	$600	$60,000	5.00%	$63,000
	TITUSVILLE AMTRAK STATIONS							
	Alt. #2 - North of Pine Street (Historic station)							
			2	EA	$50,000	$100,000	10.00%	$110,000
			100	TF	$600	$60,000	5.00%	$63,000
	COCOA AMTRAK STATIONS							
	Alt. #2 - South of Rosa L. Jones Boulevard							
			1	EA	$50,000	$50,000	10.00%	$55,000
			50	TF	$600	$30,000	5.00%	$32,000
	MELBOURNE AMTRAK STATIONS							
	Alternative 3 - North of E. Strawbridge Avenue (U.S. 192)							
			2	EA	$50,000	$100,000	10.00%	$110,000
			100	TF	$600	$60,000	5.00%	$63,000
	ST. AUGUSTINE OPTION 1							
	Alt. #1 - U.S. 1 at San Marco Avenue (Historic Rail Turnaround)							
			0	EA	$50,000	$0	10.00%	$0
			0	TF	$600	$0	5.00%	$0
	VERO							
	Alt. #3 - North of 23rd Street							
			3	EA	$50,000	$150,000	10.00%	$165,000
			150	TF	$600	$90,000	5.00%	$95,000
	FORT PIERCE							
	Alt. #1 - South of Orange Avenue							
			2	EA	$50,000	$100,000	10.00%	$110,000
			100	TF	$600	$60,000	5.00%	$63,000
	STUART							
	Alt. #3 - Stypmann Boulevard							
			2	EA	$50,000	$100,000	10.00%	$110,000
			200	TF	$600	$120,000	5.00%	$126,000
	Sub-Total							**$1,275,000**
	Mainline System Signals MP 9.7 to WPB							
	Install Signal Cut Section & Adjust Grade Crossing Approaches		1	LS	$16,000,000	$16,000,000	5.00%	$16,800,000
	Sub-Total							**$16,800,000**
	Northwood Connection							
	Warninng and Protection System		3	EA	$400,000	$1,200,000	10.00%	$1,320,000
	Grade Crossing Panels		150	TF	$600	$90,000	5.00%	$95,000
	Sub-Total							**$1,415,000**
	Total							**$19,490,000**

70 VEHICLES

70.03 Vehicle Acquistion: DMU

	STATIONING						UNIT		ALLOCATED	
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	COST	BASE COST	CONTINGENCY	TOTAL COST
									5%	$0
			Total							**$0**

70 VEHICLES

70.04 Vehicle Acquistion: Loco-haul passenger cars

			DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
		Passenger Cars and locos			24			$105,000,000	5%	$110,250,000
			Total		24					**$110,250,000**

80 PROFESSIONAL SERVICES

80.02 Preliminary Engineering/ Project Environmental

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Preliminary Engineering		4.00%	LS		$1,308,078		$1,308,078
			RR Force Account							
			Preliminary Engineering		2.00%	LS		$939,000		$939,000

80 PROFESSIONAL SERVICES

80.03 Final Design and Construction Services

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Final Design Engineering-		6.00%	LS		$1,962,117		$1,962,117
			Construction Services by Engineering Team		4.00%	LS		$1,308,078		$1,308,078
			(Shop Dwgs, RFI's, NPC's, FOF's, etc)							
			TOTAL							**$3,270,196**
			RR Force Account							
			Final Design Engineering-		4.00%	LS		$1,878,000		$1,878,000
			Construction Services by Engineering Team		2.00%	LS		$939,000		$939,000
			(Shop Dwgs, RFI's, NPC's, FOF's, etc)							
			TOTAL							**$2,817,000**

80 PROFESSIONAL SERVICES

80.04 Project Management for Design and Construction

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Project Management for Design and Construction		2%	LS		$654,039		$654,039
			RR Force Account							
			Project Management for Design and Construction		2%	LS		$939,000		$939,000

80 PROFESSIONAL SERVICES

80.05 Construction Administration and Management

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Construction Administration & Management		8.50%	LS		$2,779,666		$2,779,666
			RR Force Account							
			Construction Administration & Management		2.00%	LS		$939,000		$939,000

80 PROFESSIONAL SERVICES

80.06 Professional liability and other non-construction insurance

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Insurance and Insurance Certificates		5%	LS		$1,635,098		$1,635,098
			RR Force Account							
			Insurance and Insurance Certificates			LS		$0		$0

80 PROFESSIONAL SERVICES

80.07 Legal; Permits; Review Fees by other agencies, cities, etc.

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Legal; Permits; Review Fees by Others, Cities, Etc		2%	LS		$654,039		$654,039
			RR Force Account							
			Legal; Permits; Review Fees by Others, Cities, Etc			LS		$0		$0

80 PROFESSIONAL SERVICES

80.08 Surveys, testing, investigation

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Surveys, Testing, Investigations		1.00%	LS		$327,020		$327,020
			RR Force Account							
			Surveys, Testing, Investigations		1.00%	LS		$469,500		$469,500

80 PROFESSIONAL SERVICES

80.09 Engineering inspection

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			General Contractor							
			Engineering Inspection		1.50%	LS		$490,529		$490,529
			RR Force Account							
			Engineering Inspection			LS		$0		$0

90 UNALLOCATED CONTINGENCY

	STATIONING		DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
	BEGIN	END								
			Unallocated Contingency		10%	LS		7,965,196		7,965,196

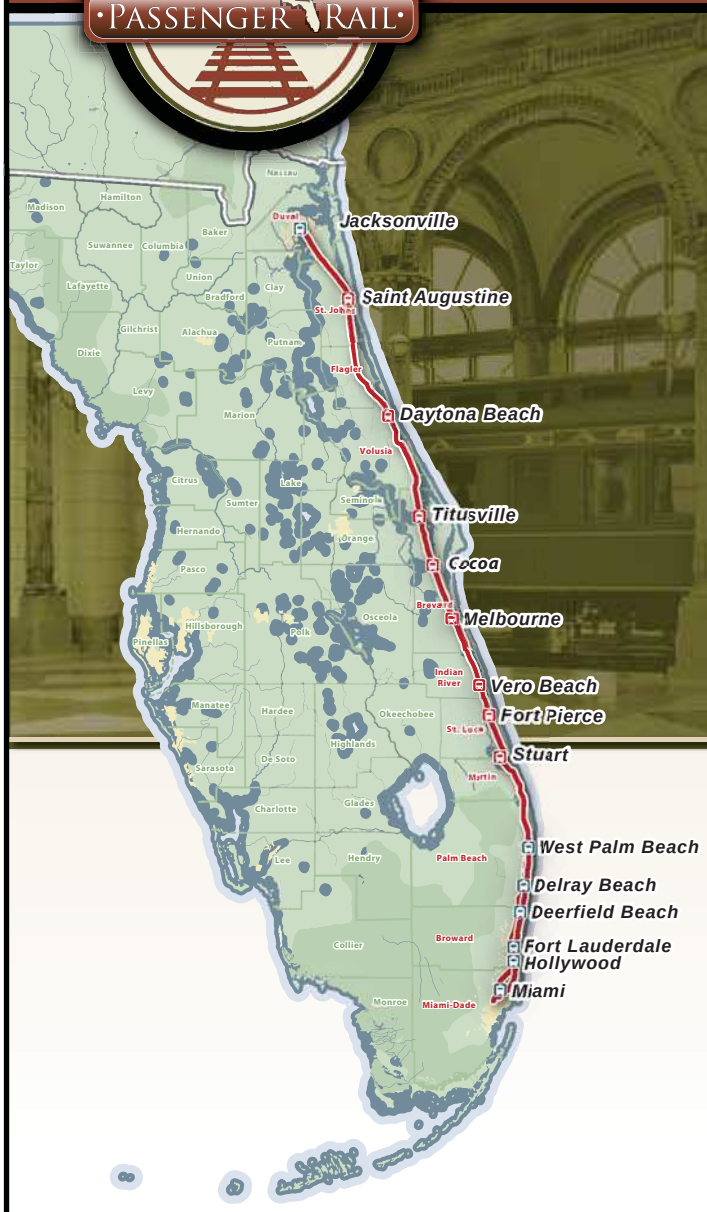
100 FINANCIAL CHARGES

	STATIONING									
	BEGIN	END	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLOCATED CONTINGENCY	TOTAL COST
			Payment and Performance Bonds and Guarantees		2.00%	LS		$1,593,039		$1,593,039

ATTACHMENT E

FINANCIAL ANALYSIS SUMMARY

FEC AMTRAK® PASSENGER RAIL



Federal Funding Opportunity Number: FR-HSR-10-004

TBG061410232339ORL

FINANCIAL IMPACT FROM PROPOSED FEC SERVICE (REVISED)

1. This analysis assumes the *Silver Star* extension over the FEC is part of the LD network for operating cost purposes (and not a state-supported expense), but its required incremental equipment is included in the capital needs portion.

Allocated Financial Impact (1)	Phase 1, Option D/E			Phase 2 (2)	
	Star (3)	Corridor	Total	Option D Corridor	Option E Corridor
Total Riders	135,800	86,800	222,600	190,300	150,100
Total Revenue (millions)		$1.6	$10.8	$3.1	$2.4
Total Direct Costs (millions)		$6.9	$19.2	$21.8	$17.9
Net Impact (Rev. – Direct Costs) (millions)		-$5.3	-$8.4	-$18.7	-$15.5

1) 2010 Dollars
2) Both Option D and Option E for Phase 2 are incremental to the Corridor portion of Phase 1
3) Includes the impact of current riders transferring form the *Meteor* to the *Star*
4) Amtrak responsible for revenues / costs for *Silver Star*

2. Summary of Proposed Changes

We have updated the FEC analysis to include the financial impact from splitting the Silver Star at Jacksonville.

We were asked to determine the financial impact for two options for passenger train service along the FEC Corridor. There are two phases for each option. Both options include splitting the *Silver Star* at Jacksonville, operating one section over the FEC Corridor and the other vie the current route through Tampa. This analysis is a continuation of a previous analysis.

- **Option D**
  - **Phase 1**
    - Split the *Silver Star* daily at Jacksonville (14 trips per week)
    - One additional daily roundtrip between Miami and Jacksonville over the FEC (14 trips per week)
  - **Phase 2**
    - Phase 1 service, plus
    - Three daily roundtrips between Miami and Cocoa over the FEC corridor (42 trips per week).
- **Option E**
  - **Phase 1**
    - Same as Option D
  - **Phase 2**
    - Phase 1 service, plus
    - One daily roundtrip and two additional weekday roundtrips between Miami and Vero Beach over the FEC corridor (34 trips per week).

3. Important Assumptions

- **T&E Crew Bases**
  - Option D
    - Phase 1: Jacksonville crew base
    - Phase 2: Miami crew base
  - Option E
    - Phase 2: Vero Beach crew base

- **Equipment**

Incremental Equipment	Phase 1		Phase 2
	Star	Corridor (protect) (1)	JAX-Cocoa
Train Sets Assigned	4	1	3
Locomotives		1 (1)	3
Baggage Car (1 per set)	4		
Viewliner Sleeper (1 per set)	4		
Amfleet II Coaches (2 per set)	8		
Bi-Level Cab Cars (1 per set)		1 (1)	3
Bi-Level Coaches (3 per set)		2 (1)	6
Bi-Level Food Cars (1 per set)		1	3

1) The proposed protect equipment is listed parenthetically
2) Amtrak absorbs incremental protect needs for *Star*

- **Locomotives/Cab Cars**

  We are assuming a push-pull operation requiring a cab-car for each set.
- **Weekend Trains for Option E**

  We assumed trains 883 and 886 would operate on the weekend for Option E
- **Mechanical**
  - Hialeah costs were based on a T. Farr estimate (made for Option C), proportionately adjusted for changes in incremental equipment and for the daily turns and layovers at MIA.
  - Turnaround costs:
    - Jacksonville: $55,000 per month for 1 layover (contractor)
    - Cocoa/Vero Beach: $55,000 per month for 1 layover plus $15,000 per month for one turn (contractor)
- **Food Service**
  - FEC: Food service similar to NE Regionals (1 LSA)
- **Stations**
  - We have assumed none of the new FEC stations would be staffed and that Amtrak would not incur any operating expenses for these new stations.
  - Estimated growth in ridership at Florida staffed stations is 40%. We assume that labor costs at these stations would increase by 20%.
- **Schedule**

  None of the proposed schedules have been submitted to the host railroads for approval, so are subject to change.

4. Incremental Headcount

Incremental Headcount	Phase 1, Option D/E			Phase 2	
	Star	Corridor	Total	Option D	Option E
Stations	tbd	tbd	tbd	tbd	tbd
T&E Crew (1)		15		35	16
OBS (2)		4		9	6
Mechanical		tbd	tbd	tbd	tbd

1) Includes one Road Foreman per 15 new T&E employees
2) Includes 1 OBS District Manager per 15 new OBS employees
3) Amtrak absorbs incremental crew costs for Star

5. Financial Analysis Results

Allocated Financial Impact [1]	Phase 1, Option D/E			Phase 2 [2]	
	Star	Corridor	Total	Option D Corridor	Option E Corridor
Riders	135,800	86,800	222,600	190,300	150,100
Revenue (million)					
Ticket Revenue		$1.5		$3.0	$2.3
Food and Beverage Revenue		0.0		0.1	0.1
Total Revenue		$1.6		$3.1	$2.4
Expenses (million)					
Host Railroad		$2.0		$5.3	$4.0
Fuel		0.8		2.2	1.8
Power - Electric Traction		0.0		0.0	0.0
T&E (Labor & Support)		1.8		5.2	3.4
OBS (Labor & Support)		0.3		1.1	0.9
Commissary (F&B)		0.1		0.2	0.2
Yard Ops		0.0		0.0	0.0
Operations Management		0.3		1.3	1.3
Motor Coach		0.0		0.0	0.0
Maintenance of Equipment		0.9		4.7	4.7
Stations		0.4		0.8	0.8
Amtrak Maintenance of Way		0.0		0.0	0.0
Sales and Marketing		0.2		0.37	0.29
Commissions		0.0		0.1	0.1
Insurance		0.1		0.14	0.10
Passenger Inconvenience		0.0		0.02	0.01
Police, Environmental, and Safety		0.1		0.3	0.4
Sub-total Direct Operating Costs		$6.9		$21.8	$17.9
Net (Rev. – Dir. Op. Costs) (mil)		-$5.3		-$18.7	-$15.5
Cost Recovery (Rev/ Dir Costs)		23%		14%	14%
Cost per Train Mile		$27		$32	$36

1) 2010 Dollars
2) Both Option D and Option E for Phase 2 are <u>incremental</u> to the Corridor portion of Phase 1
3) Amtrak absorbs operating costs for *Star*

6. One Time Charges

In addition to annual operating costs, implementation would also require one time training/qualification costs as well as capital costs.

Training and Qualifying Costs (millions) [1]	Phase 1, Option D/E			Phase 2 [3]	
	Star	Corridor	Total	Option D	Option E
Amtrak					
OBS		$0.05	$0.35	$0.10	$0.10
T&E		$1.03	$2.06	$2.00	$0.90
Host Railroad T&E [2]		$0.57	$1.14	$1.80	$0.80
Total		$1.65	$3.55	$3.90	$1.80

1) 2010 Dollars
2) Assume 30 trips for each new employee. Host railroad staff required includes 1 engineer and 1 conductor.
3) Phase 2 is incremental after Phase 1. Option D and Option E are exclusive; one or the other

4) Amtrak absorbs one time charges for Star

Equipment Capital Costs for both Options D and E [1]							
		Phase 1 Star		Phase 1 Corridor		Phase 2	
	Unit Costs (mil)	Number [2]	Total (mil)	Number [2]	Total (mil)	Number [2]	Total (mil)
Diesel Locomotives	$7			2	$14	3	$21
Cab Cars [3]	$5			2	$10	3	$15
Coaches	$4	8	$32	3	$12	6	$24
Food Cars	$5			1	$ 5	3	$15
Baggage Car	$3	4	$12				
Sleeper (Viewliner)	$5	4	$20				
Total			$64		$41		$75

1) 2010 Dollars **Total**
2) Includes shop count (see Equipment Assumption above)
3) Assume push-pull operation requiring cab-cars
4) Amtrak absorbs capital costs for Star shop count

Host Railroad Capital Costs: The Finance Department has not estimated nor reviewed any estimate of the capital cost required by the host railroads.

Station Capital Costs: The Finance Department has not estimated nor reviewed any estimate of the capital cost required for new stations.

7. Financial Analysis Methodology

- Ticket Revenues and Ridership: We used a Long Distance and Commuter Train Demand Forecasting Model to forecast ridership and ticket revenue. The model uses a direct demand approach to forecast Amtrak ridership by geographic market and class of service.
- Food and Beverage Revenues: Corridor train food and beverage revenues and cost estimates were based on average food and beverage costs for the *Surfliner* Service.
- Host Railroad Costs: We based Host Railroad costs on the current, route specific, cost per train mile.
- Fuel Costs: We estimated fuel costs based on the average fuel costs per train mile on the *Silver Star* Route for the last 12 months.
- Train Crew Costs: T&E labor cost estimates were provided by Crew Management.
- Route and Shared Station Costs – Estimated costs for route stations (both staffed and unstaffed) were based on average allocated costs for similar stations.

8. Impact of Ramp-up on Revenue

Estimated demand numbers are mature; they have not been adjusted to reflect phasing or ramp-up. The Finance Department strongly encourages that the first year revenues and riders be adjusted to reflect the expected impact of the ramp up period.