BEACH CORRIDOR TRANSIT CONNECTION STUDY— PEC MEETING PRESENTATIONS

PREPARED FOR:



JUNE 2015







PROJECT EXECUTIVE COMMITTEE (PEC) MEETING JANUARY 28, 2014

Beach Corridor Transit Connection Study Project Executive Committee (PEC) Meeting

Stephen P. Clark Center
111 NW 1st Street, Miami
Conference Room 18-4
January 28, 2014

Today's Meeting Goals

- Provide project background
- Review 2004 Locally Preferred Alternative (LPA)
- Roundtable discussion on LPA refinements
- Identify PEC preferences
- Set future meeting date

Project Background: Studies for Miami - Miami Beach System

- 1988 Miami Beach Light Rail Feasibility Study
- 1992 Dade County Priority Corridors Transitional Study
- 1995 East-West Multimodal Corridor Study Draft Environmental Impact Statement (DEIS)
- 2002 Miami-Miami Beach Transportation Corridor (Bay Link) Study
- 2003 Miami-Dade MPO adopts Locally Preferred Alternative (LPA)
- 2013 Beach Corridor Transit Connection Study (Current Study)

Project Background: Study Organization

Agency/Organization

- Miami-Dade MPO
- Florida Department of Transportation (FDOT)
- Miami-Dade County
- City of Miami
- City of Miami Beach
- Miami DDA

Study Contribution

\$ 150,000

\$ 75,000

\$ 25,000

\$ 25,000

\$ 25,000

\$ 25,000

\$ 325,000 Total

The Miami-Dade MPO serves as the lead agency.

Project Background: Project Executive Committee Members (PEC)

5-member Committee appointed by Elected Officials and comprised as follows:



MPO Governing Board (2)





City of Miami







Project Background: Supporting Agencies

- Miami-Dade MPO
- Miami Dade Transit
- PortMiami
- FDOT District 6
- Miami DDA
- MDX
- Miami-Dade Regulatory and Economic Resources(RER) Department
- Miami Parking Authority
- City of Miami
- City of Miami Beach
- Miami-Dade Public Works and Waste Management (PWWM) Department

TECHNICAL STEERING COMMITTEE

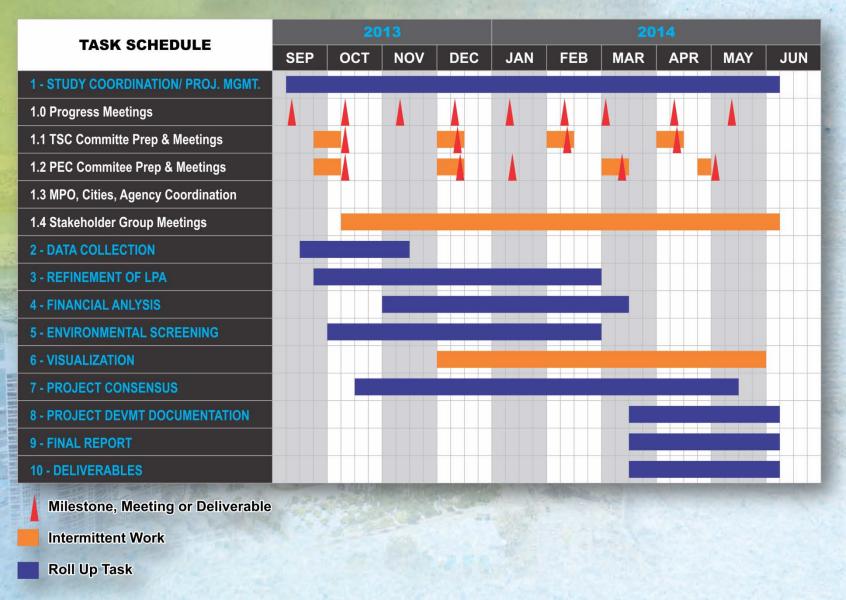
Supported by Gannett Fleming Consulting Team

Project Background: Study Purpose

- 1. Update the key elements of 2004 study
 - Refinements to the 2004 LPA
 - Identify potential extensions
 - Identify maintenance facility location(s)
 - Study wireless modern streetcar technology
 - Update cost estimates and financial plan
 - Conduct high level environmental screening
- 2. Gain consensus on how to move forward

Project Background: Study Schedule

BEACH CORRIDOR TRANSIT CONNECTION STUDY



2004 Locally Preferred Alternative (LPA)



2004 LPA: Miami Beach Alignment

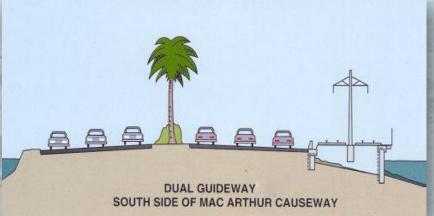
- Two independent loops:
 - ✓ Counter Clockwise Loop: Causeway/ Regional Connector (red line)
 - ✓ Clockwise Loop: Local Circulator (green line)



2004 LPA: Causeway Alignment

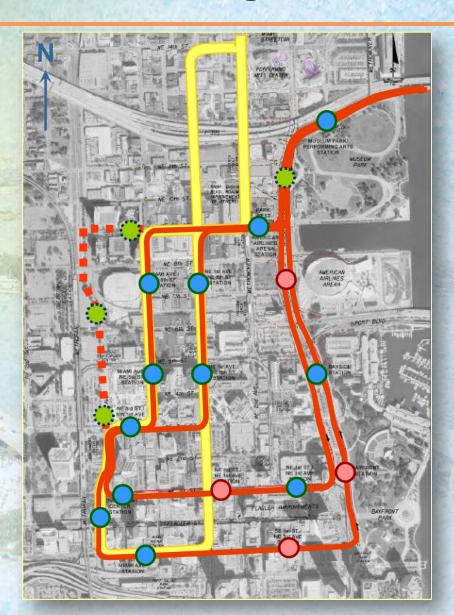
- Causeway Connector (red line)
 - ✓ Two elevated stations
 - ✓ Double track segment in exclusive guideway
 - ✓ Located on south side of causeway
 - ✓ Pedestrian bridge at Watson Island to connect to Jungle Island





2004 LPA: Downtown Miami Alignment

- Split Service (red line)
 - Counter clockwise outer loop
 - Clockwise inner loop
 - Optional alignments remained viable (dotted line)
 - Assumed Miami
 Streetcar (yellow)



2004 LPA: Technology Modern Streetcar/LRT



2004 LPA: Cost and Funding Sources

Funding Source:

Capital Cost by Source*:

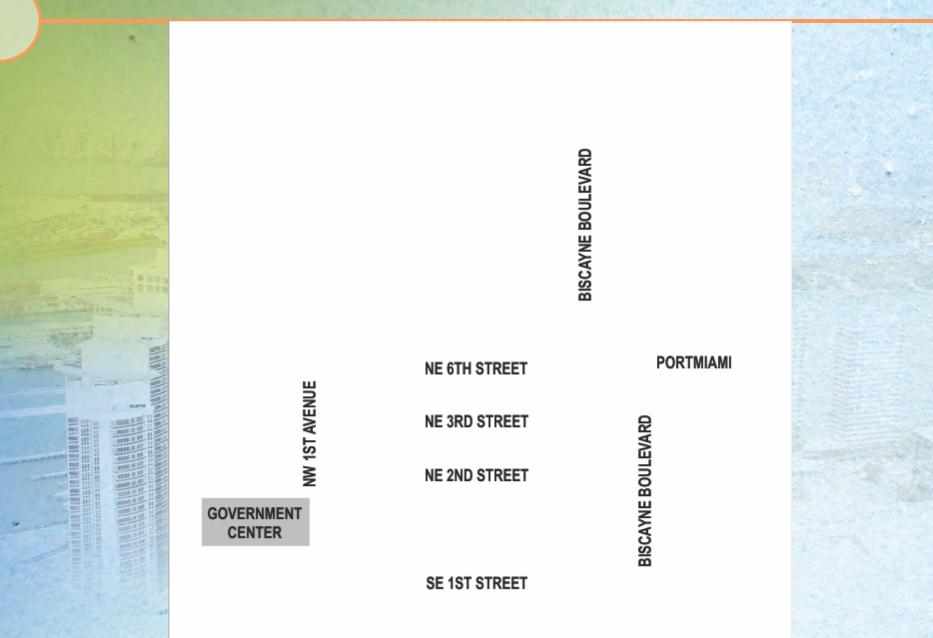
- State (25% FDOT) \$120.68
- Local (25% PTP) \$120.68

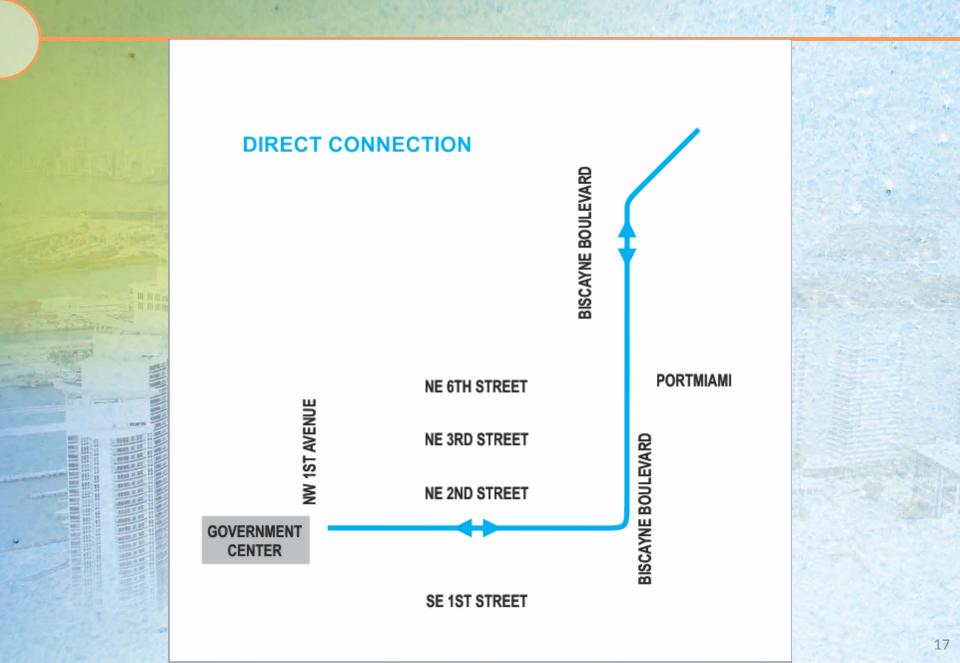
\$482.71 Total

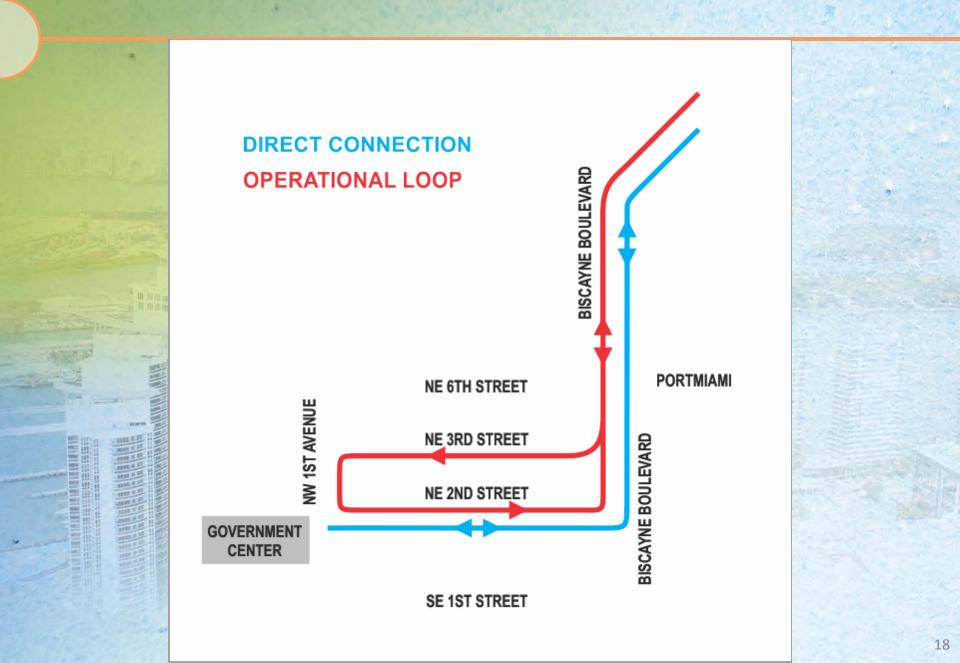
^{*}In millions of 2004 dollars

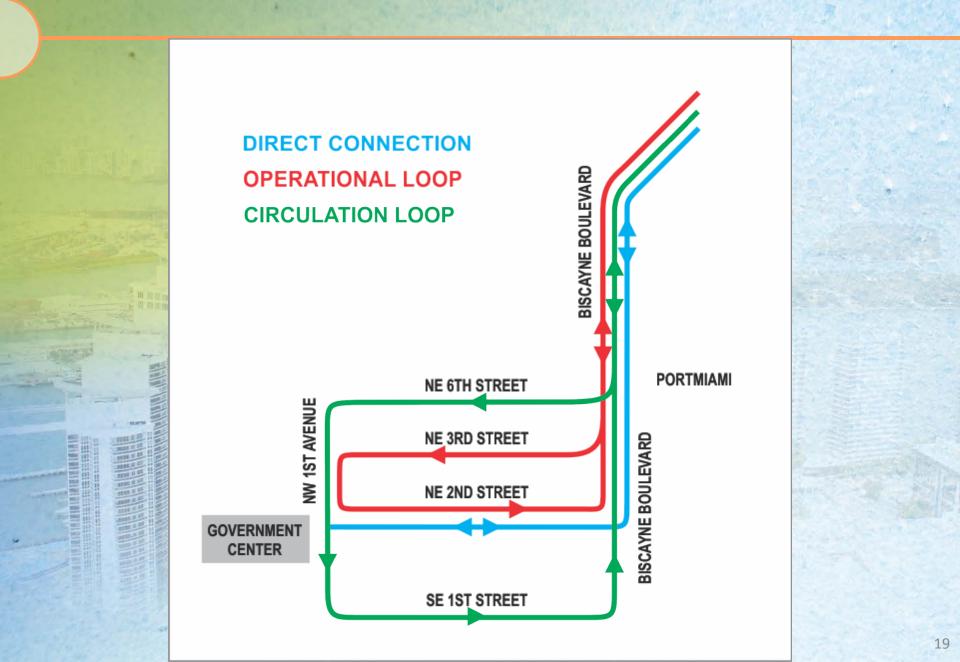
LPA Refinements: Grouping of Alternatives in Downtown Miami

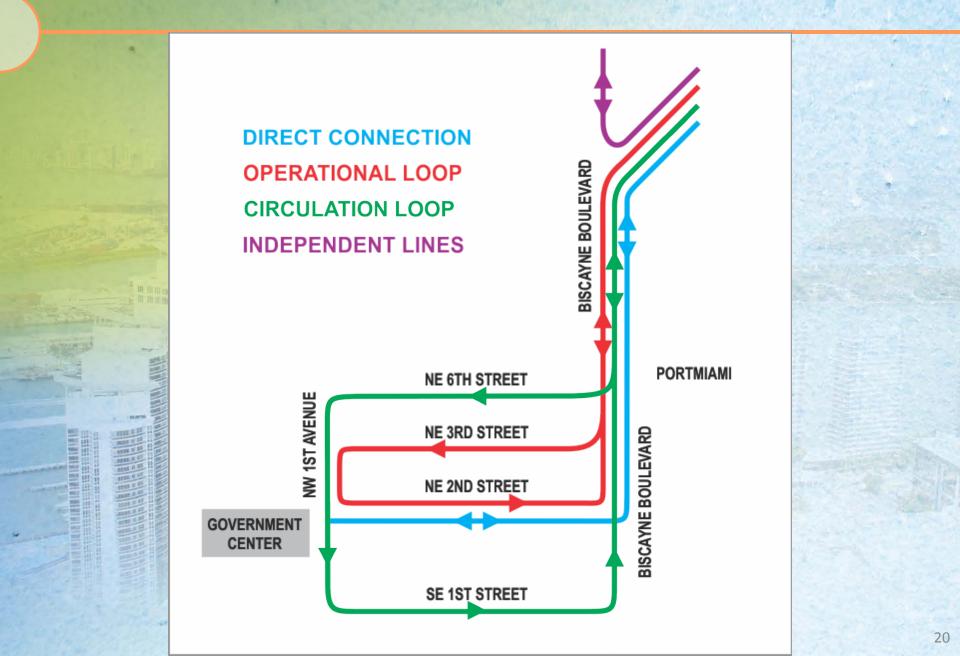
- <u>Direct Connection</u>: most direct connection from the Causeway to the Government Center transit hub
- Operational Loop: small loop that runs around the block on a single track thus improving street operations
- <u>Circulation Loop</u>: large one-way loop with several blocks in between that covers larger area
- Independent Lines: separate routes that operate independent of each other

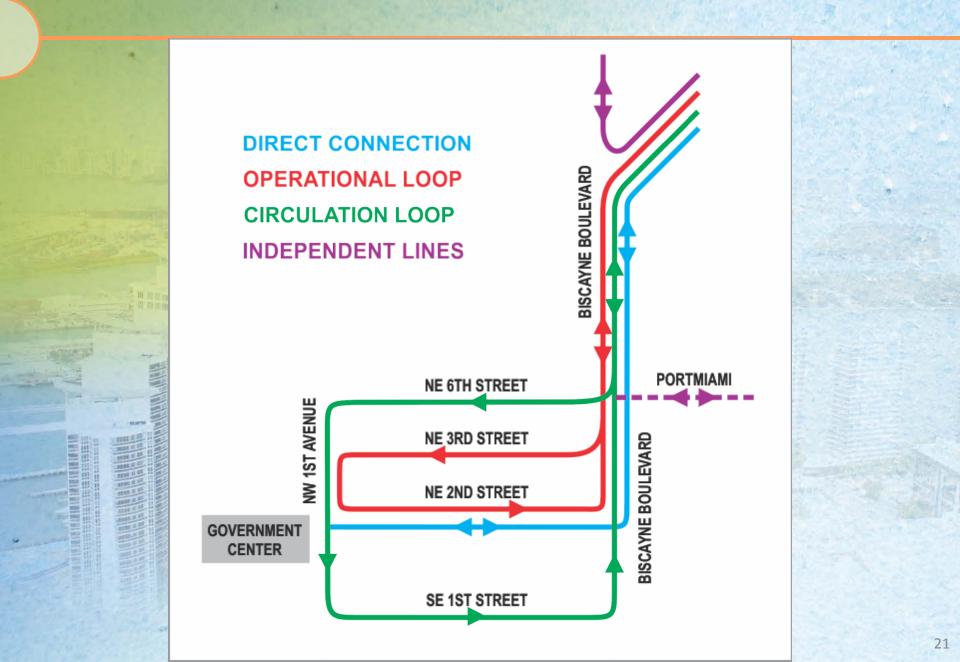












LPA Refinements: Grouping of Alternatives in Miami Beach

- <u>Direct Connection</u>: most direct rail connection from the Causeway to the Convention Center
- Operational Loop: small loop that runs around the block on a single track thus improving street operations
- <u>Circulation Loop</u>: large two-way loop with several blocks in between that covers larger area
- Independent Lines: separate two-way routes that operate independent of each other

17TH STREET

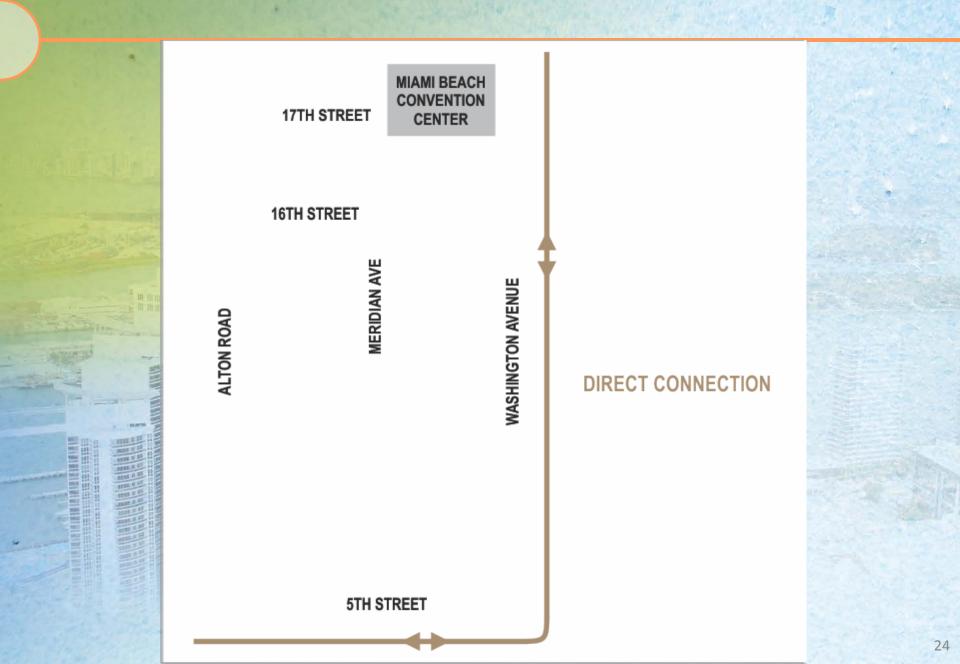
MIAMI BEACH CONVENTION CENTER

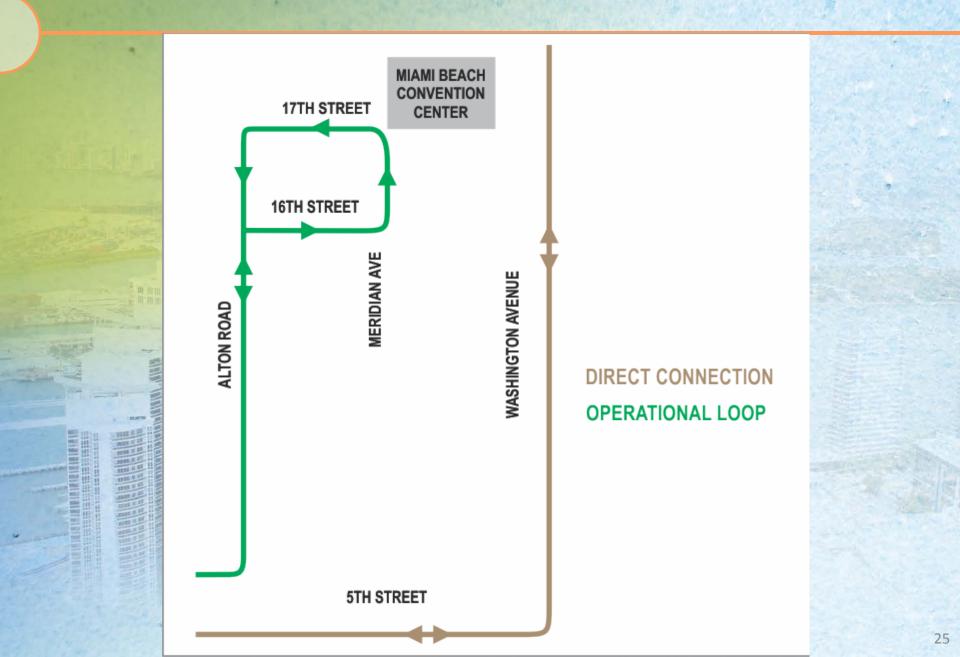
16TH STREET

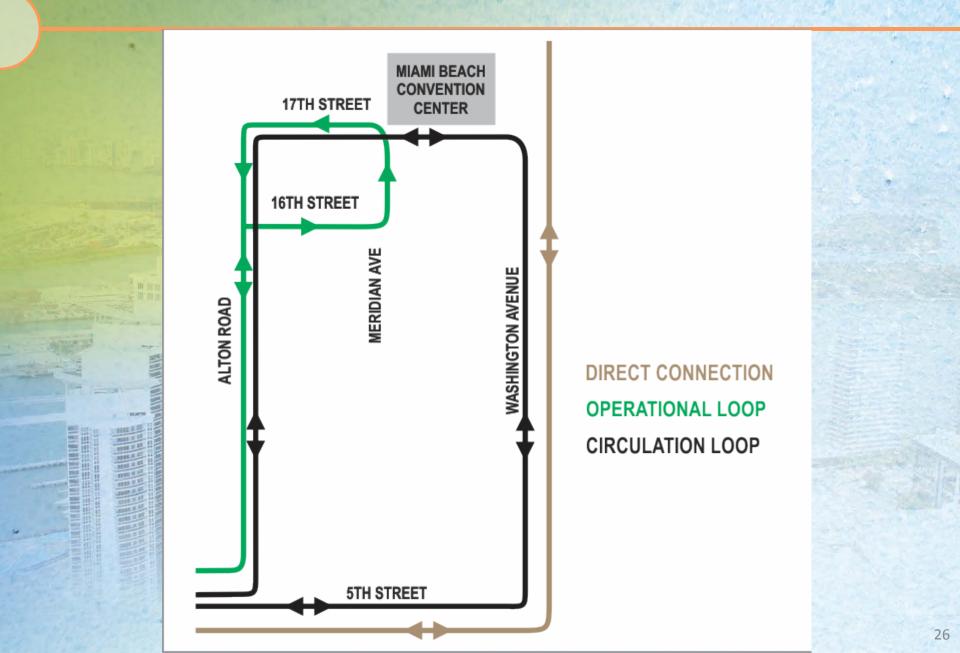
MERIDIAN AVE

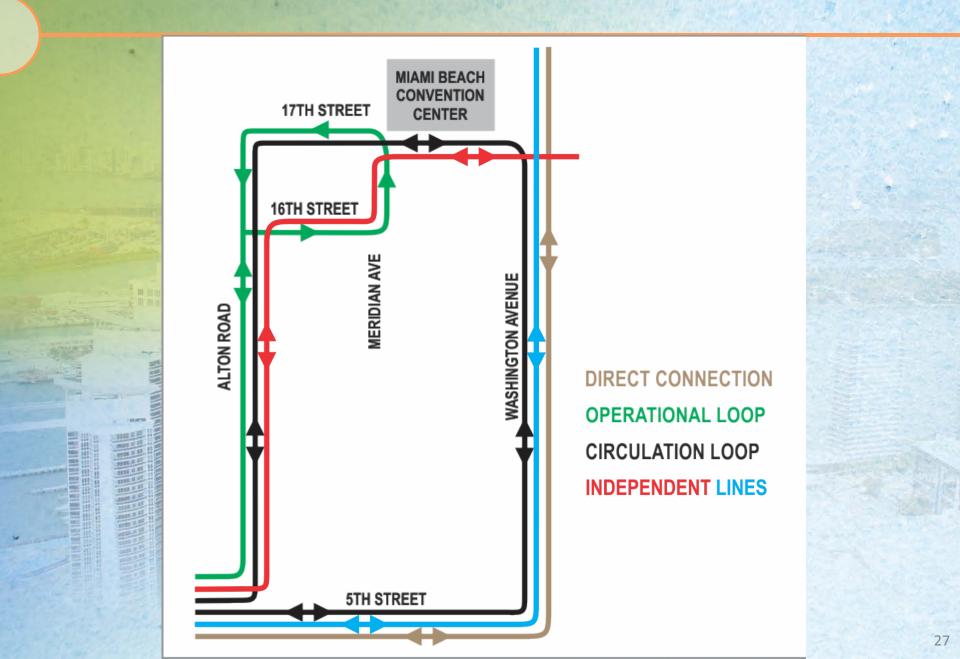
WASHINGTON AVENUE

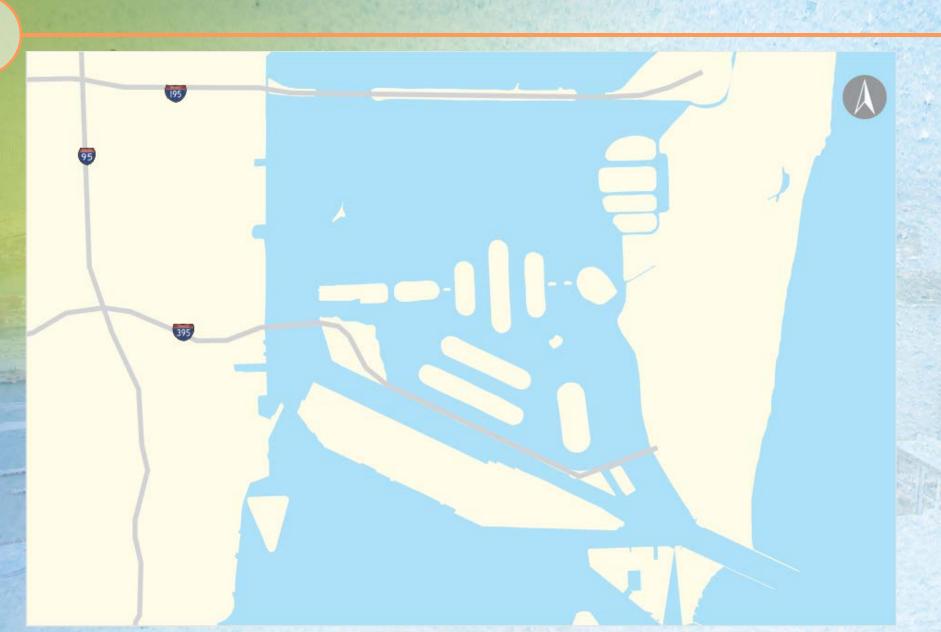
5TH STREET

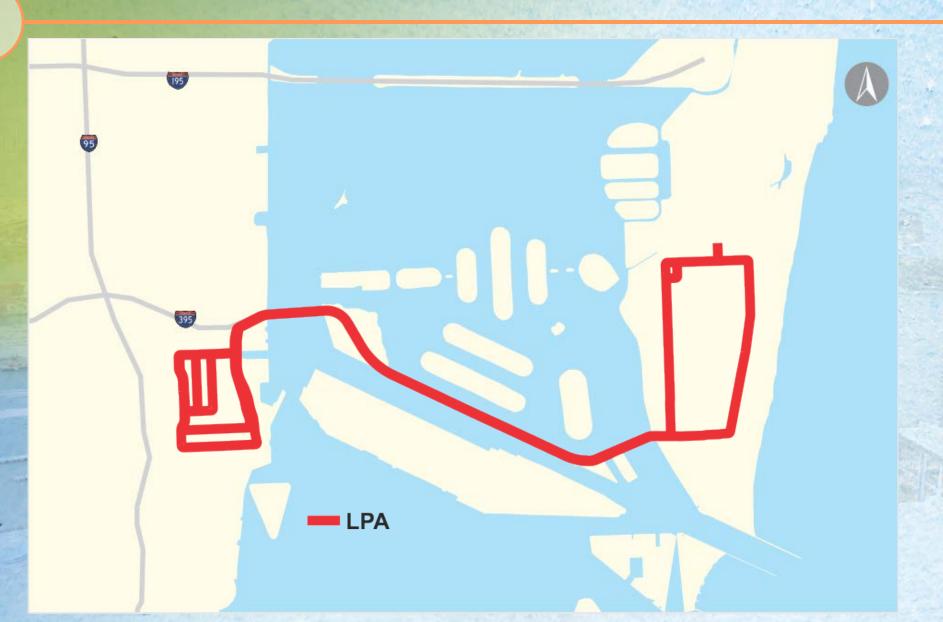


















PEC Preferences

- Prefer more direct route over circulation element?
- Train operating in exclusive right-of-way or mixed traffic?
- Facilitate future extensions?
- Avoid right-of-way acquisition at all costs?
- Removing on-street parking for exclusive guideway?
- Which is the primary travel market to be served (i.e. residents, employees or visitors)?
- Are phasing options desirable?
- Any other refinement options or extensions?



Future PEC Meeting

- Date
- Location
- Agenda
 - o Reduced number of LPA refinements
 - Updated costs
 - o Identify funding options
 - o Wireless technology assessment





PROJECT EXECUTIVE COMMITTEE (PEC) MEETING APRIL 2, 2014

PANISONAL-



Policy Executive Committee Meeting
April 2, 2014

Beach Corridor Transit Connection Study



Policy Executive Committee Meeting
April 2, 2014

Beach Corridor Transit Connection Study

Today's **Agenda**

Modern LRT/Streetcar Overview

LPA Refinements and Extensions Review

Conceptual Cost Estimates Review

TIGER Grant Application

Next PEC Meeting Agenda

Today's **Agenda**

Modern LRT/Streetcar Overview

LPA Refinements and Extensions Review

Conceptual Cost Estimates Review

TIGER Grant Application

Next PEC Meeting Agenda

MODERN LEUCAR DERVIEW

Modern LRV/Streetcar Specifications

Capacity: 62 - 231 total

Length: 66 - 105 feet

Width: 7'5", 7'9", 8', or 8'7"

Speeds: 26 - 66 mph (45 - 50 mph most)

common)

Power: battery, underground, super capacitors

(overhead most common)

Wireless car builders: Alstom, Bombardier, Brookville, CAF,

Kawasaki, Kinkisharyo, United Streetcar

Modern LRV/Streetcar Specifications

Capacity: 62 - 231 total

Length: 66 - 105 feet

Width: 7'5", 7'9", 8', or 8'7"

Speeds: 26 - 66 mph (45 - 50 mph most)

common)

Power: battery, underground, super capacitors

(overhead most common)

Wireless car builders: Alstom, Bombardier, Brookville, CAF,

Kawasaki, Kinkisharyo, United Streetcar

Wireless Modern LRT



Seville, Spain



Reims, France



Bordeaux, France



Al Sufouh, Dubai

Wireless Modern LRT



Seville, Spain



Reims, France



Bordeaux, France



Al Sufouh, Dubai

Wireless Modern LRV/Streetcars



Dallas, Texas



Brookville Liberty Vehicle (testing wireless)



Marseille, France



Zaragoza, Spain

Wireless Modern LRV/Streetcars



Dallas, Texas



Brookville Liberty Vehicle (testing wireless)



Marseille, France



Zaragoza, Spain

REFINENTS ALDEXIENSIONS REVIEW

Activities Since Last Meeting

Met twice with Technical Steering Committee

Met with Miami Worldcenter developer

Revised the Downtown alignment

Narrowed down LPA refined alternatives

Developed two system-wide alternatives

Refined the extensions

Developed capital and operating conceptual costs

Activities Since Last Meeting

Met twice with Technical Steering Committee

Met with Miami Worldcenter developer

Revised the Downtown alignment

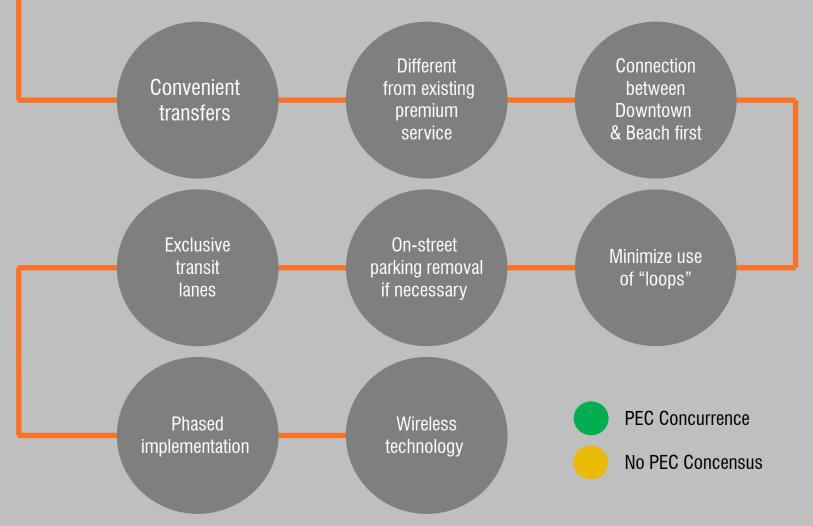
Narrowed down LPA refined alternatives

Developed two system-wide alternatives

Refined the extensions

Developed capital and operating conceptual costs

PEC/TSC Preferences



2004 Refined LPA Alignment



2004 Refined LPA Alignment



Direct Connection (DC) Alternative



Direct Connection (DC) Alternative



Extension to New Miami Conference Center *



Extension to New Miami Conference Center



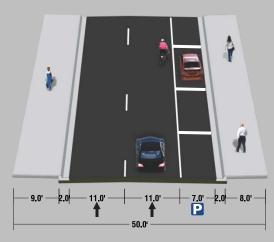
Operational Loop + Alton (OLA) Alternative



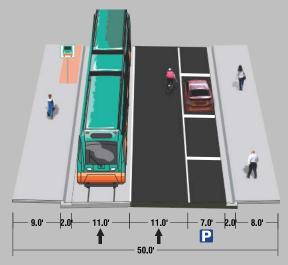
Operational Loop + Alton (OLA) Alternative



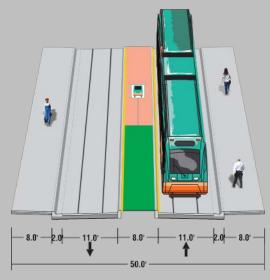
Typical Section NE 2nd Street



Existing

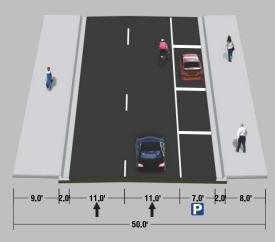


Operational Loop + Alton (OLA)

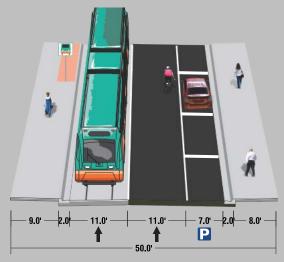


Direct Connection (DC)
"Transit Mall"

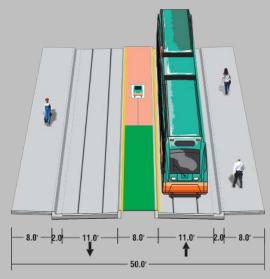
Typical Section NE 2nd Street



Existing

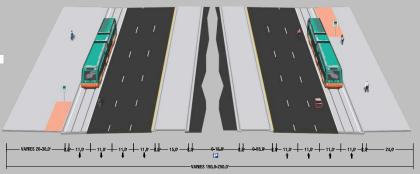


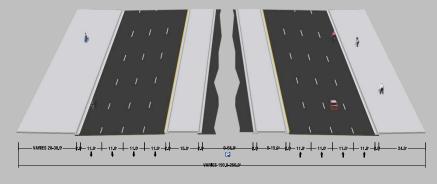
Operational Loop + Alton (OLA)



Direct Connection (DC)
"Transit Mall"

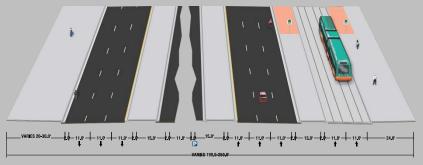
Typical Section Biscayne Blvd.





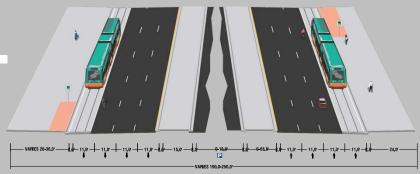
Option 1: DC & OLA

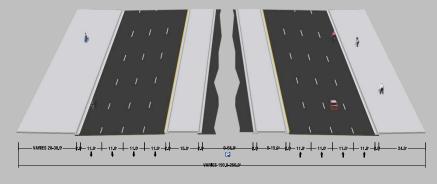
Existing (from SE 1st St. to NE 6th St.



Option 2: DC & OLA

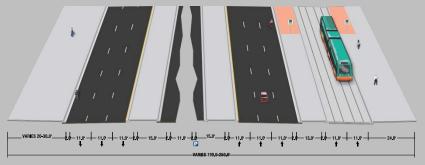
Typical Section Biscayne Blvd.





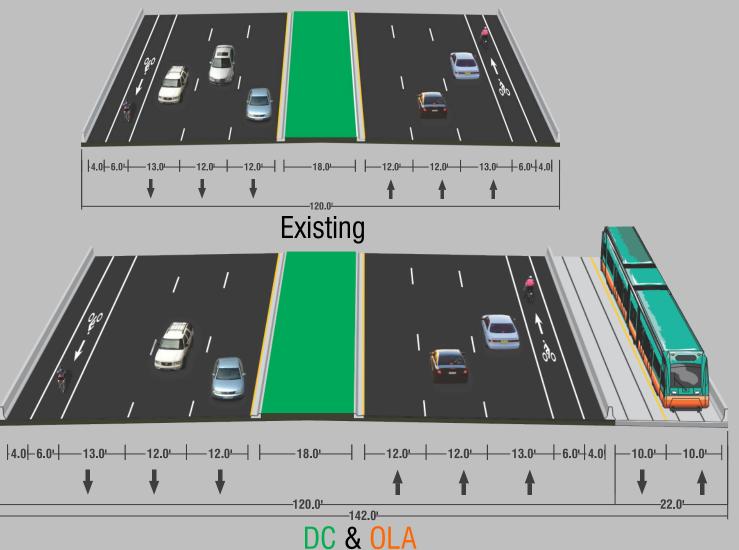
Option 1: DC & OLA

Existing (from SE 1st St. to NE 6th St.

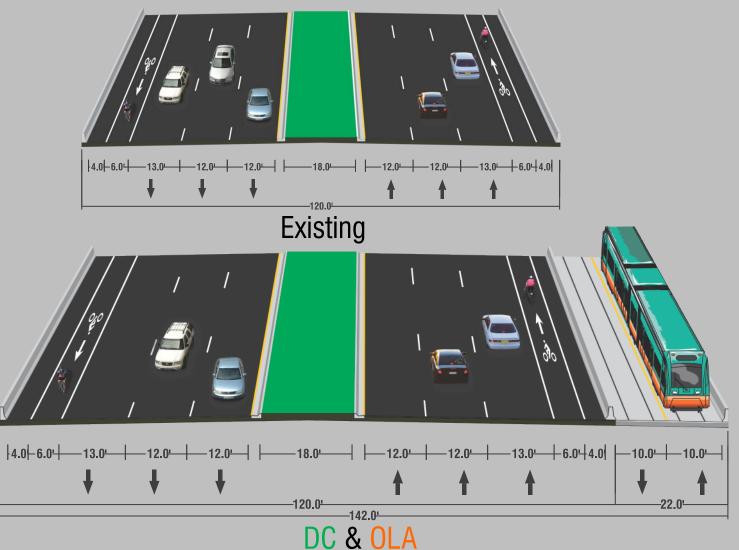


Option 2: DC & OLA

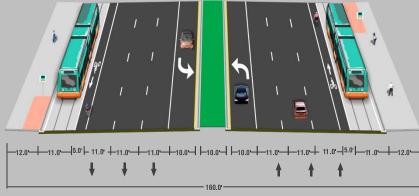
Typical Section MacArthur Causeway

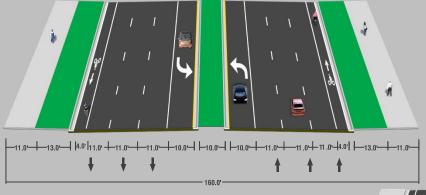


Typical Section MacArthur Causeway



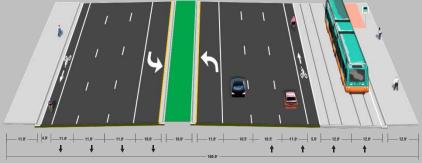
Typical Section 5th Street





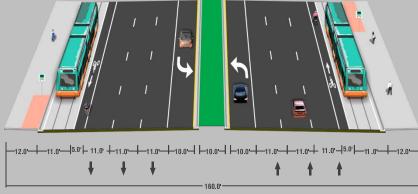
Option 1: DC & OLA

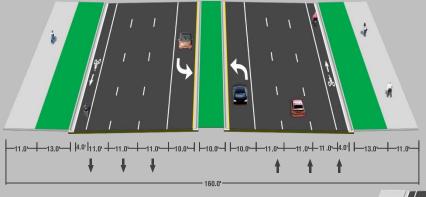
Existing



Option 2: DC & OLA

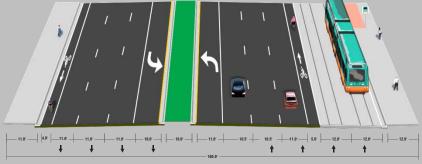
Typical Section 5th Street





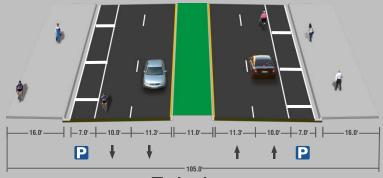
Option 1: DC & OLA

Existing

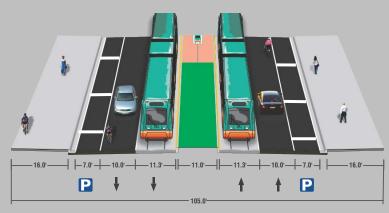


Option 2: DC & OLA

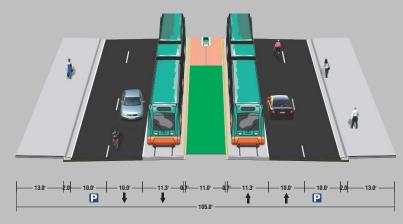
Typical Section Washington Av.



Existing

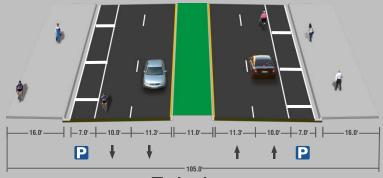


Option 1: DC & OLA

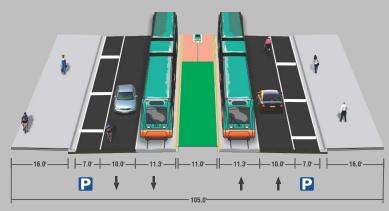


Option 2: DC & OLA

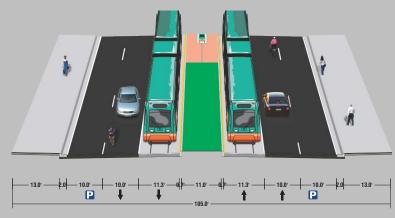
Typical Section Washington Av.



Existing

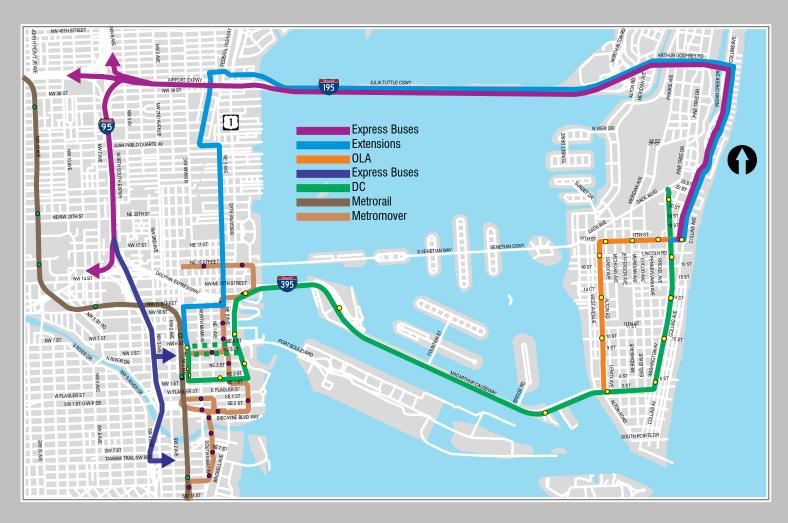


Option 1: DC & OLA



Option 2: DC & OLA

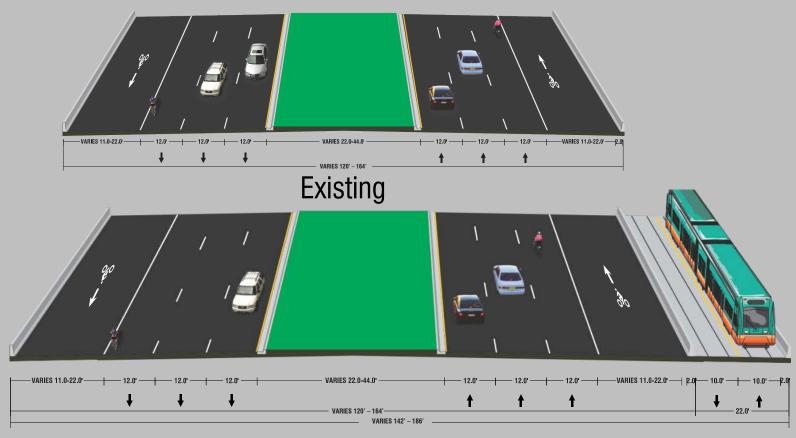
DC & OLA Extensions



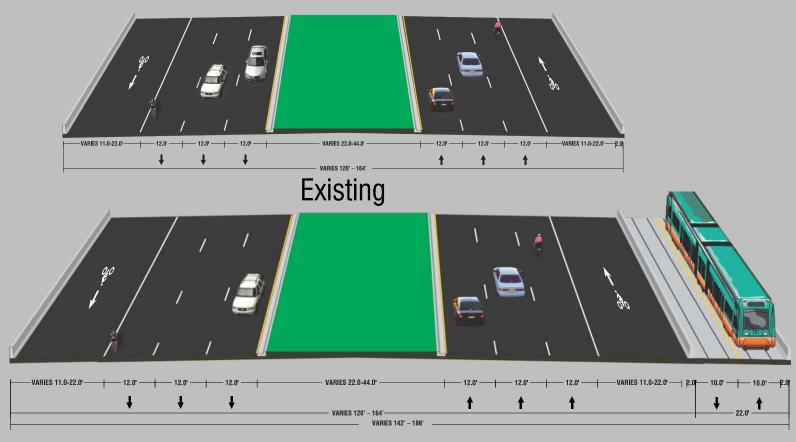
DC & OLA Extensions



Typical Section Julia Tuttle Causeway



Typical Section Julia Tuttle Causeway



COSTESTIMATE COSTESTIMAL REVIEW

Methodology for Updating Capital Costs

Steps to updating LPA capital costs

- -FTA capital cost databases for similar projects
- -Performed reasonableness tests for cost of major components (structures)
- -Cost increases between 2004 and 2013 averaged 55%

Steps to updating refined LPA alternatives and Extensions

- -Calculated cost/linear foot (Downtown, Causeway and Beach)
- -Estimated lengths of each alternative

Methodology for Updating Capital Costs

Steps to updating LPA capital costs

- -FTA capital cost databases for similar projects
- -Performed reasonableness tests for cost of major components (structures)
- -Cost increases between 2004 and 2013 averaged 55%

Steps to updating refined LPA alternatives and Extensions

- -Calculated cost/linear foot (Downtown, Causeway and Beach)
- -Estimated lengths of each alternative

2004 LPA Capital Cost

Description	\$2004 (Millions)	\$2013 (Millions)
Guideway Elements	\$135.52	\$210.05
Yards & Shops (Support Facilities)	\$26.57	\$41.18
System Elements	\$70.22	\$108.84
Passenger Stations	\$35.97	\$55.75
Vehicles	\$43.22	\$92.40
Special Conditions	\$38.77	\$60.09
Right-of-Way	\$10.63	\$16.47
Soft Costs	\$121.82	\$188.82
Grand Total:	\$482.71	\$773.60

2004 LPA Capital Cost

Description	\$2004 (Millions)	\$2013 (Millions)
Guideway Elements	\$135.52	\$210.05
Yards & Shops (Support Facilities)	\$26.57	\$41.18
System Elements	\$70.22	\$108.84
Passenger Stations	\$35.97	\$55.75
Vehicles	\$43.22	\$92.40
Special Conditions	\$38.77	\$60.09
Right-of-Way	\$10.63	\$16.47
Soft Costs	\$121.82	\$188.82
Grand Total:	\$482.71	\$773.60

Refined Alternatives' Capital Cost (\$2013)

	Downtown	Causeway	Beach	Vehicles	Maint. Fac.	Total
2004 LPA	\$149 M	\$208 M	\$217 M	\$ 92 M	\$108 M	\$774 M
DC	\$ 57 M	\$192 M	\$131 M	\$ 44 M	\$108 M	\$532 M
OLA	\$ 54 M	\$192 M	\$ 248 M	\$ 44 M	\$108 M	\$646 M
Extensions	\$124 M	\$264 M	\$101 M	\$ 40 M	*	\$529 M

^{*} Assumes utilizing Phase 1 maintenance facility

Refined Alternatives' Capital Cost (\$2013)

	Downtown	Causeway	Beach	Vehicles	Maint. Fac.	Total
2004 LPA	\$149 M	\$208 M	\$217 M	\$ 92 M	\$108 M	\$774 M
DC	\$ 57 M	\$192 M	\$131 M	\$ 44 M	\$108 M	\$532 M
OLA	\$ 54 M	\$192 M	\$ 248 M	\$ 44 M	\$108 M	\$646 M
Extensions	\$124 M	\$264 M	\$101 M	\$ 40 M	*	\$529 M

^{*} Assumes utilizing Phase 1 maintenance facility

Extension Assumptions

LRT rail vehicle technology for costing

Express bus costs not included

Comparable service frequencies as DC

Comparable rail vehicle speeds on both LPA Refined Alternatives

Extension Assumptions

LRT rail vehicle technology for costing

Express bus costs not included

Comparable service frequencies as DC

Comparable rail vehicle speeds on both LPA Refined Alternatives

Extensions (with DC & OLA) Options & Capital Costs



Extensions (with DC & OLA) Options & Capital Costs



Refined Alternatives' 0&M Cost (\$2012)

Methodology and Assumptions:

- -Calculated new station to station miles, minutes, and speeds
- -Assumed fewer stations
- -Calculated number of vehicles required based on higher capacity LRT vehicle
- -Used Charlotte's 2012 Cost Model for cost factors
- -Compared costs to similar LRT systems

Refined Alternatives' 0&M Cost (\$2012)

Methodology and Assumptions:

- -Calculated new station to station miles, minutes, and speeds
- -Assumed fewer stations
- -Calculated number of vehicles required based on higher capacity LRT vehicle
- -Used Charlotte's 2012 Cost Model for cost factors
- -Compared costs to similar LRT systems

Refined Alternatives' O&M Cost Statistics

	2004 LPA	DC	OLA
Number of Routes	3	1	2
Round Trip Distance	30.3 route miles	13.5 route miles	27 route miles
Round Trip Travel Time	55 minutes each for regional routes (35 minutes for Beach Circulator)	41 minutes	41 minutes each route
Number of Stations	42	14	23
Number of Trains	18 in peak 18 in off-peak	8 in peak 4 in off- peak	8 in peak 8 in off-peak

Refined Alternatives' O&M Cost Statistics

	2004 LPA	DC	OLA
Number of Routes	3	1	2
Round Trip Distance	30.3 route miles	13.5 route miles	27 route miles
Round Trip Travel Time	55 minutes each for regional routes (35 minutes for Beach Circulator)	41 minutes	41 minutes each route
Number of Stations	42	14	23
Number of Trains	18 in peak 18 in off-peak	8 in peak 4 in off- peak	8 in peak 8 in off-peak

Direct Connection (DC) Operating Plan



Direct Connection (DC) Operating Plan



Operational Loop + Alton (OLA) Operating Plan



Operational Loop + Alton (OLA) Operating Plan



Annual 0 & M (\$2012) Cost Summary

2004 LPA:

Direct Connection (DC):

Operational Loop + Alton (OLA):

Extensions:

- -Collins Avenue
- -Julia Tuttle
- -2nd Avenue

Total: \$45 M

Total: \$22 M

Total: \$34 M

Total: \$28 M

Total: \$ 5 M Total: \$14 M

Total: \$ 9 M

Annual 0 & M (\$2012) Cost Summary

2004 LPA:

Direct Connection (DC):

Operational Loop + Alton (OLA):

Extensions:

- -Collins Avenue
- -Julia Tuttle
- -2nd Avenue

Total: \$45 M

Total: \$22 M

Total: \$34 M

Total: \$28 M

Total: \$ 5 M Total: \$14 M

Total: \$ 9 M

TICERCE CRANT

TIGER Grant 2014 Summary

Notice of Funding Availability (February 25, 2014)

Allows for planning and capital activities

Total funding up to \$600M; \$35M set aside for planning

Planning activities include project-level or regional plans

Federal participation capped at 80% in urban areas

TIGER Grant 2014 Summary

Notice of Funding Availability (February 25, 2014)

Allows for planning and capital activities

Total funding up to \$600M; \$35M set aside for planning

Planning activities include project-level or regional plans

Federal participation capped at 80% in urban areas

TIGER Grant 2014 -Application Process

Application submittal deadline is April 28, 2014

Applicants may submit a maximum of 3 planning applications

Competitively awarded using selection criteria

- -Infrastructure conditions
- -Economic competitiveness
- -Livability
- -Environmental sustainability
- -Safety

Additional consideration given to innovation and partnerships

TIGER Grant 2014 -Application Process

Application submittal deadline is April 28, 2014

Applicants may submit a maximum of 3 planning applications

Competitively awarded using selection criteria

- -Infrastructure conditions
- -Economic competitiveness
- -Livability
- -Environmental sustainability
- -Safety

Additional consideration given to innovation and partnerships

TIGER Grant 2014 - Application Proposal

Submit request for Beach Corridor Project Development phase activities

- -Conduct NEPA process
- -Community outreach
- -Ridership forecasts
- -Secure funding sources
- -Selection of LPA

Partnership between the FDOT, Miami-Dade County, Cities of Miami and Miami Beach, and the MPO

TIGER Grant 2014 - Application Proposal

Submit request for Beach Corridor Project Development phase activities

- -Conduct NEPA process
- -Community outreach
- -Ridership forecasts
- -Secure funding sources
- -Selection of LPA

Partnership between the FDOT, Miami-Dade County, Cities of Miami and Miami Beach, and the MPO

Project Development Funding Proposal

Estimated Project Cost for Project Development Phase is \$ 3M

Assume 50% Local Match to be Nationally Competitive

Maintain Similar Funding Structure from the Current Study

-TIGER \$ 1,500,000 -FDOT \$ 750,000 -MDT \$ 250,000 -City of Miami \$ 250,000 -City of Miami Beach \$ 250,000

Secure Local Match Commitments Prior to Submittal Deadline

Project Development Funding Proposal

Estimated Project Cost for Project Development Phase is \$ 3M

Assume 50% Local Match to be Nationally Competitive

Maintain Similar Funding Structure from the Current Study

-TIGER \$ 1,500,000 -FDOT \$ 750,000 -MDT \$ 250,000 -Miami & DDA \$ 250,000 -Miami Beach \$ 250,000

Secure Local Match Commitments Prior to Submittal Deadline

Next PEC Meeting Agenda Topics

Financial Plan

Wireless Technology Assessment

Maintenance Facility Locations

Revised Station Locations

June 2014





PROJECT EXECUTIVE COMMITTEE (PEC) MEETING JULY 8, 2014



Policy Executive Committee Meeting
July 8, 2014

Beach Corridor Transit Connection Study

PURPOSE OF THE PROPERTY OF THE

Purpose of Meeting

New Beach Hybrid Option

Off-wire technology assessment and recommendations

Financial analysis results and recommendations







BEACHHYBRID AFGNENT OPTON

Beach Hybrid Alignment Option

Derived from TSC Members

More Frequent Service in South Beach

Circulation on East & West Sides

Duplicative Bus Service Eliminated

Potential Bus O&M Cost Savings



Beach Hybrid Alignment Option

Capital and O&M Cost Summary							
	2004 LPA	DC	OLA	DC+ Hybrid	Extensions		
Capital Cost	\$774 M	\$532 M	\$646 M	\$694 M	\$529 M		
Annual 0&M Cost	\$45 M	\$22 M	\$34 M	\$49 M*	\$28 M		

^{* 5} Min peak and off-peak headways both segments

TECHNICIES TO ASSESSMENT

Vehicle Marketplace

- ▶ 400+ streetcar/tram/LRT systems worldwide, (8,000+ low-floor vehicles)
- US is only a small portion of the global marketplace for rail transit equipment
- Streetcar/tram vehicle market has evolved considerably since 2000
- Power supply technology still developing





Why Eliminate Overhead Wires?





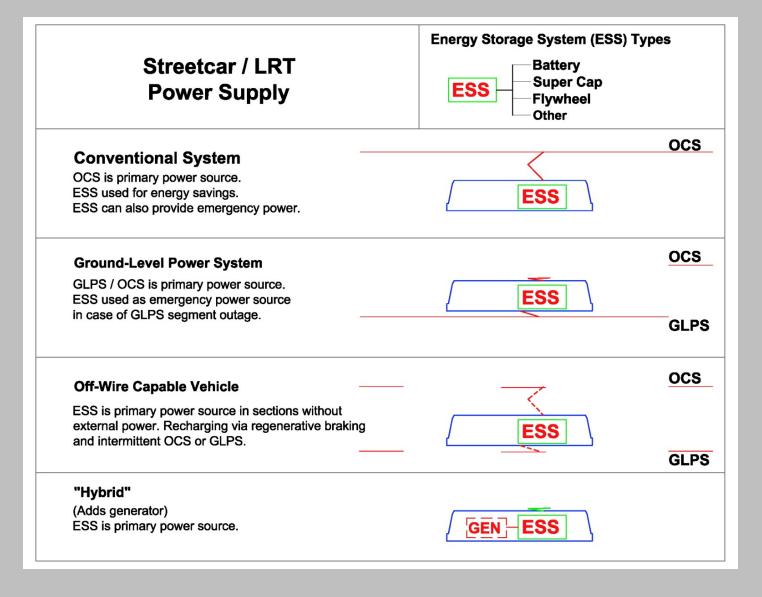


- Aesthetic concerns e.g. historic district
- Route optimization solution to a specific problem (impaired clearance, narrow right-of-way, utility conflict, etc.)
- Cost? (difficult to know with certainty)

Overhead wire visual impact can be minimized

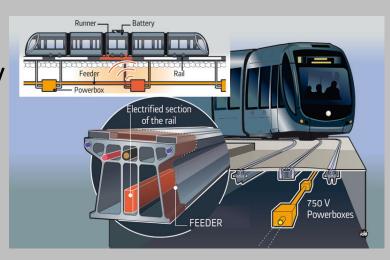


Speaking the Same Language



Ground Power Supply

- Power supply replaced overhead wire
 - Segmented power supply turns on only when vehicle is over it
- Proprietary infrastructure and vehicle equipment
- Significant underground infrastructure
- Complicates track design
- Typically used for a portion of system (first full system now under construction)
- Continuous vs. blended approach, inductive variant





State of the Art: Ground Power Supply

Under Contract:

Beijing, China (5.8 miles) Breda

Under Construction:

Dubai, UAE (6.2 miles 2014) Alstom
Zhuhai, China (5.4 miles 2016) Breda
Cuenca, Ecuador (portion of 6.5 mile line, 2016) Alstom



Revenue Service:

Bordeaux (8 mile portion, 2007) Alstom Angers (0.9 mile portion, 2011) Alstom Reims (1.25 mile portion, 2011) Alstom Orleans (1.25 mile portion, 2012) Alstom Tours (1.1 mile portion, 2013) Alstom



Onboard Energy Storage

- Vehicles use external power supply or onboard energy storage (OESS)
- Batteries and Super Caps most common energy storage technologies
- Off-wire "range" dependent on operating conditions and OESS capacity
- New technology evolving rapidly
- Energy (battery) storage devices have limited life
- Weight added to vehicle; increased energy consumption
- Reduced acceleration rate, reduced AC





State of the Art: Onboard Energy Storage

Planned:

2016 Detroit (portions)

2017 Ft. Lauderdale (segment)

- ? Washington, DC (portion)
- ? Budapest, Hungary (portion)
- ? Konya, Turkey (1.1 mile segment of 3.2 mile line)



Dallas

Under Construction:

2014 Seattle (one direction of new 2.5 mile line)

2014 Dallas (2 vehicles, 1 mile of 1.6 mile line)

2014 Kaohsiung, Taiwan (13.7 mile line, charging at stops)

2014 Guangzhou, China (4.8 mile line, charging at stops)

2015 Nanjing, China (10.6 miles, some overhead)

2015 Doha, Qatar (7.2 miles, charging at stops)

State of the Art: Onboard Energy Storage

Revenue Service:

- 2007 Nice, France. 0.6 of 5.5 mile line
- 2011 Seville, Spain. 0.4 of 1.4 mile line
- 2011 Zaragoza, Spain. 1.25 of 8 mile line
- 2013 Shenyang, China. Portion of new system





"Hybrid" (add generator)

E.g. hydrogen fuel cells or diesel generator

Significantly less progress compared to ground power supply and onboard energy storage

Fuel cells still in prototype phase

Some notable but limited applications of diesel generators







FEVE Hydrogen tram prototype



Nordhausen; Siemens Combino DUO

Comparing O&M Costs

Off-wire O&M savings:

- Less overhead wire to maintain
- Reduces conflicts with other users of the rightof-way

Off-wire O&M added costs:

- Replacement /disposal of batteries
- Additional maintenance costs:
 - Batteries, additional subsystem complexity
 - Additional maintenance hazards
 - Current collector (e.g. pantograph) cycles
 - Proprietary parts issues
 - "New Technology" unknowns



South Korean prototype battery tram

Variables:

- Technology employed
- Length of off-wire section
- Duty cycle

State of the Art (Summary)

	Grou	ınd Power Su	pply	Onboard Energy Storage		
Carbuilder	Prototype	Under Contract	Revenue Service	Prototype	Under Contract	Revenue Service
Alstom *		Х	Х	Х		Х
Bombardier *	X					
Brazil- Bom Sinal				In devmt.		
Breda *	Х	X				
Brookville *					Х	
CAF *					Х	Х
China- CSR					X	
China- CNR Changchun						X
Hyundai Rotem / KRRI *				Х		
Inekon					X	
Kawasaki *				Х		
Kinkisharyo *				Х		
RTRI Japan				Х		
Siemens *				Х	X	
Skoda				Х	X	
Stadler				X		
United Streetcar *						
Vossloh					X	

^{*} Have delivered Buy-America compliant vehicles

Local Issues

Duty Cycle

- Stops per mile (mixed traffic vs. exclusive guideway)
- Grades
- Climate (HVAC)

Vehicle length and weight

Exclusive guideway opportunities

Utility impacts

Full off-wire; or only partial?

- At 6.75 miles Miami "DC" option would be among the longer off-wire systems
- Time under wire is time spent charging
- Some wire provides flexibility to optimize the amount of on-board energy storage
- Marketplace might still respond with a fully off-wire solution





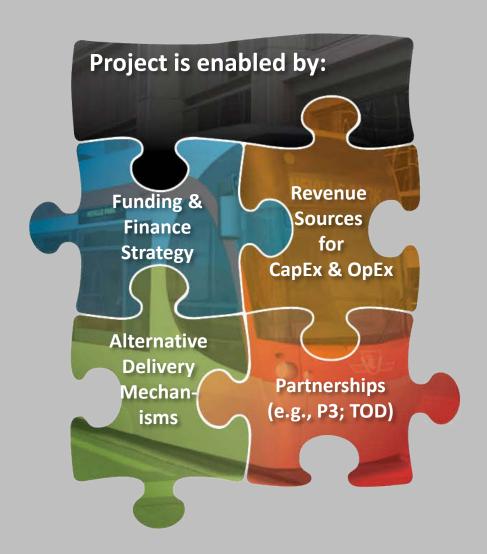
Conclusions

Don't define the solution--define the need and let the marketplace propose solutions

Define the business case for off-wire; understand cost/benefit Being an early adopter of a new technology has risks; mitigate by using project delivery that shares that risk Ground power supply not a good match to flood-prone areas Stay flexible; partially wired system has important advantages Reduce energy demand; keep vehicles out of mixed traffic Use longer vehicles (~98 ft); more room for OESS, greater future passenger capacity



Financial Analysis



Cost Framework: Initial Estimates of CapEx and Opex

	2004 LPA	DC	OLA	Extensions
Capital Cost	\$774 M	\$532 M	\$646 M	\$529 M
Annual 0&M Cost	\$45 M	\$22 M	\$34 M	\$28 M

\$2013 in millions of dollars for total capital cost estimate. Source: Gannett Fleming, 2014.

Funding Questions

- 1. Should the project be funded with a corridor-specific source?
- 2. Should Federal New Starts funds be applied?
- 3. What funding mechanisms are viable for this project?
- 4. What is the potential for new tolls?
- 5. What is the potential for value capture?
- 6. What are the benefits and real opportunities for P3?

1. Should the project be funded with a corridor-specific source?

- Probably yes
- No county-wide source available
- Benefits are localized to Miami and Miami
 Beach travel market and development
- Self-sufficient and viable corridor-specific funding sources are available
- Avoids county-wide prioritization process

2. Should Federal New Starts funds be applied?

- If County and Cities commit to local, dedicated funding, then answer is "no"
- Complicated process, competitive, and overprescribed
- Constrains flexibility in procurement opportunities, especially for P3
- Adds 2+ years to the opening day
- Forego potentially ~\$200M capital dollars
- Viable mix of non-Federal funding sources are available to cover full project costs

3. What funding mechanisms are viable for this project?

- Numerous sources identified for capital and O&M costs.
- Several sources could fund project in its entirety.
- Two seem most promising.

Funding & Financing Landscape

Operating Revenues Passenger Fare Revenue Traditional/Existing Sources • FHWA CMAQ operating (3 yr limit) • Dept. of Public Works (DPW) - 6 cent LOGT - County Gas Tax - 9th cent Gas Tax

- MDT
 - Direct Operating Revs.
 - Fed/State Grants incl. FDOT Transit
 - PTP Surtax (operations)

Innovative/New Sources

- Advertising (pillars/kiosks) and marketing; naming rights
- Right-of-Way / Air rights
- Digital Ecosystem
- Station revenues
 - Concessions (travel retail; food; ATMs)
- FL State Energy Program (SEP)

Capital Revenues

Traditional/Existing Sources

- Federal grants:
 - TIGER (8th or 9th cycle)
 - FTA New Starts Capital
 - TA Formula Grants
- Real Property Ad Valorem Tax
- Local Option Gas Tax (LOGT)
- County Option Sales Tax Surtax
- Local Gov Infrastruc Sales Surtax
- HEFT/MDX Toll Revenue Share
- DDA or County transp fees
- FDOT transit funding
- PTP Surcharge
- County General Funds

Innovative/New Sources

- TOD/joint development
- Special assessment districts
- Tax increment districts (TIFD)
- Tourist and Convention Devel.
- Parking surcharge
- Vehicle Miles Traveled (VMT)
- Partner agencies (e.g., CRAs)
- Causeway (2) Tolling

Financing Mechanism

Traditional/Existing

Debt and GO Bonds

Alternative Delivery & Innovative Mechanisms

- Florida (FDOT) SIB loans
- Tax credit bonds
- TIFIA
- P3 mechanisms
 - Availability payments
 - Private activity bonds (PAB)
 - Private equity

4. What is the potential for new tolls?

- Projected annual yield of ~\$75 -- \$150 million/year (2014\$) combined on both Causeways.
 - Range assumes \$1 toll and \$2 toll, respectively
- USDOT procedures for Interstates (e.g., I-395) constrains, but could be modified. USDOT considering eliminating the prohibition.

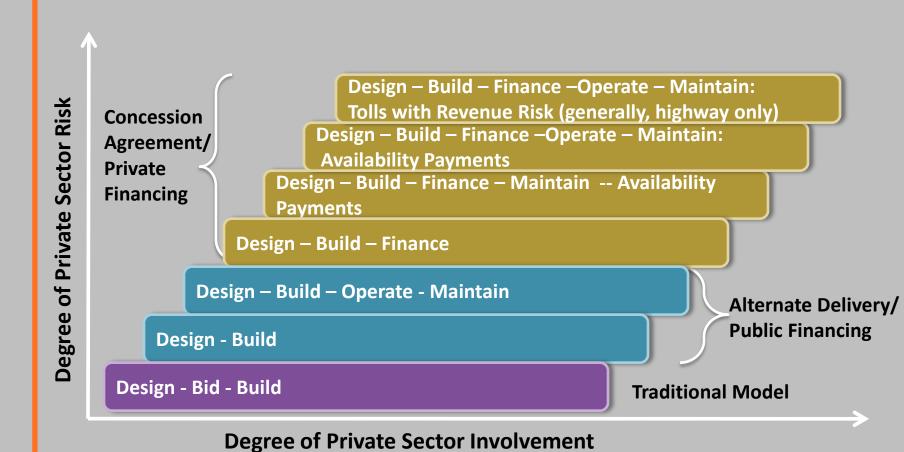
5. What is the potential for value capture?

- Tax Increment Financing yield: \$18 million/year
- Special Assessment District yield: \$12 million/year
- 1% local option surtax to the Tourist and Convention Development Tax yield: \$10 million/year
- Total: ~\$40 million/year

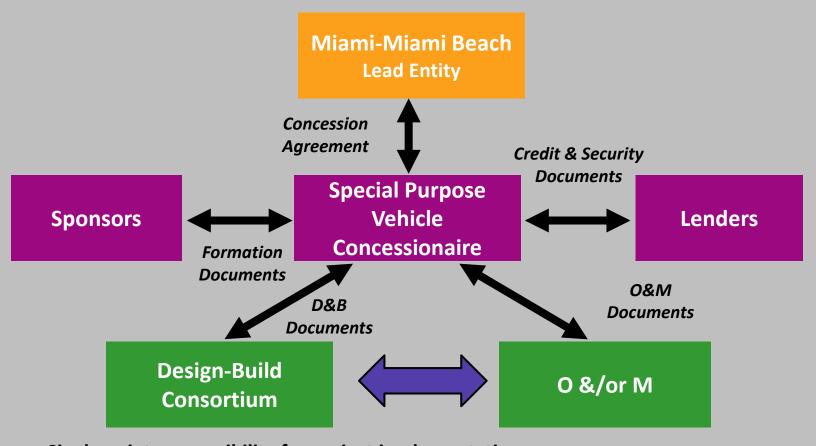
6. What are the benefits and real opportunities for P3?

- Expedited and efficient project delivery:
 - Saves time and money
 - Allocates risks to parties best able to manage
- Miami-Dade region is national leader in successful P3 projects.
- National best practices in P3 streetcar systems demonstrate effectiveness. (e.g., Portland Streetcar; Denver RTD Eagle Project).

Alternate Delivery Mechanisms: Project Implementation Techniques

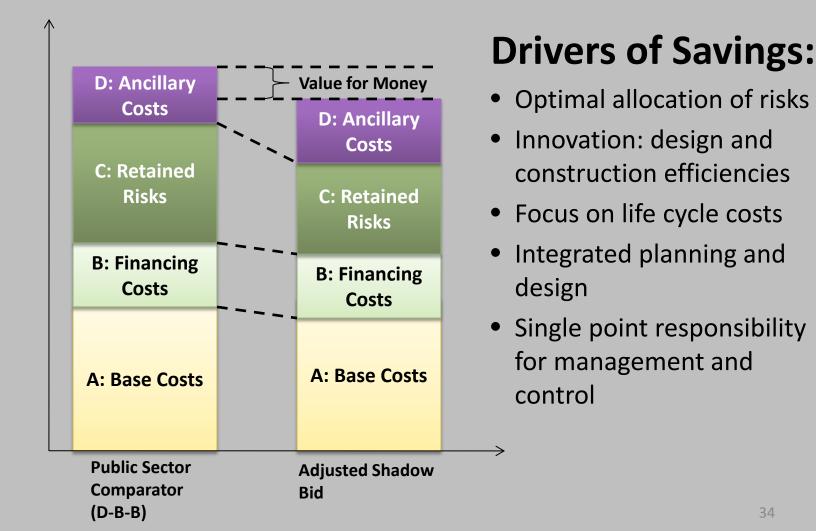


Typical P3 Business Model



Single point responsibility for project implementation Need for coordination with Operator during design and commissioning

Benefit of P3: Value for Money



Alternative Project Delivery Typical Risk Allocations

Risk	Design Bid Build	Design Build	DBFOM
Change in Scope	Public	Public	Public
NEPA Approvals	Public	Public	Public
Permits	Public	Shared	Private
Right of Way	Public	Public	Shared
Utilities	Public	Shared	Shared
Design	Public	Private	Private
Ground Conditions	Public	Public	Private
Hazmat	Public	Public	Shared
Construction	Private	Private	Private
QA / QC	Public	Shared	Private
Security	Public	Public	Shared
Final Acceptance	Public	Private	Private
0&M	Public	Public	Private
Financing	Public	Public	Private
Force Majeure	Public	Shared	Shared

North America P3 Projects



Denver RTD Eagle P3 Project

Project Description

- Gold Line Corridor: 11.2-mile rail transit corridor from Denver Union Station to the vicinity of Ward Road
- East Corridor: 22.8-mile commuter rail transit between Denver Union Station and Denver International Airport

North Metro Corridor: 18-mile rail link between Denver

Union Station and 162nd Ave

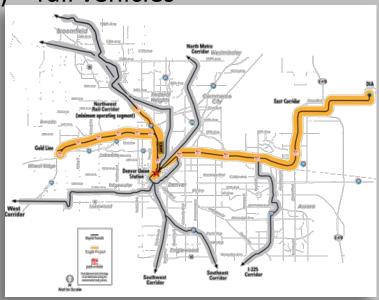
Maintenance Facility



Denver RTD Eagle P3 Project

Concessionaire – Denver Transit Partners

- Macquarie (90%) sold to Uberior and John Laing
- Fluor (10%)
- Design Build Contractors:
 - -Fluor 50% of the EPC & 33% of the O&M
 - -Balfour Beatty 50% of EPC and 33% of O&M
 - HYUNDAI -Rotem (USA) rail vehicles
 - -Ames Construction
 - -HDR engineering



- Denver RTD Eagle P3 Project

Financial Details

- 46 year concession reduced by mutual agreement to 34 years
- Lifecycle cost reduced by \$817.5m (2010\$) by 12 yr reduction in term of concession
- Total Investment: \$1.6bn (Phase 1)
- FTA New Starts Grant: \$1.0bn
- Private Equity: \$50.4m
 - Superior: \$ 24.5m (45%)
 - Laing: \$ 24.5m (45%)
 - Fluor: \$ 5.4m (10%)
- PABs: \$398m
- RTD Bridge Financing: \$142m (includes \$44m of service payments for early completion)

Denver RTD Eagle P3 Project

Benefits of P3

- Cost Savings \$300 million less than the RTD cost estimate
- Faster delivery delivery scheduled 11 months in advance of RTD's deadline
- Transfer of certain construction risks and O&M risks from RTD to P3 concessionaire

Alternative Project Delivery: Benefits for this Project

- Risk sharing (or transfer)
- Accelerated project delivery (time) and cost certainty
- Contractor/engineer innovation
- Life-cycle cost efficiencies
- Increased leverage of existing revenue streams
- Negotiation, partnership, collaboration

Conclusions and Next Steps

- Need dedicated, available and stable funding source(s), not just a portion of revenues.
 - Several funding options are promising; some with lead time or enabling legislation
- Add project into transit project development programming (TDP and TIP).
- Prioritize transportation investment utilizing latent capacity in existing funding sources and new local revenues.
- Checklist of "readiness" steps for P3.

DID WE ADDRESS ALL QUESTIONS?

- ✓ Is a partially wired system acceptable?
- ✓ Should the project be funded with corridor-specific funding sources?
- ✓ Should we pursue Federal New Starts funding?
- ✓ Should we further explore tolling the two Causeways?
- ✓ Should we further explore value capture funding mechanisms?
- ✓ Should we further explore a P3 arrangement?
- ✓ Should we amend the LRTP to include this project?
- ✓ Should the Miami Beach Hybrid Option be considered in the first phase, or a later phase?

TIGERPLANING - GRANTSTATUS

-Tiger Grant Summary

- Notice of Funding Availability (NOFA) announced February 25th, 2014
- \$35M available for planning projects
- TIGER grant submitted on April 26th, 2014
- Requested \$1.5M (50% of anticipated project cost)
- Expect response by September/October 2014

Options for Funding Next Phase

	Option 1	Option 2	Option 3
• TIGER	\$ 1,500,000	\$ 0	0
• FDOT	\$ 750,000	\$ 1,500,000	?
• MDT	\$ 250,000	\$ 500,000	?
Miami	\$ 250,000	\$ 500,000	?
Miami	\$ 250,000	\$ 500,000	<u>?</u>
Beach			
	\$ 3,000,000	\$ 3,000,000	

Next PEC Meeting Date

DATE: October 2, 2014, 2:00 pm

TIME: 2:00 pm - 3:00 PM

LOCATION: TBD

AGENDA:

- Maintenance Facility Locations
- Tiger Planning Grant Update
- Implementation Plan/Next Steps







PROJECT EXECUTIVE COMMITTEE (PEC) MEETING MAY 4, 2015

Policy Executive Committee Meeting

Date: May 4, 2015

Beach Corridor Transit Connection Study







Study Results

- LPA Alignment Refinement
- Stations
- Technology Assessment
- Capital and O&M Costs
- Funding Analysis
- Environmental Screening
- Implementation Plan
- Next Steps
 - Funding Next Phase
 - Agency Roles and Responsibilities



Study Results





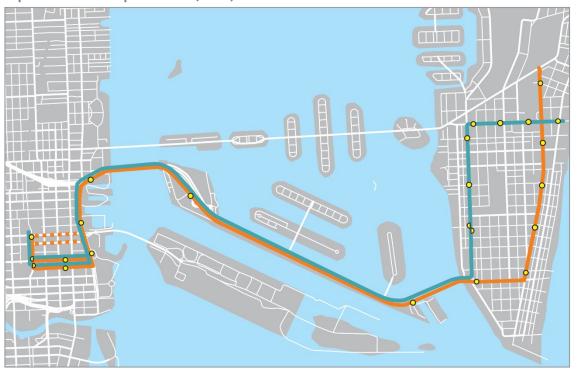
LPAALIGNMENT REFINEMENT

Screened over 30 alignment options

Direct Connection (DC)



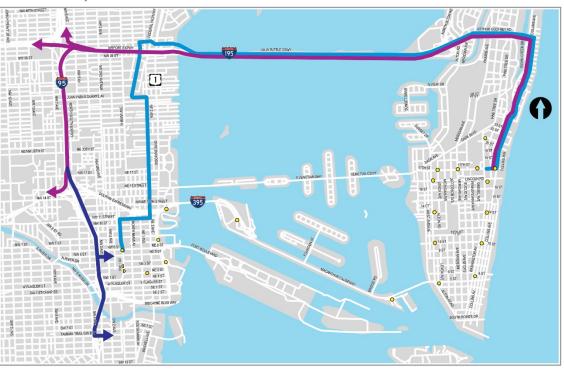
Operational Loop + Alton (OLA)



LPA ALIGNMENT REFINEMENT

Identified extensions

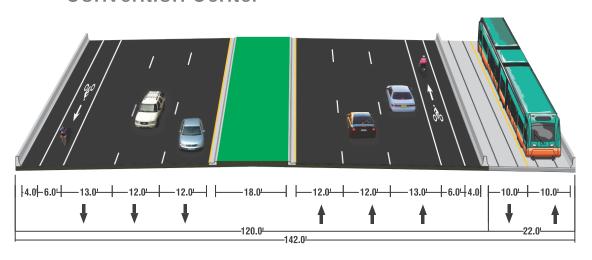
Extensions)



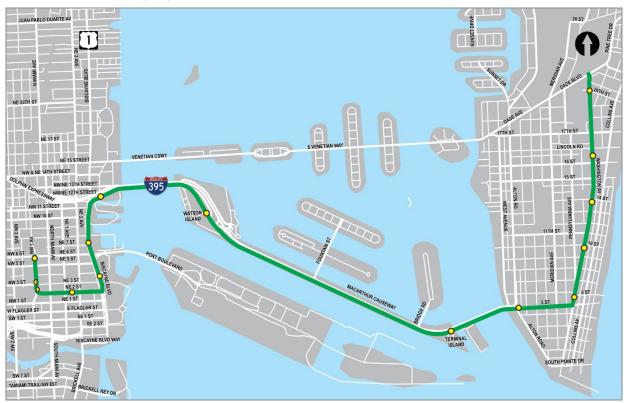
LPA ALIGNMENT REFINEMENT

PEC recommendations

- Concentrate on an affordable, most direct first phase
- Use the MacArthur Causeway; most direct route between Government Center and Miami Beach Convention Center



Direct Connection (DC)

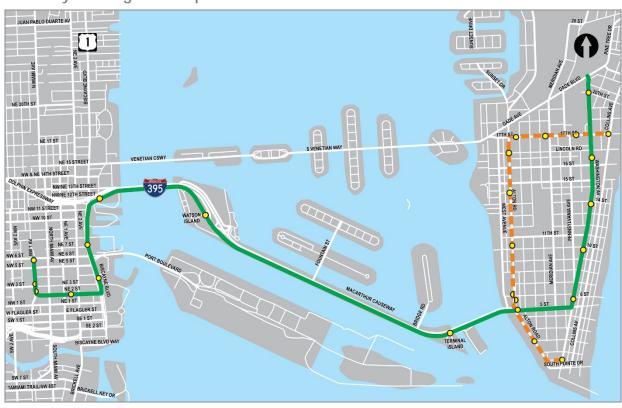


LPAALIGNMENT REFINEMENT

PEC recommendations

 Consider the "hybrid" circulator option in Miami Beach on Alton Road in next phase

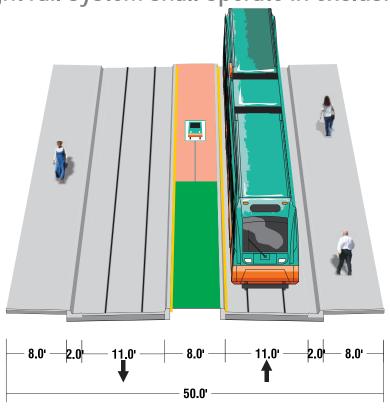
Beach Hybrid Alignment Option



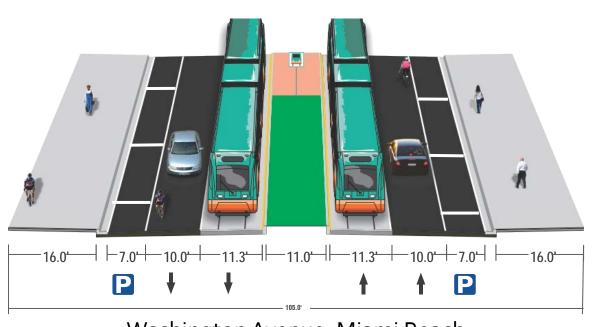
LPAALIGNMENT REFNEMENT

PEC recommendations

Light rail system shall operate in exclusive right-of-way



NW/NE 2nd Street Transit Mall, Miami



Washington Avenue, Miami Beach

STATIONS

Number of Stations by Alternative

	2004 LPA	Direct Connection	OLA	DC+ Hybrid
Downtown	16	7	8	7
Causeway	2	2	2	2
Beach	24	6	14	17
Total	42	15	24	26



PEC recommendations

Stations will be kept simple to keep costs down

TECHNOLOGY ASSESSMENT

- Don't define the solution, define the need
- Mitigate by using project delivery that shares the risk
- Stay flexible; partially wired system has important advantages
- PEC recommendations
 - Maximize off-wire technology and/or limited overhead wire if it reduces costs
 - Consider both overhead storage system and inground energy source for off-wire technology



CAPITAL AND O&M COSTS

PEC recommendation

• Concentrate on an affordable, most direct first phase

	2004 LPA	Direct Connection (DC)	OLA	DC+ Hybrid
Capital Cost	\$774	\$532	\$646	\$694
Annual O&M Cost	\$45	\$22	\$34	\$49*

Note: Updated costs based on 2004 LPA. Values in million 2014 dollars.

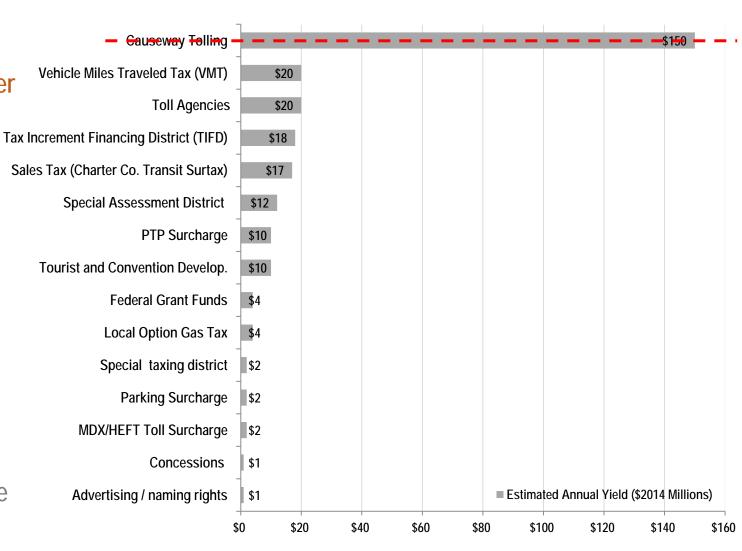
^{*} Increase service frequency compared to DC option

FUNDING ANALYSIS - LOCAL SOURCES*

- Causeway tolling is the largest source of revenue
- Without tolling, will need combination of other sources
- Estimated P3 availability payments
 - ~36 54 M/year for DC
 - ~67- 91 M/year for DC + Hybrid
 - Order of magnitude values
 - Cash flow analysis required

PEC recommendations

- Will not pursue federal capital funding at approximately 50% participation
- Countywide and corridor specific funding sources will be examined
- Tolling the causeways as a funding source will not be considered
 - **★** For partial capital costs and all O&M costs



ENVIRONMENTAL SCREENING

- Some change in the natural and man-made environment from 2004
- Age of document requires complete update
- Major issues to be addressed in NEPA
 - Biscayne Bay Impacts
 - FEC railroad crossing
 - Utility relocation impacts
 - Construction impacts
 - ROW impacts at stations
 - Roadway drainage and sea level rise

PEC recommendation

 Follow NEPA process to leave federal funding option open at a later date and expedite permitting

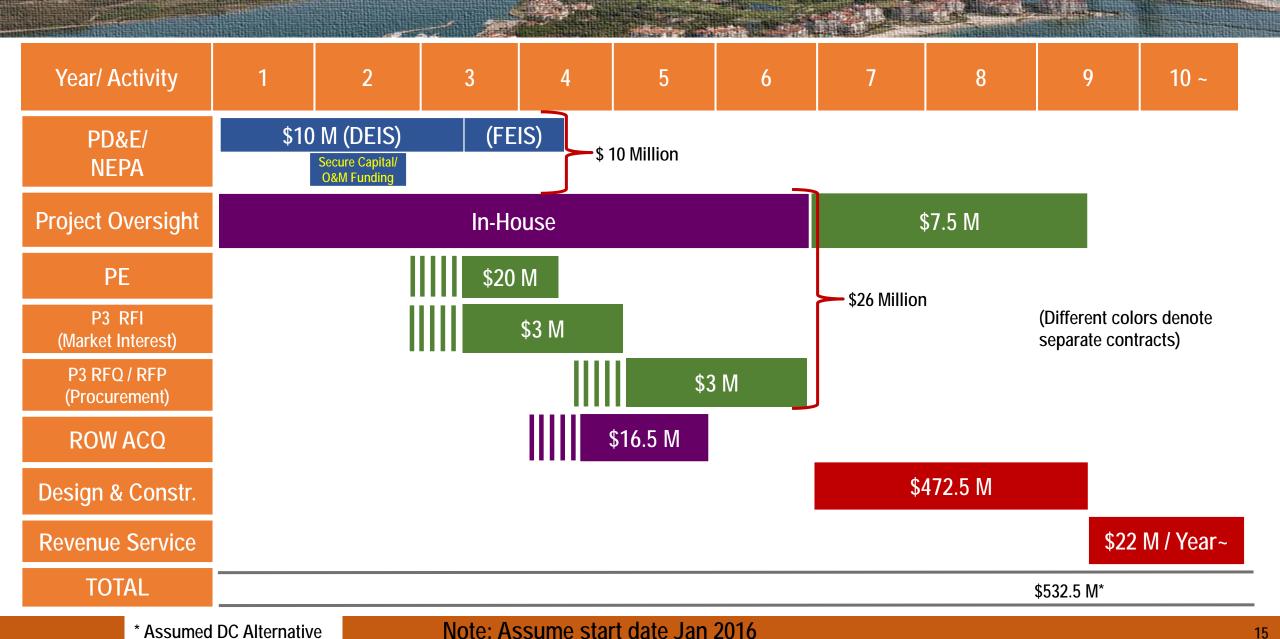


Implementation Plan



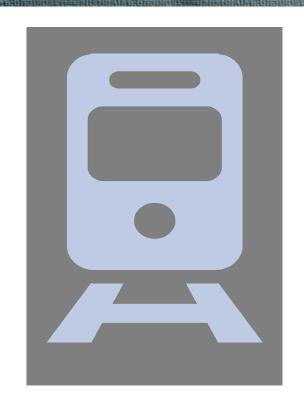


IMPLEMENTATION STRATEGY AND SCHEDULE



POTENTIAL TO ACCELERATE PROCESS

- Single lead agency for environmental, preliminary engineering and P3 procurement documents
- Prepare and approve a Memorandum of Understanding between all involved agencies prior to environmental phase
- Consolidate contract for environmental, preliminary engineering and P3 procurement
- Expedite the implementation of less complex segments of corridor into the environmental phase, as supported by a City of Miami Beach resolution passed on April 29, 2015



PROPOSED PROJECT DEVELOPMENT AGENCY ROLES AND RESPONSIBILITIES.

	Lead Agency			Agency Participation			
	NEPA / EIS / PE	PROJECT OVERSIGHT	P3 RFI/RFQ	ROW ACQ.	FUNDING	PEC	TSC
MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION						✓	✓
MIAMI-DADE COUNTY					✓	✓	√
FDOT	√	✓	✓	✓	√	✓	✓
OUT OF THE PARTY O					✓	√	1
MIAMIBEACH					✓	√	✓
					✓	√	√

Next Steps





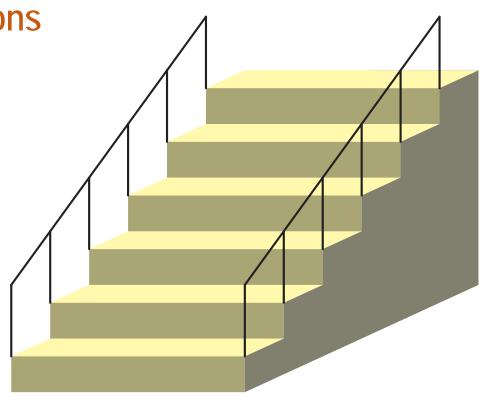
FUNDING NEXT PHASE

- Potential Funding Distribution
 - Various options considered
 - Reviewed by TSC and achieved consensus
 - Strong funding commitment by FDOT and CITT

Funding Distribution					
Agency	Percentage	Dollars			
FDOT	50.0%	5.0 mil			
CITT	37.5%	3.75 mil			
Local	12.5%	1.25 mil			
- County	4.17%	417 K			
- Miami	4.17%	417 k			
- Miami Beach	4.17%	417 k			

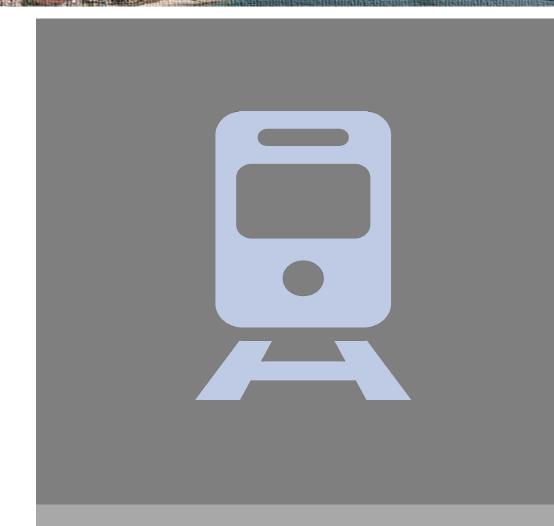
NEXT STEPS

- MPO Board endorsement of PEC recommendations
- Municipal and County Commission approvals
- CITT Approvals
- Secure funding
- Secure agency agreements
- Proceed with preparation of Beach Corridor Environmental Impact Statement (EIS)
- Explore expediting minimum operating segments within South Beach and Downtown Miami



DECISIONS MADE TODAY

- Did we agree on the Recommended Strategy and Schedule?
- Were any previous PEC recommendations changed?
- Does the PEC needs to meet again during transition period?



Questions?





