SOUTH FLORIDA
REGIONAL
TRANSPORTATION
AUTHORITY

Strategic Regional Transit Plan

December 2008

Technical Executive Summary

TECHNICAL EXECUTIVE SUMMARY
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1.0 INTRODUCTION

The South Florida region faces complex and diverse transportation, land use, economic, and development issues. Problems such as increased road congestion and lack of mobility options stem from recent explosive growth and an essentially suburban pattern of land use and development. Transit is a critical element of South Florida's transportation future and key to promoting economic development and access to jobs, providing options to network gridlock, and mitigating the isolation of the transportation disadvantaged.

The Strategic Regional Transit Plan was developed by the South Florida Regional Transportation Authority (SFRTA) to respond to the need for transit alternatives that meet regional needs in cooperation with agency partners. The results of this strategic planning process provide a draft recommended network of transit alternatives. The considerable amount of data derived from the process will be a starting point for the Regional Long Range Transportation Plan Transit Needs Element.

1.1 PARTNER OUTREACH

The SFRTA actively pursued communication with partner agencies through a series of briefings conducted in December 2006 and January 2007 where initial alternatives were presented. Adjustments to the alternatives were made as a result of these briefings prior to analysis.

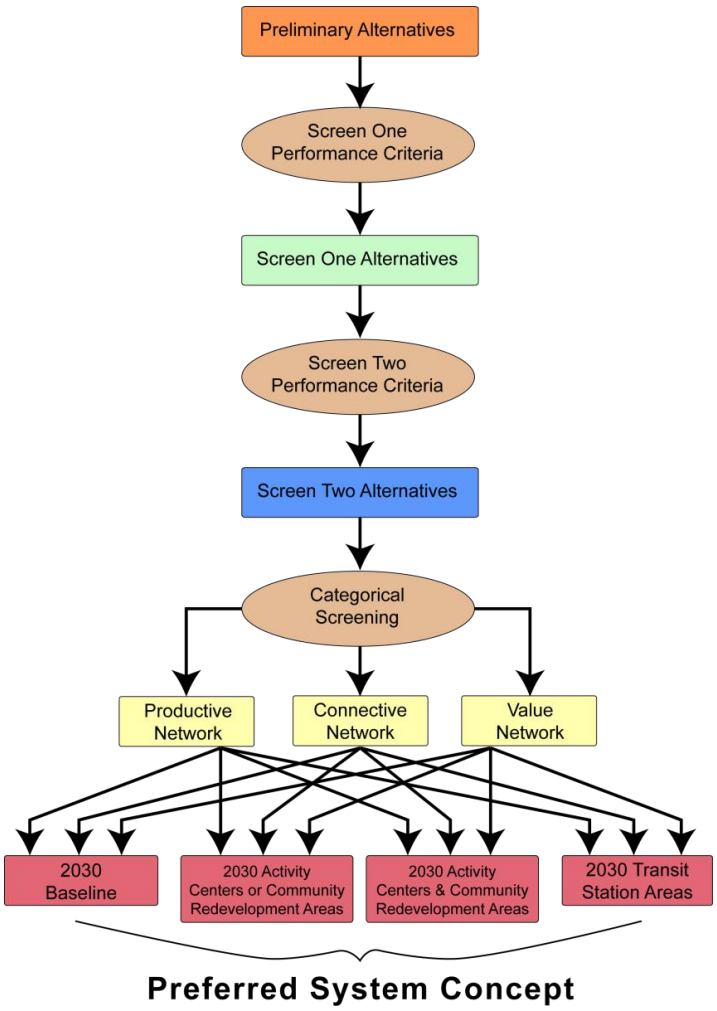
Extensive outreach was also pursued with the SFRTA Planning Technical Advisory Committee (PTAC). Throughout the screening process, the alternatives were presented to the PTAC. As a result of the comments from the committee, necessary adjustments or additions were made to the alternatives.

2.0 ALTERNATIVES DEVELOPMENT

The process to develop initial alternatives included analysis of existing and projected socio-economic data, transit service, land use patterns and policies, major trip flows, availability of right-of-way, connections to regional activity centers, and connections to existing premium transit within the region. Additionally, proposed fixed-guideway transit projects, identified in existing plans and proposals, were considered throughout the development process.

Figure 1 shows how alternatives advanced through the screening process and ultimately into the three networks tested using four land use scenarios.

Figure 1 – Alternatives Development Process



2.1 DEFINING REGIONAL

Five main criteria were initially used to determine if proposed regional transit projects or corridors served regional needs:

- Interjurisdictional – crosses county boundaries
- Serves Regional Activity Centers (RACs)
- Trip length or distance covered
- Connects to existing premium transit service
- Provides intermodal connection

To be considered regional, projects do not need to meet all criteria; however priorities may be determined by how many are met.

2.2 REGIONAL ACTIVITY CENTERS

RACs include areas with a high concentration of jobs in the year 2000, those that were projected to experience significant employment growth between the years 2000 and 2030, and Developments of Regional Impact. Local comprehensive plans were also consulted for data verification. The study identified 34 RACs in the region: nine in Palm Beach County, seven in Broward County, and 18 in Miami-Dade County.

2.3 TRIP FLOWS

Trip flows between major areas were analyzed to determine the magnitude of travel demand between RACs and regional areas, or "superzones". Generally, superzones comprise areas with similar residential character, identity, and densities. RAC superzones are typically considered trip destinations, while all other superzones are generally considered trip origins. **Figure 2** shows the major trip flows within the region to RACs.

3.0 SCREENING PROCESS

Twenty-seven preliminary alternatives were tested using national best practice criteria. The outcome of this analysis included an understanding of which corridors showed positive performance, which needed adjustment to perform better, and which did not meet regional criteria or metric thresholds. The alternatives were evaluated using the following performance criteria:

- **Connective**
  - Interjurisdictional
  - Number of regional activity centers (RACs) served
  - Connects to premium transit
  - Intermodal connection
- **Productive**
  - Incremental trips per mile
  - Total trip flows
- **Value**
  - Capital cost per mile
  - Annual cost per trip
  - Subsidy per trip

3.1 SCREEN ONE

During Screen One, preliminary alternatives were analyzed using performance criteria that define regional projects as well as cost-effectiveness criteria. Each alternative was analyzed as an addition to the existing plus committed network, independently from other proposed alternatives.

A three-tiered scoring system helped identify the high opportunity corridors and concepts for further study. Standards were based on the best performing alternative in each performance criterion, thus creating a comparative analysis unique among South Florida projects. Alignments falling below the 25th percentile of the highest performing alternatives (1st quartile) were given a score of 1. Projects falling between the 26th and 74th percentile were given a score of 2. Projects above the 75th percentile (4th quartile) were given the highest score of 3. The middle percentile was given a large range to allow those projects the opportunity to be adjusted and retested. Only projects in Tier 1 (score 1) were considered to have performed poorly.

As a result of the screening process, corridors not scoring well were adjusted as needed to increase their performance, or removed from testing altogether. These modified alternatives resulted in 21 Screen One Alternatives, which were advanced into Screen Two.

3.2 SCREEN TWO

In Screen Two, alternatives were analyzed using performance criteria similar to the process in Screen One. The evaluation process resulted in the removal or modification of several alternatives, plus the addition of new alternatives (as suggested by PTAC, member agencies, and SFRTA staff) for testing through Screen Two.

Similar to the Screen One Evaluation process, the results of the modified routes were attributed to the relevant category and graded. However, Screen Two used a four-tiered scoring system to identify the highest opportunity corridors and concepts for further study, where Tier 4 would be the higher/better score. Alternatives were examined for ability to perform and redundancy with other alternatives, and then modified as needed before advancing, or being removed from testing.

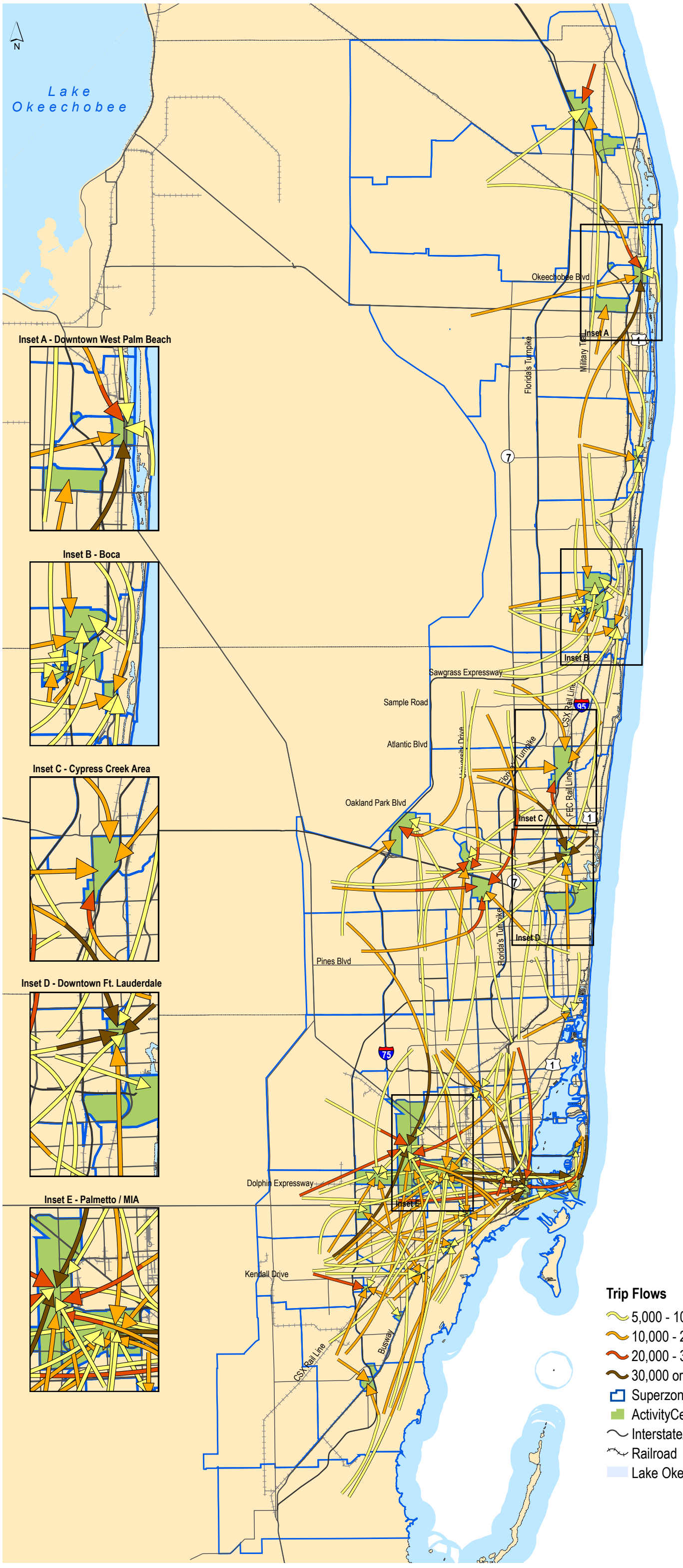
Figure 3 shows the Screen Two Alternatives, **Table 1** lists the alternatives, and provides a corresponding key for the map.

3.3 PRELIMINARY NETWORK COMPOSITION

The basic scoring process gave each performance criteria category equal weight, and therefore each alignment competed on its own to perform best overall. Additional analysis was taken to ensure the alignments that were selected to advance achieved multiple goals. To determine each alignment's contribution to the regional system, each was weighted by emphasizing specific criteria within three categories: Connective, Productive, and Value. To determine each alignment's weighted score, the corresponding criteria score was given a weight of 60%, and the two other classification groups were each given a weight of 20%. The weighted scores in each category were then used to determine which alternatives would comprise each network. Alternatives that did not perform well in at least two categories were removed from testing or modified.

FIGURE 2
MAJOR TRIP FLOWS

AM PEAK HOUR



Sourse: Strategic Regional Transit Plan - Model Run November 14, 2006

Table 1 - Screen Two Alternatives Key

KEY	ALT	NAME	TECHNOLOGY	DESCRIPTION
	30C	East-West Metrorail Extension West to FIU	Metrorail	Extend Metrorail service from the MIC to FIU along the north side of SR 836/Dolphin Expressway corridor.
	30D	East-West Metrorail Extension South to Kendall	Metrorail	Extend Metrorail from the MIC to Kendall via FIU along the north side of SR 836/Dolphin Expressway and the Homestead Extension of the Florida Turnpike (HEFT) corridor.
	30F	Miami Beach LRT	LRT	Connects Downtown Miami tio Miami Beach along US 41/MacArthur Causeway, Collins Avenue, and Alton Road.
	30G	Broward East-West LRT	LRT	Light rail connecting Sawgrass Mills Mall in the west to FLL Airport in the east along I-595, US 441/SR 7, and Broward Boulevard to Downtown Fort Lauderdale, and the FEC Corridor to the Airport.
	30J	Tri-Rail Split to CBD	Commuter Rail	Extends existing Tri-Rail alignment to the south in the vicinity of W 21st Street, going east north of 72nd Street NW, and then south along the FEC Corridor to terminate in Downtown Miami.
	30K	FEC Complete	Commuter Rail	Commuter rail in FEC Corridor from Downtown Miami to Indiantown Road in Jupiter.
	30L	FEC Shorter Line	Commuter Rail	Commuter rail in FEC Corridor from Downtown Miami to the Pompano area, where the line switches to the CSX corridor, ending at the Pompano Beach Tri-Rail Station.
	30T	Broward E-W LRT SFEC to CBD	LRT	Light rail connecting the South Florida Education Center (SFEC) to Downtown Fort Lauderdale along US 441 and Broward Boulevard.
	30V	Jupiter Extension (7 Stations)	Commuter Rail	Extension of the existing Tri-Rail commuter rail service with seven stations between Downtown West Palm Beach and Indiantown Road in Jupiter, crossing over to the FEC Corridor at Downtown West Palm Beach.
A B C D	31A	North-South Premium Bus	Bus	Formerly a 90 mile at-grade/surface rapid bus service operating largely in freeway right-of-way from MIA to Downtown Boca Raton via the MIC, this alignment will be split into four services – "A" service would connect the Dadeland South to the MIC; "B" service would connect the Palmetto area to the HEFT; "C" service would connect the Palmetto area to the Sawgrass Mills Area; and "D" service would connect the Sawgrass Mills area to I-95, Boca Town Center, and Mizner Park.
	31D	University Drive Rapid Bus	Bus	Rapid bus service operating on SR 817/University Drive from Florida's Turnpike to the Sawgrass Expressway in Broward County.
	31K	Wellington Rapid Bus	Bus	Rapid bus on Okeechobee Boulevard from Wellington Green at US 441/SR 7 and Forest Lakes Boulevard to Downtown West Palm Beach.
	31L	Military Trail Rapid Bus	Bus	Rapid bus on Military Trail, connecting Mizner Park via US1 and Glades Road with the Palm Beach Mall via Belevedere Road and Congress Avenue.
A B	31N	Pines Rapid Bus	Bus	Rapid bus service operating on Pines/Hollywood Boulevard in Broward County with A/B service from west of Sawgrass Expressway to the FEC Corridor and south of the HEFT.
A B	31O	Oakland Park Rapid Bus	Bus	Service from Sawgrass Mills, east on Oakland, and north on I-95 to Cypress Creek Station.
	31Q	Kendall Rapid Bus	Bus	Rapid bus service along Kendall Drive from the proposed Sunset KAT Metrorail Extension to Dadeland South.
	31R	137th Rapid Bus	Bus	Service along SW 137th Avenue and 8th Street from Kendall to Palmetto and the MIC.
	31S	North-South Rapid Bus with Douglas Avenue	Bus	Rapid bus service of Alternative 31A (North-South Premium Bus) extended to connect Dadeland South to the MIC along Douglas Road.
A B	31T	Metrorail Extension plus 137th Avenue Rapid Bus	Combined Metrorail/Bus	Combines E-W Metrorail Extension to FIU with rapid bus along 137th Avenue and the Dolphin Expressway.
	31U	Tri-Rail Extension to VA Hospital	Commuter Rail	Tri-Rail extension of one station at VA Hospital
	32A	FEC West Palm Beach to Miami	Commuter Rail	Commuter Rail operating in the existing FEC rail right-of-way, from Downtown West Palm Beach to Miami.
	32B	FEC Ft. Lauderdale to Miami	Commuter Rail	Commuter rail alternative operating in the existing FEC rail right-of-way, from Downtown Ft. Lauderdale to Downtown Miami.
A B	32D	Sample Road Modified Bus	Bus	Rapid bus service along Sample Road, connecting Sawgrass Expressway to Pompano Beach and Cypress Creek.
A B	32G	Kendall Hybrid BRT-DELRT SW 137th Augmented	Combined DELRT/BRT	BRT from 137th Avenue to Dadeland on Kendall Drive combined with Diesel-Electric LRT from Dadeland to the Zoo on CSX right-of-way to Kendall Drive. BRT and DELRT would run in same right-of-way from the CSX to Dadeland on Kendall Drive.
	32K	Tri-Rail Extension to Dadeland	Commuter Rail	Extension of the existing Tri-Rail commuter rail service south to Dadeland

FIGURE 3
SCREEN TWO ALTERNATIVES

Palm Beach County Alternatives

- Wellington Rapid Bus (31 K)
- Military Trail Rapid Bus (31 L)
- Jupiter Extension - CR (30 V)
- Tri-Rail Extension to the VA Hospital (31 U)

Three County Alternatives

- North-South Premium Bus - Dadeland South (31 A)
- North-South Premium Bus - Palmetto Line B (31 A)
- North-South Premium Bus - Palmetto Line A (31 A)
- North-South Premium Bus - Sawgrass to Boca (31 A)
- Douglas Road Rapid Bus (31 S)
- FEC Complete (30 K)
- FEC West Palm Beach to Miami (32 A)

Broward County Alternatives

- University Drive Rapid Bus (31 D)
- Pines Rapid Bus to University - Line A (31 N)
- Pines Rapid Bus to FEC - Line B (31 N)
- Oakland Park Rapid Bus to Dntn Ft. Lauderdale- Line A (31 O)
- Oakland Park Rapid Bus to Cypress Creek - Line B (31 O)
- Sample Road Modified Rapid Bus - Line A (32 D)
- Sample Road Modified Rapid Bus - Line B (32 D)
- Broward East-West LRT (30 G)
- Broward East-West LRT - College to Dntn Ft. Lauderdale (30 T)

Two County Alternatives

- FEC Shorter Line (30 L)
- FEC Ft. Lauderdale to Miami (32 B)

Miami-Dade County Alternatives

- Kendall Drive Rapid Bus (31 Q)
- 137th Avenue Rapid Bus (31 R)
- East-West Metrorail Extension to FIU (30 C)
- East-West Metrorail Extension to Kendall (30 D)
- Miami Beach LRT (30 F)
- Tri-Rail Split to CBD (30 J)
- Tri-Rail Extension to Dadeland (32 K)
- Kendall Hybrid BRT-DELRT SW 137th Ave - Line A (32 G)
- Kendall Hybrid BRT-DELRT SW 137th Ave - Line B (32 G)
- Metrorail East-West Extension with 137th Avenue Rapid Bus - Line A (31 T)
- Metrorail East-West Extension with 137th Avenue Rapid Bus - Line B (31 T)

Legend

- Baseline Premium Transit*
- Interstate/Toll Road/US Road/State Road
- Activity Centers
- Superzones
- Railroad
- Lake Okeechobee
- County

*Projects included in Baseline:

- Existing Tri-Rail service
- Existing Metrorail service
- Metrorail North Corridor
- Metrorail MIC-Earlington Heights Corridor
- Bird Road MAX
- Ludlam MAX
- Beach MAX
- 7th Avenue MAX
- Coral Way MAX
- Killian KAT
- Sunset KAT
- Kendall KAT
- 95X Civic Center
- 95X Norwood-Brickell
- 95X Carol City-Omni
- 95X Norwood-West
- Broward SR 7 Fast Bus

5 Miles

Source: South Florida Regional Transportation Authority Strategic Regional Transit Plan, 2008

Table 2 **shows the method for determining the weighted score, using Alternative 30C as an example.**

Table 2 – Alternative Weighting Example

	Connective Criteria			Productive Criteria			Value Criteria				
Alternative 30C	Raw Score		Weight	Raw Score		Weight	Raw Score		Weight		Weighted Score
Connective Weighting	8	x	**60%**	6	x	20%	5	x	20%	=	7
Productive Weighting	8	x	20%	6	x	**60%**	5	x	20%	=	6.2
Value Weighting	8	x	20%	6	x	20%	5	x	**60%**	=	5.8

3.3.1 Preliminary Connective Network

What system makes the most of our land use vision and infrastructure investment?

The preliminary Connective Network alternatives scored well based on the number of county lines they cross (*Interjurisdictional*), the number of Regional Activity Centers (RACs) served by the transit alignment, and the number of other transportation modes the alignment connects (*Intermodal Connection*). Of the 27 alternatives tested in Screen Two, 12 alternatives were eligible for the Connective Network.

3.3.2 Preliminary Productive Network

What system would be used most?

The preliminary Productive Network alternatives scored well based on the number of new riders generated by the alignment (*Incremental Trips per Mile*) and trip demand in the corridor (*Trip Flows*). Of the 27 alternatives tested in Screen Two, 12 alternatives were eligible for the Productive Network.

3.3.3 Preliminary Value Network

What system balances use with costs?

Alternatives included in the preliminary Value Network scored well based on Capital Costs per Mile (including construction costs for route, stations, and maintenance facility; vehicle purchase; and right-of-way), Annual Cost per Trip (based on operating and maintenance costs, as well as annualized construction costs), and Subsidy per Trip. Of the 27 alternatives tested in Screen Two, 13 alternatives were eligible for the Value Network.

4.0 NETWORK REFINEMENT

Up until this point, all alternatives were tested as individual projects with the existing plus committed network. Prior to testing the alternatives' interaction with each other as a network the results of the preliminary network composition were examined for duplicative service by travel market.

4.1 TRAVEL MARKETS

Duplication of service as well as failure to provide adequate service can be detrimental to the success of a transit network. Those travel markets served by a single alignment were maintained; this most often occurred with rapid bus options. For areas where multiple alternatives tested serve a single travel market, alternatives were examined for which one within a single travel market best met the network intent. Travel markets with multiple options include:

- Miami East-West
- Miami Beach
- Broward East-West
- Jupiter Tri-Rail Extensions
- Miami Tri-Rail Extensions
- FEC (Florida East Coast Railroad)
- Kendall

4.2 NETWORK ANALYSIS

Each network (Connective, Productive, and Value) was tested using the adopted 2030 socio-economic data. The resulting ridership data was used to compare each alignment's individual performance in Screen Two to performance when supported by a network. If ridership of the alternative showed a large increase when placed in the network, the alternative was determined to be a benefit to the complete transit system. Conversely, a large decrease in ridership demonstrated some riders may be served by another project in the network.

Table 3 lists the alternatives included in each network. **Figures 4, 5,** and **6** show the three networks, while **Tables 4, 5,** and **6** list the alternatives and provide corresponding keys for the maps. **Table 7**, shows the results of the evaluation of all three networks. The Value Network demonstrates high cost-effectiveness, but does not show the highest ridership.

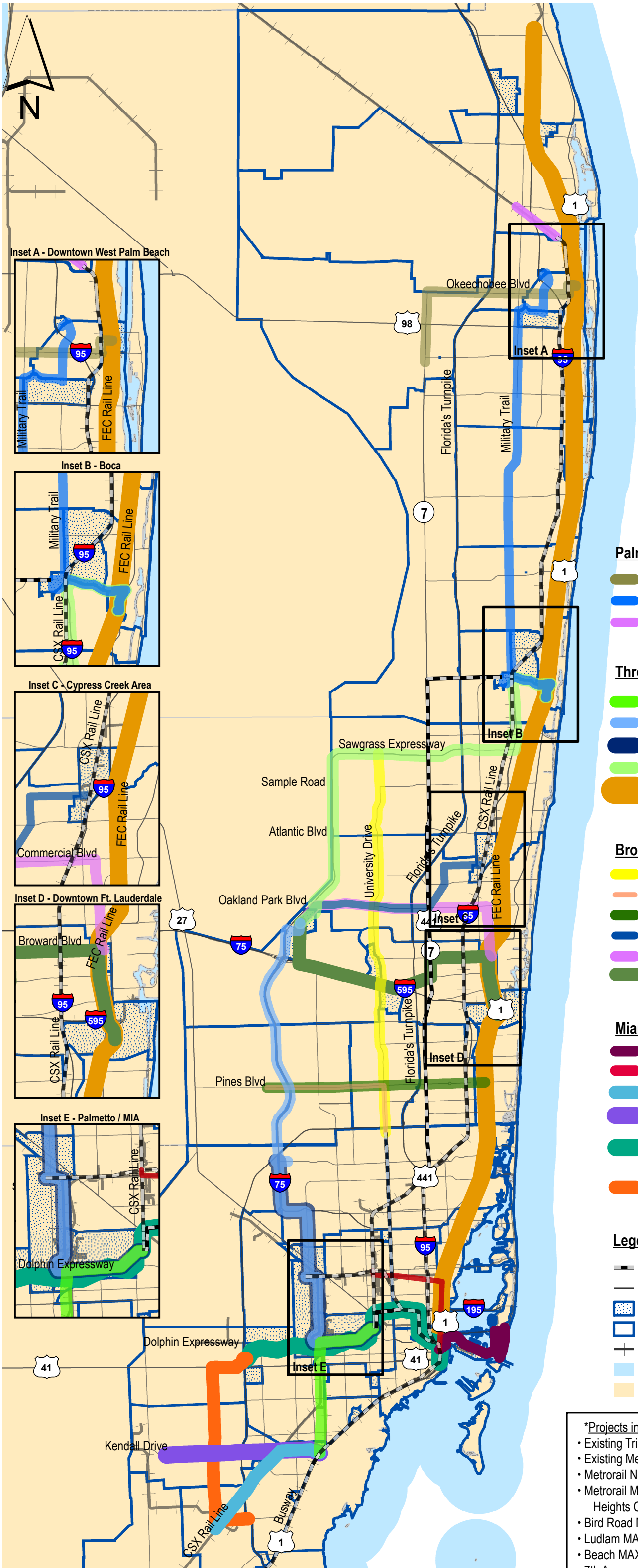
Table 3 – Network Composition

	Alternative	Name	Mode	Connective	Productive	Value
Miami East-West	30D	East-West Metrorail Extension South to Kendall	Metrorail		✓	
	31R	137th Rapid Bus	BRT			✓
	31T	Metrorail Extension plus 137th Avenue Rapid Bus	Combined Metrorail/BRT	✓		
Miami Beach	30F	Miami Beach LRT	LRT	✓	✓	✓
Broward East-West	30G	Broward East-West LRT	LRT	✓	✓	
	32L	Broward E-W LRT Sawgrass to CBD	LRT			✓
Jupiter Tri-Rail Extensions	30V	Jupiter Extension (7 Stations)	Commuter Rail		✓	✓
	31U	Tri-Rail Extension to VA Hospital	Commuter Rail	✓		
Miami Tri-Rail Ext	32K	Tri-Rail Extension to Dadeland	Commuter Rail		✓	
FEC	30K	FEC Complete	Commuter Rail	✓		
	30L	FEC Shorter Line	Commuter Rail			✓
	32A	FEC West Palm Beach to Miami	Commuter Rail		✓	
Bus	31A	North-South Premium Bus	BRT	✓		✓
	31S	North-South Rapid Bus with Douglas Road	BRT		✓	
	31D	University Drive Rapid Bus	BRT	✓		✓
	31K	Wellington Rapid Bus	BRT	✓	✓	✓
	31L	Military Trail Rapid Bus	BRT	✓	✓	✓
	31N	Pines Rapid Bus	BRT	✓	✓	✓
	32O	Oakland Park - Cypress Creek Rapid Bus	BRT	✓	✓	✓
	32P	Sample Road Modified Rapid Bus	BRT			✓
Kendall	32G	Kendall Hybrid BRT-DELRT SW 137th Augmented	Combined DELRT/BRT	✓	✓	
	32Q	Kendall Drive BRT Only Modified Service	BRT			✓
		Total Alternatives		12	12	13

Table 4 - Connective Network Alternatives Key

KEY	ALT	NAME	TECHNOLOGY	DESCRIPTION
	30F	Miami Beach LRT	LRT	Connects Downtown Miami to Miami Beach along US 41/MacArthur Causeway, Collins Avenue, and Alton Road.
	30G	Broward East-West LRT	LRT	Light rail connecting Sawgrass Mills Mall in the west to FLL Airport in the east along I-595, US 441/SR 7, and Broward Boulevard to Downtown Fort Lauderdale, and the FEC Corridor to the Airport.
	30J	Tri-Rail Split to CBD	Commuter Rail	Extends existing Tri-Rail alignment to the south in the vicinity of W 21st Street, going east north of 72nd Street NW, and then south along the FEC Corridor to terminate in Downtown Miami.
	30K	FEC Complete	Commuter Rail	Commuter rail in FEC Corridor from Downtown Miami to Indiantown Road in Jupiter.
A B C D	31A	North-South Premium Bus	Bus	Formerly a 90 mile at-grade/surface rapid bus service operating largely in freeway right-of-way from MIA to Downtown Boca Raton via the MIC, this alignment will be split into four services – "A" service would connect the Dadeland South to the MIC; "B" service would connect the Palmetto area to the HEFT; "C" service would connect the Palmetto area to the Sawgrass Mills Area; and "D" service would connect the Sawgrass Mills area to I-95, Boca Town Center, and Mizner Park.
	31D	University Drive Rapid Bus	Bus	Rapid bus service operating on SR 817/University Drive from Florida's Turnpike to the Sawgrass Expressway in Broward County.
	31K	Wellington Rapid Bus	Bus	Rapid bus on Okeechobee Boulevard from Wellington Green at US 441/SR 7 and Forest Lakes Boulevard to Downtown West Palm Beach.
	31L	Military Trail Rapid Bus	Bus	Rapid bus on Military Trail, connecting Mizner Park via US1 and Glades Road with the Palm Beach Mall via Belvedere Road and Congress Avenue.
A B	31N	Pines Rapid Bus	Bus	Rapid bus service operating on Pines/Hollywood Boulevard in Broward County with A/B service from west of Sawgrass Expressway to the FEC Corridor and south of the HEFT.
A B	31T	Metrorail Extension plus 137th Avenue Rapid Bus	Combined Metrorail/Bus	Combines E-W Metrorail Extension to FIU with rapid bus along 137th Avenue and the Dolphin Expressway.
	31U	Tri-Rail Extension to VA Hospital	Commuter Rail	Tri-Rail extension of one station at VA Hospital
A B	32G	Kendall Hybrid BRT-DELRT SW 137th Augmented	Combined DELRT/BRT	BRT from 137th Avenue to Dadeland on Kendall Drive combined with Diesel-Electric LRT from Dadeland to the Zoo on CSX right-of-way to Kendall Drive. BRT and DELRT would run in same right-of-way from the CSX to Dadeland on Kendall Drive.
A B	32O	Oakland Park Rapid Bus	Bus	Rapid bus A/B service connecting Sawgrass to Cypress Creek and Downtown Ft. Lauderdale.

FIGURE 4
CONNECTIVE NETWORK



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Three County Alternatives

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- North-South Premium Bus - Palmetto Line A (31 A)
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- Oakland Park Rapid Bus to Cypress Creek - Line B (32 O)
- Broward East-West LRT (30 G)

Miami-Dade County Alternatives

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Legend

- Baseline Premium Transit *
- Interstate/Toll Road/US Road/State Road
- Activity Centers
- Superzones
- Railroad
- Lake Okeechobee
- County

*Projects included in Baseline:

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- Existing Metrorail service
- Metrorail North Corridor
- Metrorail MIC-Earlington Heights Corridor
- Bird Road MAX
- Ludlam MAX
- Beach MAX
- 7th Avenue MAX
- Coral Way MAX
- Killian KAT
- Sunset KAT
- Kendall KAT
- 95X Civic Center
- 95X Norwood-Brickell
- 95X Carol City-Omni
- 95X Norwood-West
- Broward SR 7 Fast Bus

Source: South Florida Regional Transportation Authority Strategic Regional Transit Plan, 2007

Table 5 - Productive Network Alternatives Key

KEY	ALT	NAME	TECHNOLOGY	DESCRIPTION
	30D	East-West Metrorail Extension South to Kendall	Metrorail	Extend Metrorail from the MIC to Kendall via FIU along the north side of SR 836/Dolphin Expressway and the Homestead Extension of the Florida Turnpike (HEFT) corridor.
	30F	Miami Beach LRT	LRT	Connects Downtown Miami tio Miami Beach along US 41/MacArthur Causeway, Collins Avenue, and Alton Road.
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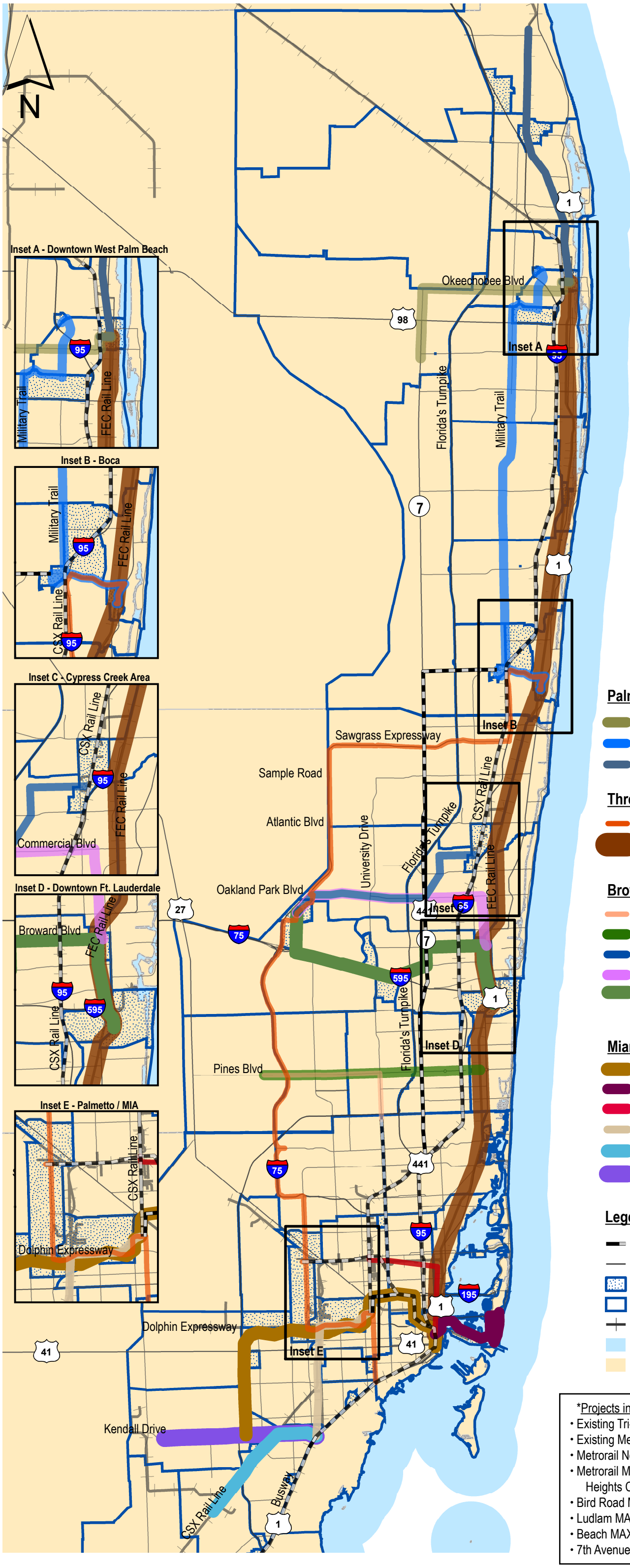
	31L	Military Trail Rapid Bus	Bus	Rapid bus on Military Trail, connecting Mizner Park via US1 and Glades Road with the Palm Beach Mall via Belevedere Road and Congress Avenue.
A B	31N	Pines Rapid Bus	Bus	Rapid bus service operating on Pines/Hollywood Boulevard in Broward County with A/B service from west of Sawgrass Expressway to the FEC Corridor and south of the HEFT.
	31S	North-South Rapid Bus with Douglas Avenue	Bus	Rapid bus service of Alternative 31A (North-South Premium Bus) extended to connect Dadeland South to the MIC along Douglas Road.
	32A	FEC West Palm Beach to Miami	Commuter Rail	Commuter Rail operating in the existing FEC rail right-of-way, from Downtown West Palm Beach to Miami.
A B	32G	Kendall Hybrid BRT-DELRT SW 137th Augmented	Combined DELRT/BRT	BRT from 137th Avenue to Dadeland on Kendall Drive combined with Diesel-Electric LRT from Dadeland to the Zoo on CSX right-of-way to Kendall Drive. BRT and DELRT would run in same right-of-way from the CSX to Dadeland on Kendall Drive.
	32K	Tri-Rail Extension to Dadeland	Commuter Rail	Extension of the existing Tri-Rail commuter rail service south to Dadeland
A B	32O	Oakland Park Rapid Bus	Bus	Rapid bus A/B service connecting Sawgrass to Cypress Creek and Downtown Ft. Lauderdale.

FIGURE 5
PRODUCTIVE NETWORK



Palm Beach County Alternatives

- Wellington Rapid Bus (31 K)
- Military Trail Rapid Bus (31 L)
- Tri-Rail Extension to Jupiter (30 V)

Three County Alternatives

- Douglas Road Rapid Bus (31 S)
- FEC West Palm Beach to Miami (32 A)

Broward County Alternatives

- Pines Rapid Bus to University - Line A (31 N)
- Pines Rapid Bus to FEC - Line B (31 N)
- Oakland Park Rapid Bus to Dntn Ft. Lauderdale- Line A (32 O)
- Oakland Park Rapid Bus to Cypress Creek - Line B (32 O)
- Broward East-West LRT (30 G)

Miami-Dade County Alternatives

- East-West Metrorail Extension to Kendall (30 D)
- Miami Beach LRT (30 F)
- Tri-Rail Split to Miami CBD (30 J)
- Tri-Rail Extension to Dadeland (32 K)
- Kendall Hybrid BRT-DELRT SW 137th Ave - Line A (32 G)
- Kendall Hybrid BRT-DELRT SW 137th Ave - Line B (32 G)

Legend

- Baseline Premium Transit *
- Interstate/Toll Road/US Road/State Road
- Activity Centers
- Superzones
- Railroad
- Lake Okeechobee
- County

*Projects included in Baseline:

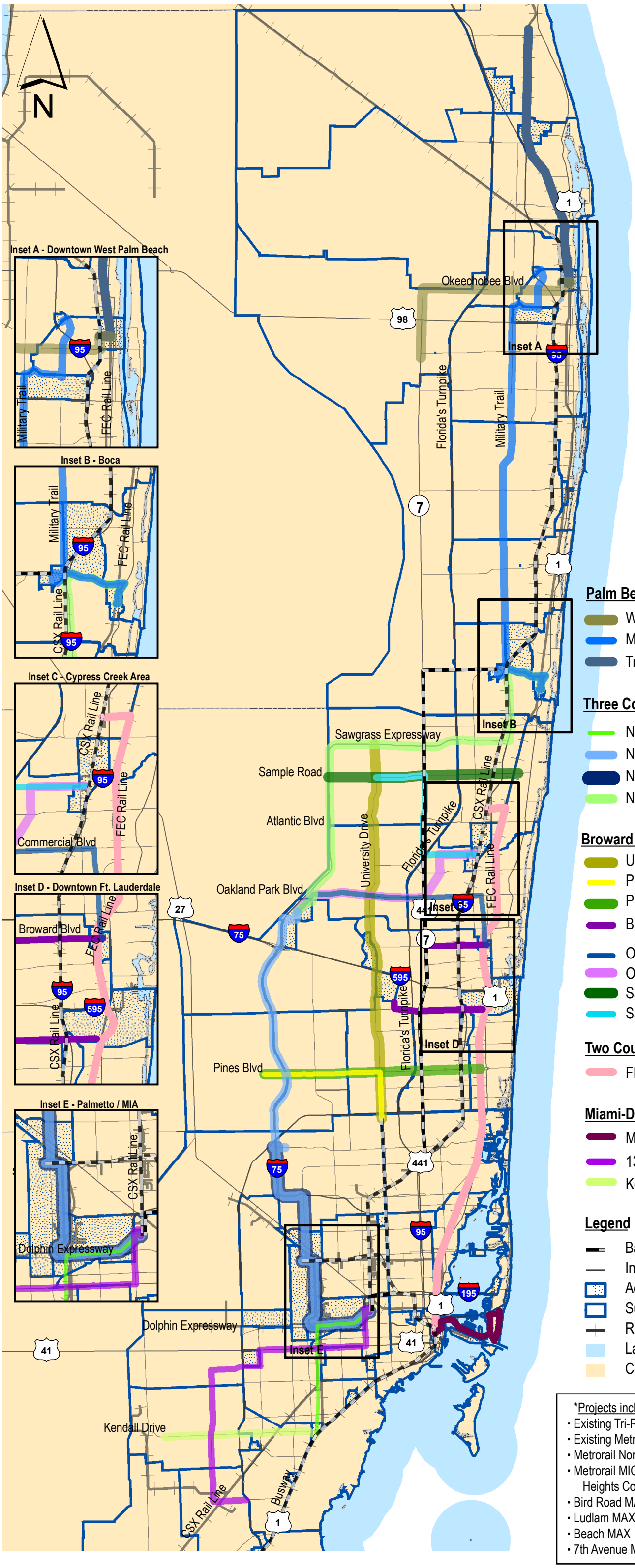
- Existing Tri-Rail service
- Existing Metrorail service
- Metrorail North Corridor
- Metrorail MIC-Earlington Heights Corridor
- Bird Road MAX
- Ludlam MAX
- Beach MAX
- 7th Avenue MAX
- Coral Way MAX
- Killian KAT
- Sunset KAT
- Kendall KAT
- 95X Civic Center
- 95X Norwood-Brickell
- 95X Carol City-Omni
- 95X Norwood-West
- Broward SR 7 Fast Bus

Source: South Florida Regional Transportation Authority Strategic Regional Transit Plan, 2007

Table 6 - Value Network Alternatives Key

KEY	ALT	NAME	TECHNOLOGY	DESCRIPTION
	30F	Miami Beach LRT	LRT	Connects Downtown Miami to Miami Beach along US 41/MacArthur Causeway, Collins Avenue, and Alton Road.
	30L	FEC Shorter Line	Commuter Rail	Commuter rail in FEC Corridor from Downtown Miami to the Pompano area, where the line switches to the CSX corridor, ending at the Pompano Beach Tri-Rail Station.
	30V	Jupiter Extension (7 Stations)	Commuter Rail	Extension of the existing Tri-Rail commuter rail service with seven stations between Downtown West Palm Beach and Indiantown Road in Jupiter, crossing over to the FEC Corridor at Downtown West Palm Beach.
A B C D	31A	North-South Premium Bus	Bus	Formerly a 90 mile at-grade/surface rapid bus service operating largely in freeway right-of-way from MIA to Downtown Boca Raton via the MIC, this alignment will be split into four services – "A" service would connect the Dadeland South to the MIC; "B" service would connect the Palmetto area to the HEFT; "C" service would connect the Palmetto area to the Sawgrass Mills Area; and "D" service would connect the Sawgrass Mills area to I-95, Boca Town Center, and Mizner Park.
	31D	University Drive Rapid Bus	Bus	Rapid bus service operating on SR 817/University Drive from Florida's Turnpike to the Sawgrass Expressway in Broward County.
	31K	Wellington Rapid Bus	Bus	Rapid bus on Okeechobee Boulevard from Wellington Green at US 441/SR 7 and Forest Lakes Boulevard to Downtown West Palm Beach.
	31L	Military Trail Rapid Bus	Bus	Rapid bus on Military Trail, connecting Mizner Park via US1 and Glades Road with the Palm Beach Mall via Belvedere Road and Congress Avenue.
A B	31N	Pines Rapid Bus	Bus	Rapid bus service operating on Pines/Hollywood Boulevard in Broward County with A/B service from west of Sawgrass Expressway to the FEC Corridor and south of the HEFT.
	31R	137th Rapid Bus	Bus	Service along SW 137th Avenue and 8th Street from Kendall to Palmetto and the MIC.
		Broward E-W LRT SR 7 to Dntn Ft. Lauderdale and SFEC to US 1	LRT	Light rail connecting SR 7 to Downtown Fort Lauderdale and the SFEC to US 1.
A B	32O	Oakland Park - Cypress Creek Rapid Bus	Bus	A service from Sawgrass Mills, east on Oakland, A service to Downtown Ft. Lauderdale, and B service north on I-95 to Cypress Creek Station.
A B	32P	Sample Road Modified Bus	Bus	Rapid bus service along Sample Road, connecting Sawgrass Expressway to Pompano Beach and Cypress Creek.
	32Q	Kendall Drive BRT Only (Modified)	Bus	Rapid bus service along Kendall Drive from the proposed Sunset KAT Metrorail Extension to Dadeland South.

FIGURE 6
VALUE NETWORK



Palm Beach County Alternatives

- Wellington Rapid Bus (31 K)
- Military Trail Rapid Bus (31 L)
- Tri-Rail Extension to Jupiter (30 V)

Three County Alternatives

- North-South Premium Bus - Dadeland South (31 A)
- North-South Premium Bus - Palmetto Line B (31 A)
- North-South Premium Bus - Palmetto Line A (31 A)
- North-South Premium Bus - Sawgrass to Boca (31 A)

Broward County Alternatives

- University Drive Rapid Bus (31 D)
- Pines Rapid Bus to University - Line A (31 N)
- Pines Rapid Bus to FEC - Line B (31 N)
- Broward East-West LRT - SR 7 to Dntn Ft. Lauderdale and SFEC to US 1 (New Alt)
- Oakland Park Rapid Bus to Dntn Ft. Lauderdale- Line A (32 O)
- Oakland Park Rapid Bus to Cypress Creek - Line B (32 O)
- Sample Road Modified Rapid Bus - Line A (32 P)
- Sample Road Modified Rapid Bus - Line B (32 P)

Two County Alternatives

- FEC Shorter Line (30 L)

Miami-Dade County Alternatives

- Miami Beach LRT (30 F)
- 137th Avenue Rapid Bus (31 R)
- Kendall Drive BRT Only - Modified (32 Q)

Legend

- Baseline Premium Transit*
- Interstate/Toll Road/US Road/State Road
- Activity Centers
- Superzones
- Railroad
- Lake Okeechobee
- County

*Projects included in Baseline:

- Existing Tri-Rail service
- Existing Metrorail service
- Metrorail North Corridor
- Metrorail MIC-Earlington Heights Corridor
- Bird Road MAX
- Ludlam MAX
- Beach MAX
- 7th Avenue MAX
- Coral Way MAX
- Killian KAT
- Sunset KAT
- Kendall KAT
- 95X Civic Center
- 95X Norwood-Brickell
- 95X Carol City-Omni
- 95X Norwood-West
- Broward SR 7 Fast Bus

5 Miles

Source: South Florida Regional Transportation Authority Strategic Regional Transit Plan, 2008

Table 7 – Evaluation of Three Networks: No Changes in 2030 Land Use

	Connective	Productive	Value
Total Capital Cost ($B)	$10.8	$10.9	$8.5
Annual Passenger Trips (M)	41.2	40.3	37.6
O&M Cost Per Trip	$2.36	$2.46	$1.91
Farebox Recovery	23%	23%	29%
Operating Subsidy Per Trip	$1.53	$1.60	$1.15

5.0 LAND USE ANALYSIS

The forecast for growth in the South Florida Region through the year 2030 shows a fairly even distribution of employment and residential development. To determine if changing existing land use policies to better serve transit would create higher ridership, each of the networks was tested using three alternative land use scenarios for the year 2030: Scenario 1, RACs or Community Redevelopment Areas (CRAs); Scenario 2, RACs and CRAs; and Scenario 3, Transit Station Areas (SAs).

5.1 DONOR ZONES AND RECEIVING ZONES

The land use scenarios were designed using Donor Zones and Receiving Zones. A portion of the growth in population and employment in the South Florida region between the base year of 1999 and horizon year of 2030 is considered transferable from Donor Zones to Receiving Zones that relates to the proposed land use policies. Three types of planning areas are considered to be desirable for an increase in population and/or employment: RACs, CRAs, and SAs.

5.1.1 Regional Activity Centers (RACs)

RACs were determined using a variety of characteristics to identify major destinations with potential as transit hubs. The resulting RACs included areas with a high concentration of jobs in 2000, those that were projected to experience significant employment growth between the years 2000 and 2030, and Developments of Regional Impact, in addition to definitions used in local comp plans. The study identified 34 RACs in the region, nine of which are found in Palm Beach County, seven in Broward County, and 18 in Miami-Dade County.

5.1.2 Community Redevelopment Areas (CRAs)

CRA designations are an instrument for local governments to revitalize communities. Areas designated as CRAs within the South Florida region were identified as areas subject to redevelopment in the future, and therefore could, by policy, attract growth.

5.1.3 Transit Station Areas (SAs)

SAs consist of those stations attributed to fixed guideway transit alternatives with dedicated rights-of-way, including, commuter rail, light rail, Metrorail, and some bus rapid transit.

5.2 LAND USE METHODOLOGY

Varying distributions of population and employment demonstrate the effect of concentrating growth as well as the effect of mixed use development on transit ridership. Areas that are not designated as RACs, CRAs, or SAs are designated as potential Donor Zones. Of these potential Donor Zones, only zones that demonstrate growth between the base year 1999 and horizon year 2030 contribute a portion (25%) of their growth, aggregated into a Donor Pool, then allocated as specified in each of the three scenarios. Allocation to the Receiving Zones is proportionate in all CRAs, all RACs, or all SAs relative to their respective employment and household characteristics in 1999. Employment and households control totals remained constant by county.

5.2.1 Scenario 1 – Regional Activity Centers <u>or</u> Community Redevelopment Areas Scenario

In this scenario, all zones designated as CRAs receive 100% of the Donor Pool's household contributions, while those designated as RACs receive 100% of the employment contributions. Other Receiving Zones (SAs) do not receive anything from the Donor Pool.

5.2.2 Scenario 2 – Regional Activity Centers <u>and</u> Community Redevelopment Areas Scenario

In this scenario, zones designated as CRAs receive 67% of household contributions and 33% of employment contributions, while RACs receive 33% of household contributions and 67% of employment contributions.

5.2.3 Scenario 3 – Transit Station Areas Scenario

In this scenario, 100% of the household and employment contributions are allocated to SAs throughout the region.

5.2.4 Results

Tables 8, **9**, and **10** show the cost performance of each preliminary network using the 2030 Base Land Use Scenario and three additional Scenarios.

While the construction of the alternative land use scenarios are exaggerated realities, the results show concentrating growth, through any of the scenarios, produced a higher propensity for transit use.

Table 8 – Evaluation of Preliminary Connective Network with Land Use Scenarios

	Base 2030	Land Use 1	Land Use 2	Land Use 3
Total Capital Cost ($B)	$10.8			
O&M Cost Per Trip	$2.36	$1.48	$1.51	$1.45
Farebox Recovery	23%	37%	36%	37%
Operating Subsidy Per Trip	$1.53	$0.76	$0.78	$0.74

AC = Activity Center, CRA = Community Redevelopment Area, SA = Station Area

Land Use Scenario 1: 100% of employment in ACs, 100% of households in CRAs

Land Use Scenario 2: 67% of employment in ACs, 33% of employment in CRAs
33% of households in ACs; 67% of households in CRAs

Land Use Scenario 3: 100% of employment and households in SAs

Table 9 – Evaluation of Preliminary Productive Network with Land Use Scenarios

	Base 2030	Land Use 1	Land Use 2	Land Use 3
Total Capital Cost ($B)	$10.9			
O&M Cost Per Trip	$2.46	$1.56	$1.59	$1.53
Farebox Recovery	23%	36%	35%	36%
Operating Subsidy Per Trip	$1.60	$0.82	$0.84	$0.79

AC = Activity Center, CRA = Community Redevelopment Area, SA = Station Area

Land Use Scenario 1: 100% of employment in ACs, 100% of households in CRAs

Land Use Scenario 2: 67% of employment in ACs, 33% of employment in CRAs
33% of households in ACs; 67% of households in CRAs

Land Use Scenario 3: 100% of employment and households in SAs

Table 10 – Evaluation of Preliminary Value Network with Land Use Scenarios

	Base 2030	Land Use 1	Land Use 2	Land Use 3
Total Capital Cost ($B)	$8.5			
O&M Cost Per Trip	$1.91	$1.19	$1.21	$1.16
Farebox Recovery	29%	48%	47%	48%
Operating Subsidy Per Trip	$1.15	$0.50	$0.51	$0.48

AC = Activity Center, CRA = Community Redevelopment Area, SA = Station Area

Land Use Scenario 1: 100% of employment in ACs, 100% of households in CRAs

Land Use Scenario 2: 67% of employment in ACs, 33% of employment in CRAs
33% of households in ACs; 67% of households in CRAs

Land Use Scenario 3: 100% of employment and households in SAs

6.0 FUNDING STRATEGIES

The transit projects that comprise the three networks have a total estimated capital cost of $8.9 to $10 billion and estimated annual operating and maintenance (O&M) expenses of $132 to $140 million (all figures in constant 2007 dollars). These are significant financial requirements, and the region's existing taxes and fees for transportation are already fully committed and will not be available to fund these projects. Therefore, the SFRTA and other regional stakeholders will need to closely examine new funding strategies to support the Preferred Network, then strongly advocate for these strategies at the local, state, and federal levels.

6.1 LOCAL SHARE OF FUNDING

Table 11 shows a breakdown of likely funding shares for both capital and operating costs. On the capital side, it is projected that the federal government and the state of Florida would each cover approximately one-third of the project cost. These projections are an average over all the projects in the networks – for example, some projects would likely be pursued outside of the federal funding process (and thus receive a 0% federal share), while other projects would successfully apply for and receive federal funding, and thus would receive 50% or more of their capital funds from the federal government. However, on average, it is assumed that the local capital cost share would be approximately one-third, or $3 to $3.4 billion, depending on the network chosen as the Preferred Network. If this figure is annualized, assuming a five percent interest rate over 20 years, the annual capital requirement for the region is approximately $243 to $300 million.

Table 11 – Capital and Operating Cost Range Required for Networks

Capital			Operating		
Total Cost	$8.9B - $10B		**Annual Cost**	$132M - $140M/year	
Likely Funding Shares					
Federal	33%	$2.9B - $3.3B	**Fares**	30%	$39.6M - $42M/year
			Federal	7%	$9.2M - $9.8M/year
State/Other	33%	$2.9B - $3.3B	**State/Other**	20%	$26.4M - $28M/year
Local	34%	$3.0B - $3.4B Bonded at 5% for 20 years **$243 - $300M/yr**	**Local**	43%	**$57M - $60M/year**

Notes: Billion (B), Million (M)

On the O&M side, funding will come not only from the federal and state governments, but also from passenger fares. An average farebox recovery ratio of 30% across the Preferred Network is assumed, and the State of Florida is assumed to cover 20% of operating costs. Another 7% of operating costs is anticipated to be covered by the federal government (through use of grant funding for preventive maintenance), which leaves approximately 43% of the O&M costs to be funded by the region. When the network is fully implemented, this is expected to total approximately $57 to $60 million annually.

Thus, the total local funding requirement, for both capital and operating expenses, is approximately $300 to $360 million per year. Of course, this funding amount would not be required immediately – as the individual projects in the Preferred Network are implemented, the funding requirements would increase, and the full amount would be needed only at the completion of the network.

6.1.1 Potential Funding Sources and Funding Combinations

Table 12 presents a set of five funding options that could be used to support the annual local requirement for the Preferred Network. The five sources presented are a per-gallon fuel tax, a daily rental car tax, a one-time automobile title fee, an annual automobile registration fee, and a regional sales tax. For each source, two data points are presented – the first data point shows the tax or fee at either a unit level (e.g., the revenue from a 1-cent per gallon fuel tax) or at its current level (e.g., the $2 per day car rental tax). The second data point then shows at what level that tax or fee would need to be levied in order to generate $300 to $360 million per year, with the exception of the sales tax.

Table 12 – Potential Funding Strategies and Estimated Amount Generated

Fuel Tax		Rental Car Fee		Registration Fee	
1¢/gal	$25M	$2/day	$42M	$15/year	$50M
12¢/gal	$300M	$14/day	$300M	$90/year	$300M
15¢/gal	$375M	$17/day	$360M	$108/ year	$360M

Sales Tax		Title Fee	
0.25%	$235M	$40	$50M
0.50%	$470M	$240	$300M
1.0% (Penny Tax)	$940M	$288	$360M

The necessary tax and fee levels required to generate the necessary funding amount from a single source are in some cases extremely high. Therefore, it is useful to consider "packages" or combinations of taxes and fees that could be used to generate the necessary funding without relying too heavily on any single source. A comparison of five potential funding combinations for the lower and upper limits are presented in **Tables 13** and **14**. Some of these combinations also assume contributions from the future managed lanes. Many additional combination variations are possible, but these cover a relatively wide range and can serve as a starting point for discussions among SFRTA and other regional stakeholders.

Table 13 – Funding Options (Lower Limit)

Option	Fuel Tax		Rental Car Fee		Sales Tax		Title Fee		Registration Fee		Managed Lanes	TOTAL
	Tax	Amt Gen	Fee	Amt Gen	Tax	Amt Gen	Fee	Amt Gen	Fee	Amt Gen	Amt Gen	
1 - Sales Tax Only					0.50%	$470M						**$470M**
2 - Sales Tax and Tolls					0.25%	$235M					$100M	**$335M**
3 - Title and Registration Fees							$120	$150M	$45/yr	$150M		**$300M**
4 - Rental Car and Tolls			$10/dy	$200M							$100M	**$300M**
5 - Fuel Tax, Fees, and Tolls	5¢/gal	$125M					$20	$25M	$15/yr	$50M	$100M	**$300M**

Table 14 – Funding Options (Upper Limit)

Option	Fuel Tax		Rental Car Fee		Sales Tax		Title Fee		Registration Fee		Managed Lanes	TOTAL
	Tax	Amt Gen	Fee	Amt Gen	Tax	Amt Gen	Fee	Amt Gen	Fee	Amt Gen	Amt Gen	
1 - Sales Tax Only					0.50%	$470M						**$470M**
2 - Sales Tax, Tolls, and Title Fee					0.25%	$235M	$20	$25M			$100M	**$360M**
3 - Title and Registration Fees							$144	$180M	$54/yr	$180M		**$360M**
4 - Rental Car Fee and Tolls			$12.50 /dy	$260M							$100M	**$360M**
5 - Fuel Tax, Fees, and Tolls	6¢/gal	$150M					$28	$35M	$23/yr	$75M	$100M	**$360M**

6.1.2 The Role of the State in Funding Transit Operations

Using data taken from the National Transit Database, **Figure 7** compares the role of states and local jurisdictions in funding transit operations in Florida and in the U.S. as a whole. As the chart makes clear, the local share of transit operating funding in Florida is more than twice the national average, and State of Florida funding is only half the national average. The funding assumptions presented previously in this section assume that the State of Florida will significantly increase its support for transit operations in the future. Achieving such a change will require a concerted effort on the part of SFRTA and all the stakeholders in the South Florida region.

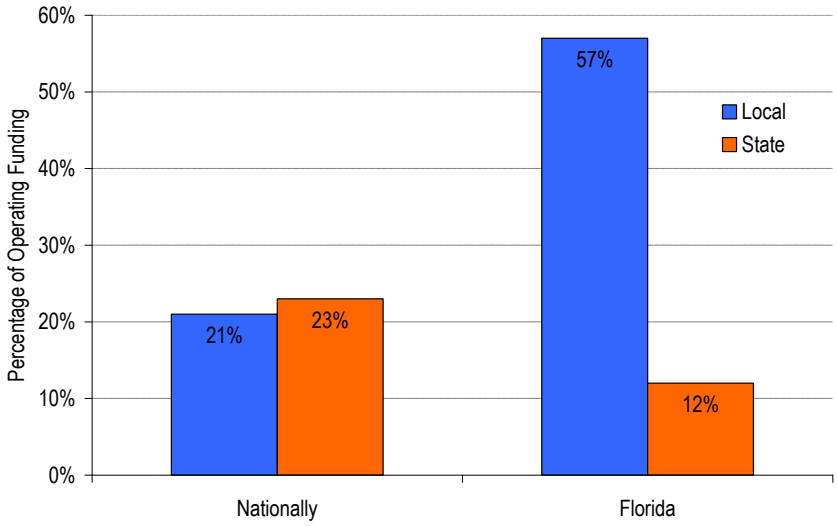



Figure 7 – Transit Operations Funding, Local and State Portions