



GPC WO # 29

# DOWNTOWN MIAMI BUS LANES STUDY

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SEPTEMBER 2, 2015

PREPARED BY: PARSONS BRINCKERHOFF

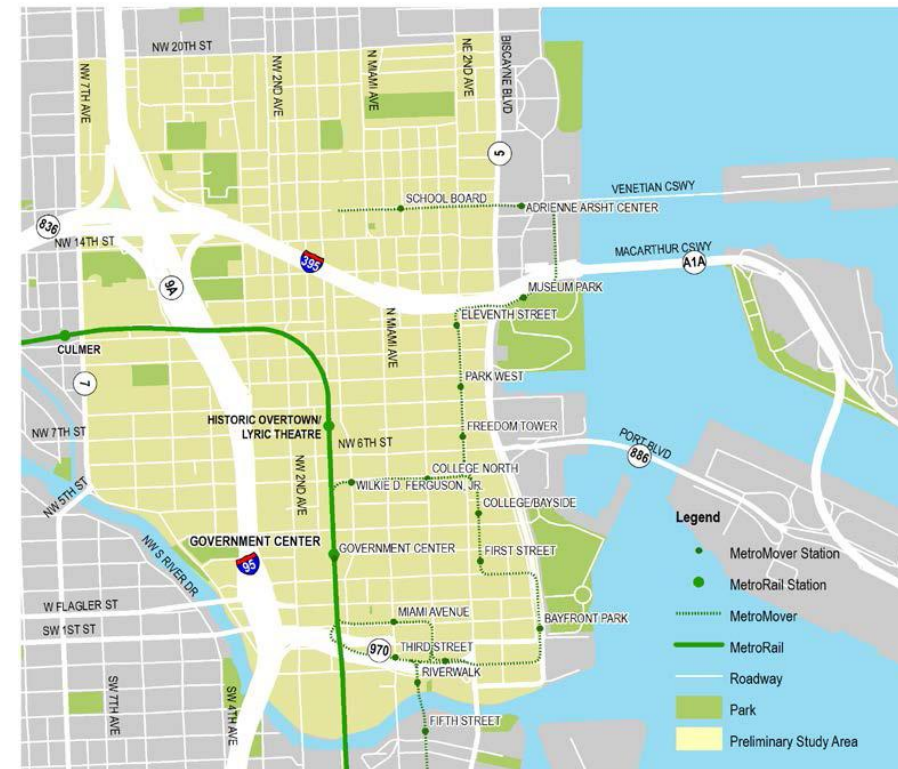
# AGENDA

- Study Objectives
- Existing Conditions
  - Roadway Existing Conditions
  - Transit Existing Conditions
- Hot Spots
- Potential Bus Lane Improvements
- Potential Intersection Priority
- Further Evaluation
- Discussion



# STUDY OBJECTIVES

- To identify the need and feasibility of Transit Priority Measures (TPM), such as bus-only lanes, in the Downtown Miami area.
- The intended purpose of TPMs is to improve performance of bus routes operated downtown.
- Systems/services to be analyzed
  - Miami-Dade Transit
  - Miami Trolley
  - Broward County Transit
- Future transit considerations
  - New Miami-Dade Transit bus terminal
  - All Aboard Florida Miami Central Station
  - Future Miami Streetcar / Beach Connector routes



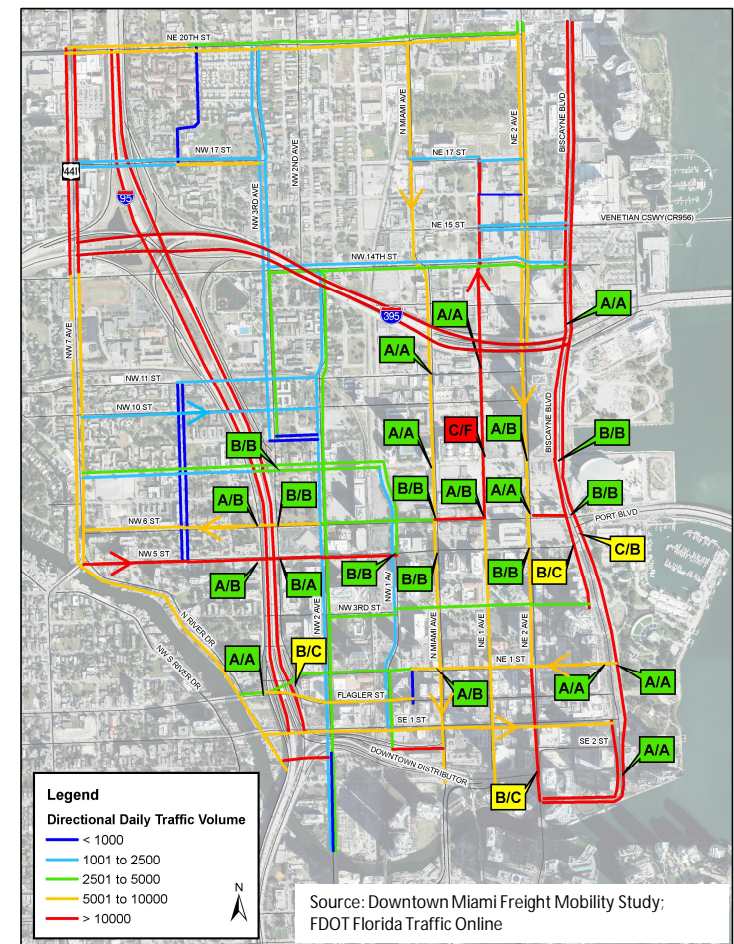
## Study Area

# EXISTING CONDITIONS

Roadway	Transit
Traffic Volumes - ADT and Peak	Bus Volumes – Daily & Peak
Traffic Signals	Passenger Volumes - Daily
Intersection Level of Service (LOS) – AM and PM Peak	Bus Speeds – Daily & Peak
Crashes – 5 Year (2008-2012)	MDT Street Supervisor Input
Roadway Number of Lanes (Directional)	
Parking Availability (No. of spaces)	
Parking Occupancy – AM and PM Peak and Mid-day	

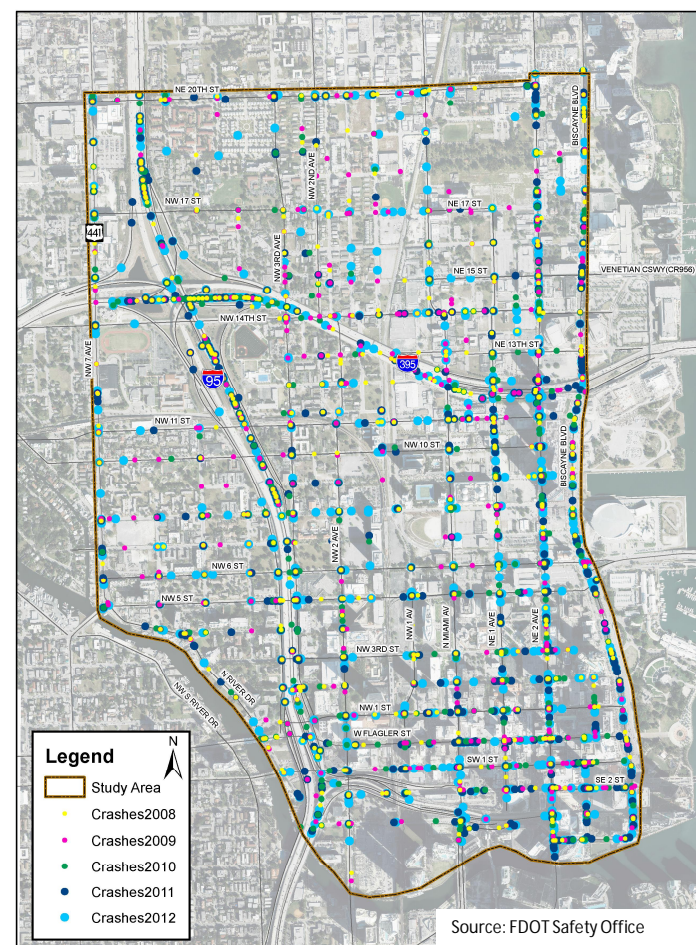
# EXISTING TRAFFIC OPERATIONS

- Most intersections show LOS A-B
- Some extended queuing particularly with Miami River Bridge openings
- High volume roadways
  - I-95 and I-395
  - Biscayne Blvd
  - NE 1<sup>st</sup> Ave and NE 2<sup>nd</sup> Ave
  - NW 5<sup>th</sup> St



# CRASHES

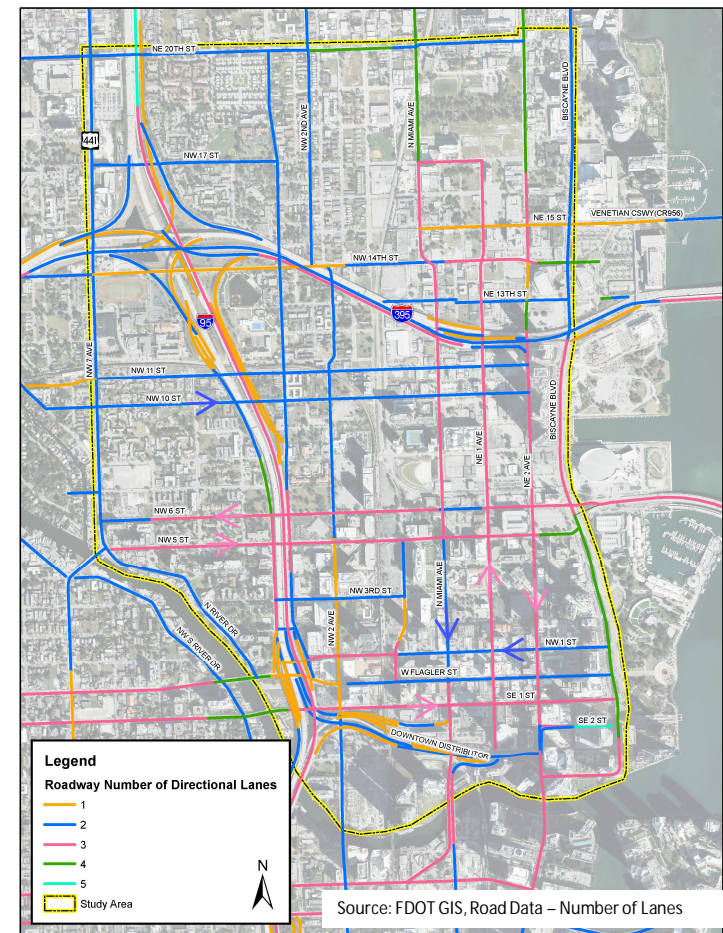
- Orientation to east and south sides of study area where higher traffic exists
- Higher crash corridors
  - I-95 and I-395
  - Biscayne Blvd
  - NE/SE 2<sup>nd</sup> Ave
  - NE/SE 1<sup>st</sup> Ave
  - SE/SW 1<sup>st</sup> Ave
  - SE/SW Flagler St
  - NE/NW 1<sup>st</sup> St



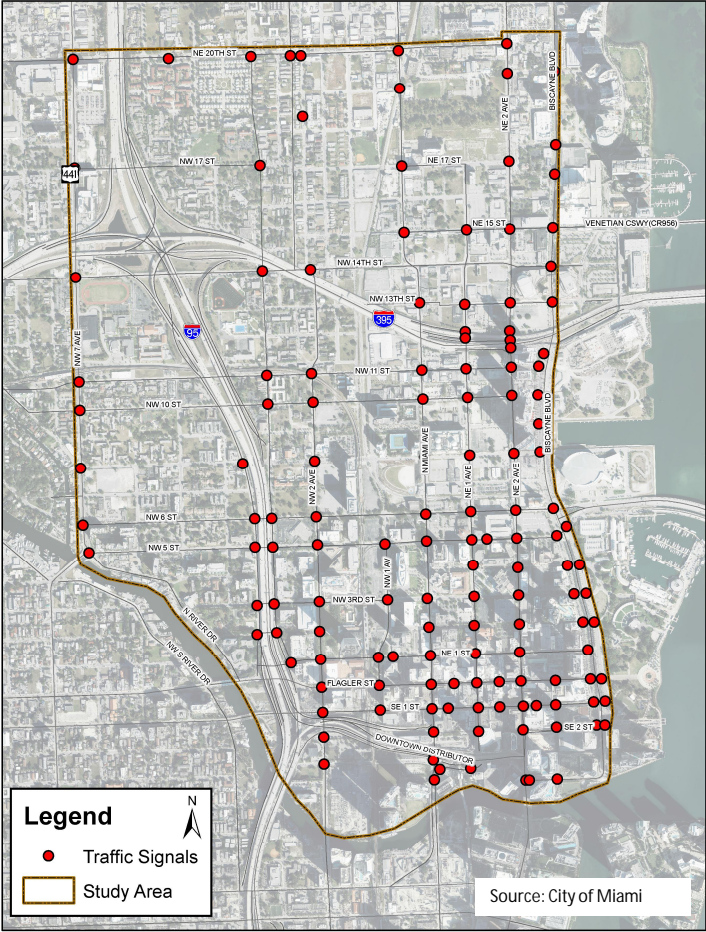


# NUMBER OF DIRECTIONAL LANES

- Increased arterial capacity
  - North – South
    - Biscayne Blvd
    - NE 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> Avenues
  - East – West
    - NE 5<sup>th</sup> St and 6<sup>th</sup> St
    - SE 1<sup>st</sup> St
- One-way pairs focused on east-west
  - NE 5<sup>th</sup> St and 6<sup>th</sup> St
  - NE 1<sup>st</sup> St and SE 1<sup>st</sup> St
  - No continuous north-south pair

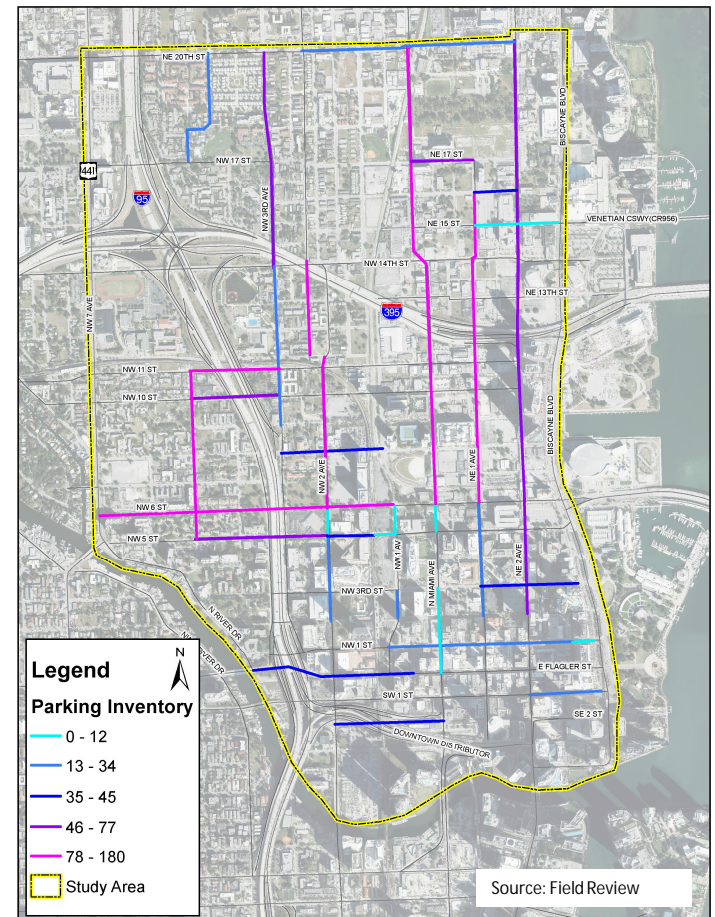


# TRAFFIC SIGNALS



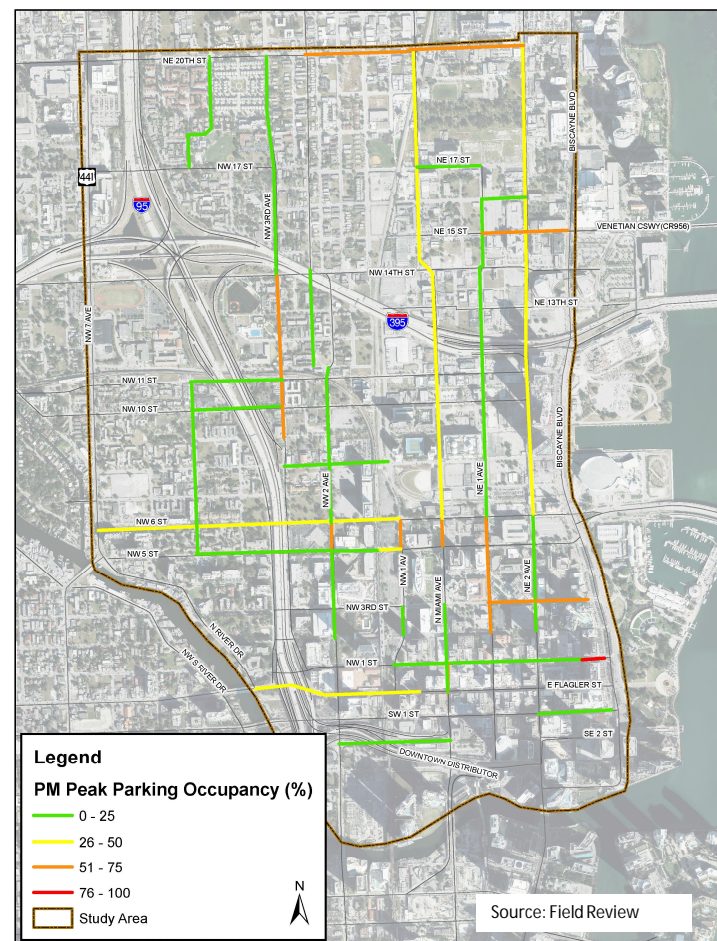
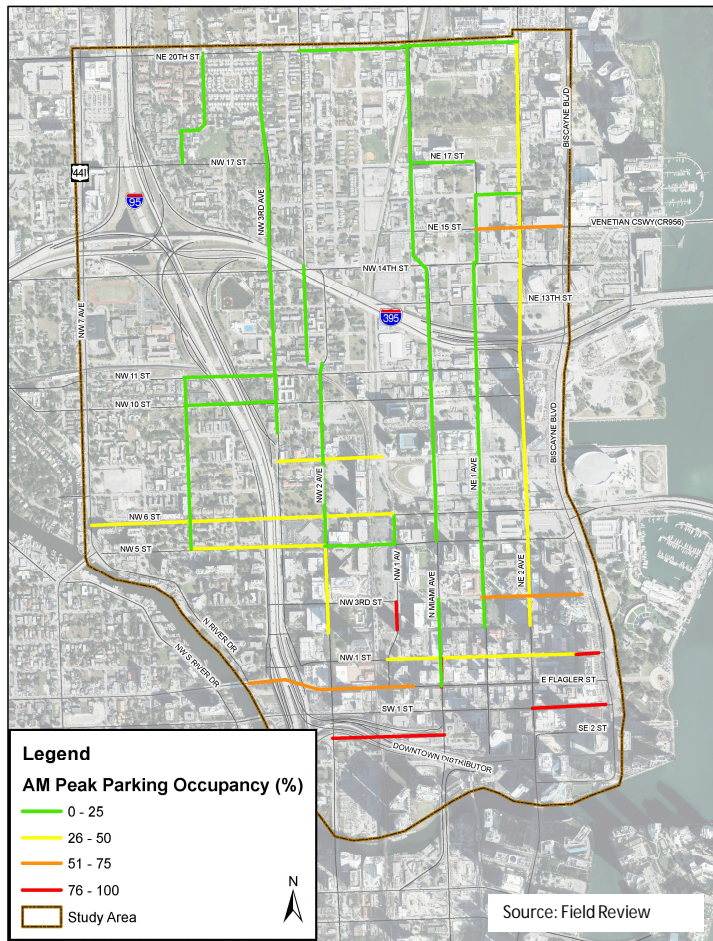
# PARKING INVENTORY

- Streets with higher number of parking spaces
  - NE Miami Ave (NE 6<sup>th</sup> St to NE 20<sup>th</sup> St)
  - NE 1<sup>st</sup> Ave (NE 6<sup>th</sup> St to NE 16<sup>th</sup> St)
  - NW 2<sup>nd</sup> St (NW 6<sup>th</sup> St to NW 1<sup>st</sup> Ave)
  - NW 6<sup>th</sup> St (NW 7<sup>th</sup> Ave to NW 1<sup>st</sup> Ave)
- Most streets in downtown core do not have on-street parking





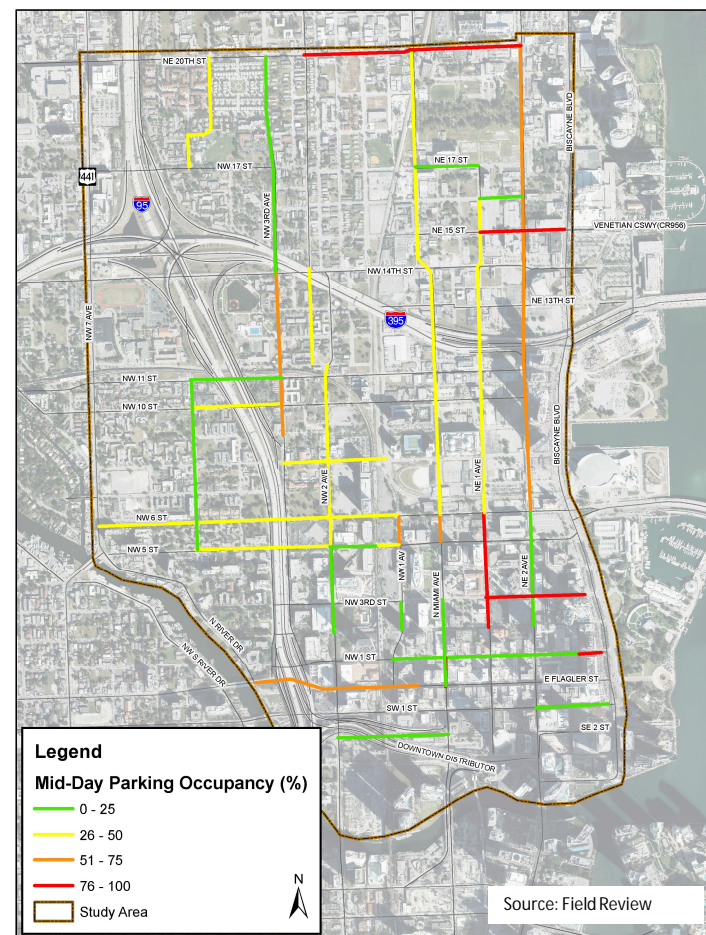
# PARKING OCCUPANCY (AM/PM)





# PARKING OCCUPANCY (MID-DAY)

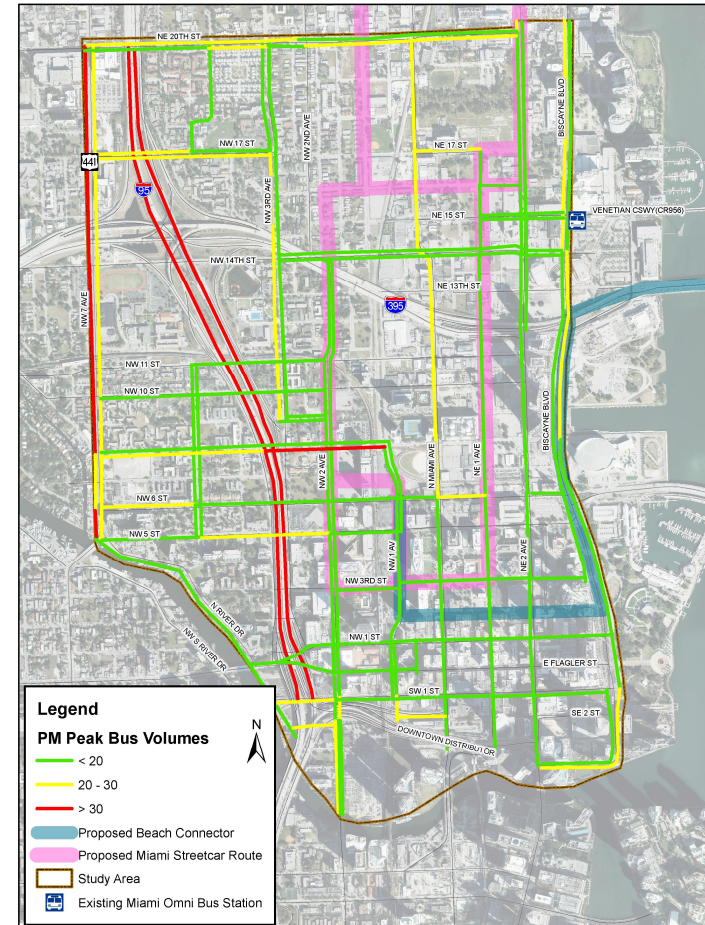
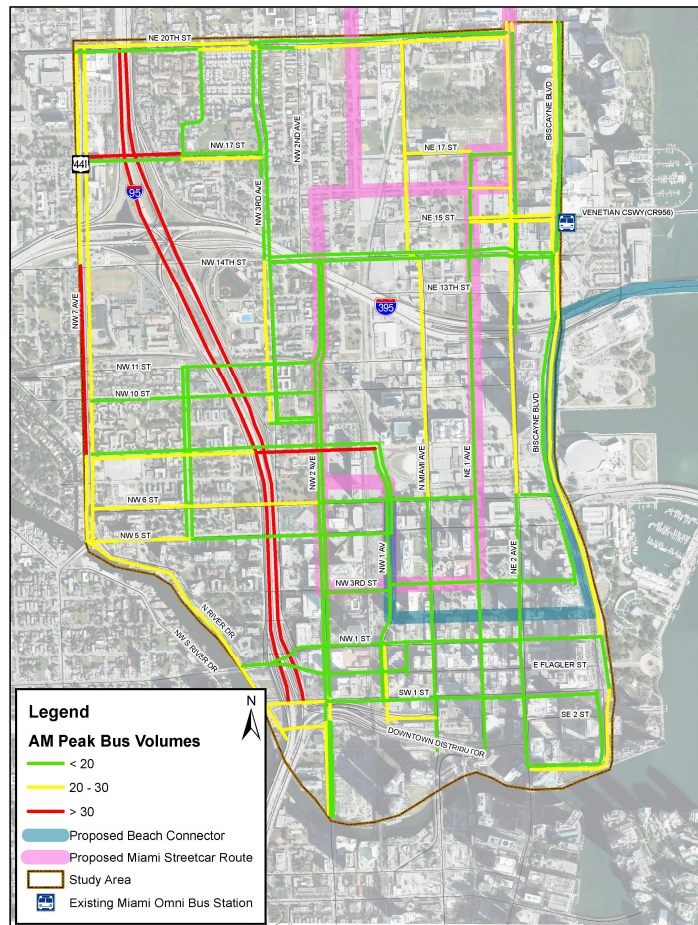
- Lower parking during peaks in general
  - Exception - sections of SE 1<sup>st</sup> St and SW 2<sup>nd</sup> St
- Highest mid-day occupancy
  - NE/NW 20<sup>th</sup> St
  - NE 1<sup>st</sup> St
  - NE 3<sup>rd</sup> St
  - NE 1<sup>st</sup> Ave



# AVAILABLE DATA FOR BUS MODES IN STUDY AREA

Agency	Available Data		
	Bus Volumes	Passenger Volumes	Speed
MDT	●	●	●
Miami Trolley	●	●	
BCT			

# DIRECTIONAL BUS VOLUMES (AM-PM PEAK)



# DIRECTIONAL BUS VOLUMES

- Higher bus volume streets / number of routes
  - NE Biscayne Blvd / 12 routes
  - NE 6<sup>th</sup> St / 10 routes
  - NE 1<sup>st</sup> Ave / 6 routes
  - NE 17<sup>th</sup> St / 5 routes
  - NW 3<sup>rd</sup> Ave / 4 routes
  - NE 20<sup>th</sup> St / 4 routes
  - N. Miami Ave / 3 routes



- Concentration of bus turns
  - NW 2<sup>nd</sup> St and SW 1<sup>st</sup> St
  - NE / NW 6<sup>th</sup> St
  - NE Biscayne Blvd (access to Omni bus station)

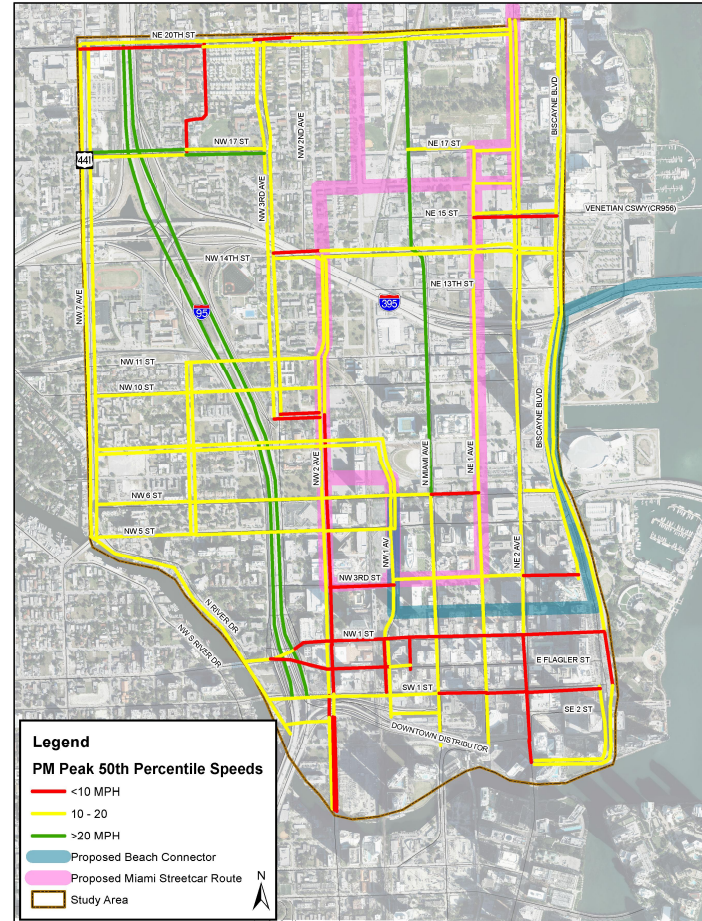
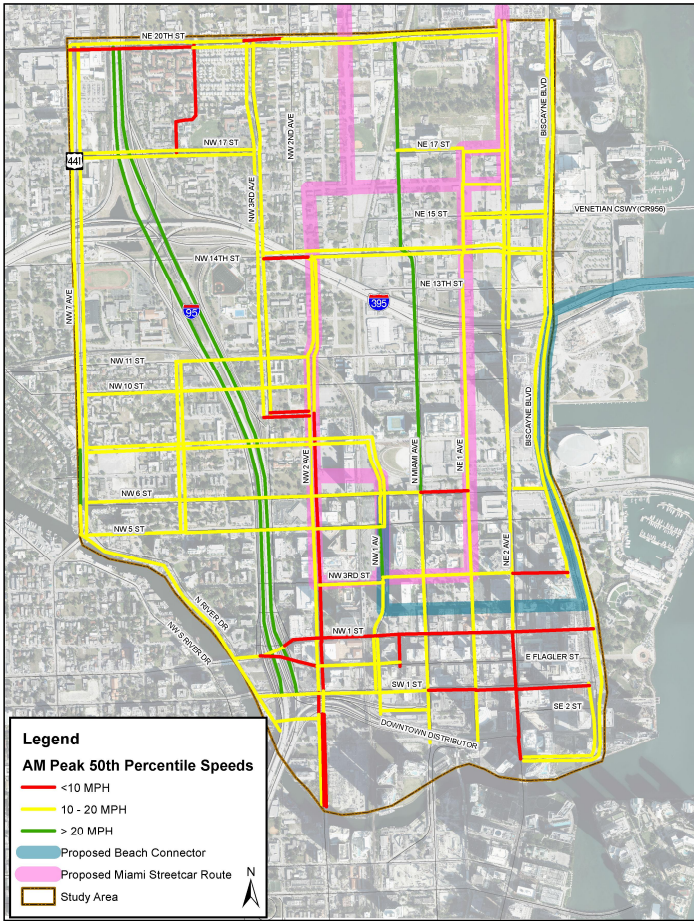


- Higher passenger volume streets
  - Biscayne Blvd
  - NW / NE 1<sup>st</sup> St
  - SW / SE 1<sup>st</sup> St
- Higher volumes on streets in downtown core





# BUS SPEEDS (AM-PM PEAK)



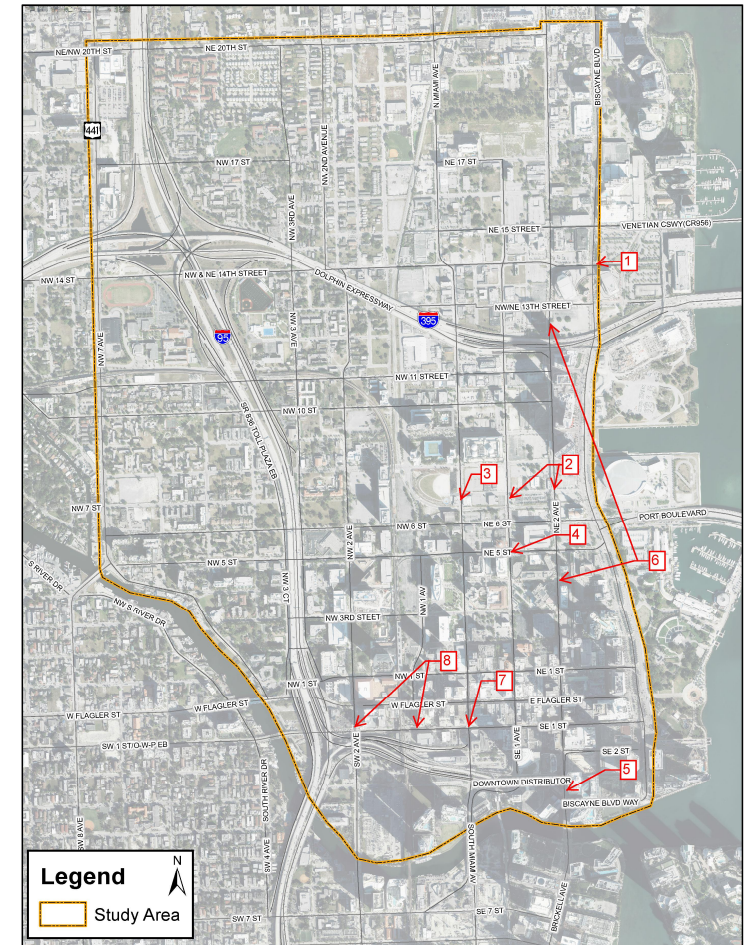
# BUS SPEEDS

- Lower bus speeds in SE of study area – downtown core
- Trends similar for both AM and PM peak periods
- Streets with lowest peak bus speeds (<10 MPH)
  - NE / NW 1<sup>st</sup> St
  - SE 1<sup>st</sup> St
  - Biscayne Blvd
  - NE 2<sup>nd</sup> Ave
  - NW / SW 2<sup>nd</sup> Ave



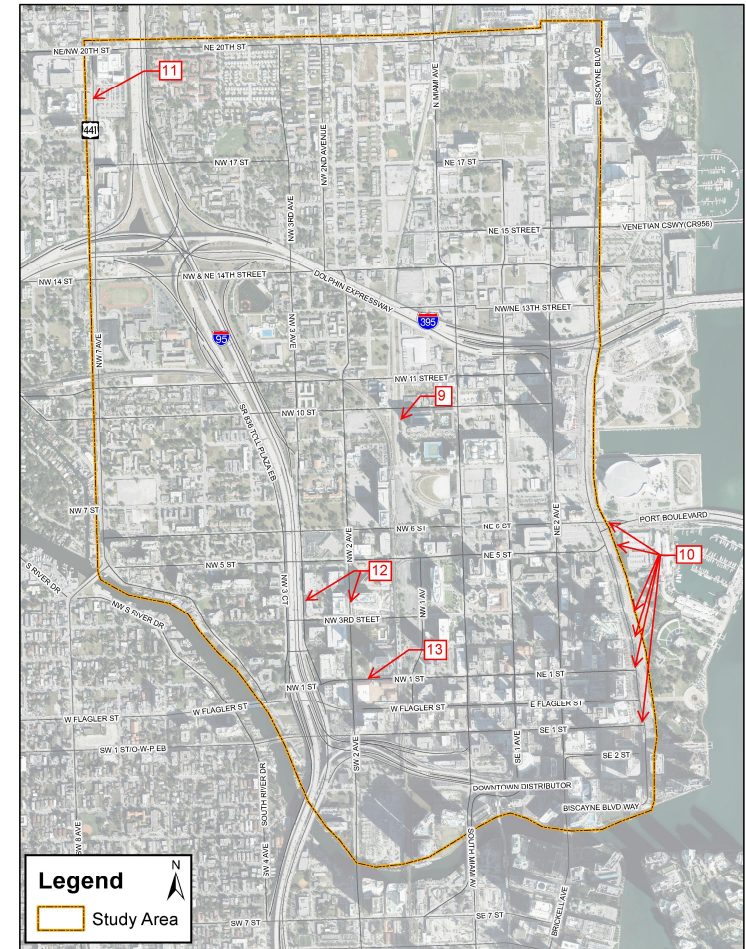
# MDT STREET SUPERVISOR INPUT

1. Bus routes turning at NE 14<sup>th</sup> St and Biscayne Blvd conflict with traffic exiting the MacArthur Causeway
2. Biscayne Blvd closings during special events result in detours to NE 1<sup>st</sup> and 2<sup>nd</sup> Avenues causing delays
3. Little activity and its relative distance to Biscayne Blvd limits use of Miami Ave as an alternate when Biscayne is closed during special events
4. Intersection at NE 1<sup>st</sup> Ave and NE 5<sup>th</sup> St is regularly blocked
5. Significant delays on NE 2<sup>nd</sup> Ave due to Brickell Avenue Bridge opening
6. On-street parking on both sides of NE 2<sup>nd</sup> Ave results in damage to buses
7. Queue of cars accessing I-95 ramps at Miami Ave and SE 1<sup>st</sup> St causes delays and conflicts with bus stop at this location
8. Pedestrian / car / transit conflicts at SW 1<sup>st</sup> St between SW 2<sup>nd</sup> Ave and SW 1<sup>st</sup> Ave



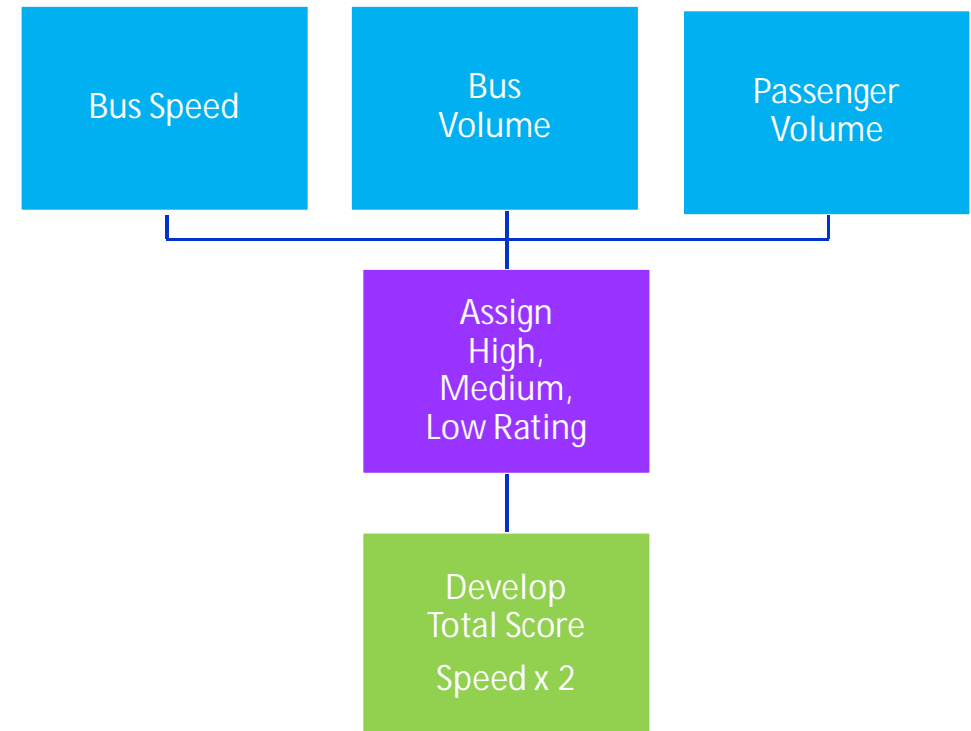
# STREET SUPERVISOR INPUT

9. Evaluate possibility of extending NW 1<sup>st</sup> Ave south of NW 10<sup>th</sup> St to provide access to Overtown Metrorail Station
10. Access to new Downtown Terminal from Biscayne Blvd will potentially require transit only designation to an east-west street (NE 6<sup>th</sup> St, NE 5<sup>th</sup> St, NE 3<sup>rd</sup> St, NE 2<sup>nd</sup> St, NE 1<sup>st</sup> St, SE 1<sup>st</sup> St)
11. On-street parking on NW 7<sup>th</sup> Ave is restricted to off-peak hours. However, not vacate on time causing conflicts
12. Critical Mass (bike event – last Friday every month) causes significant delays at NW 1<sup>st</sup> St at Government Center
13. NW 2<sup>nd</sup> Ave and NW 3<sup>rd</sup> Ave present a significant conflict for bus drivers during peak travel periods. Peak traffic coming from I-95 and presence of Law Enforcement Officers Memorial High School present challenges for bus operations.
14. More enforcement is needed downtown to prevent passenger and commercial vehicles from blocking bus stops



# ANALYSIS METHODOLOGY – HOT SPOTS

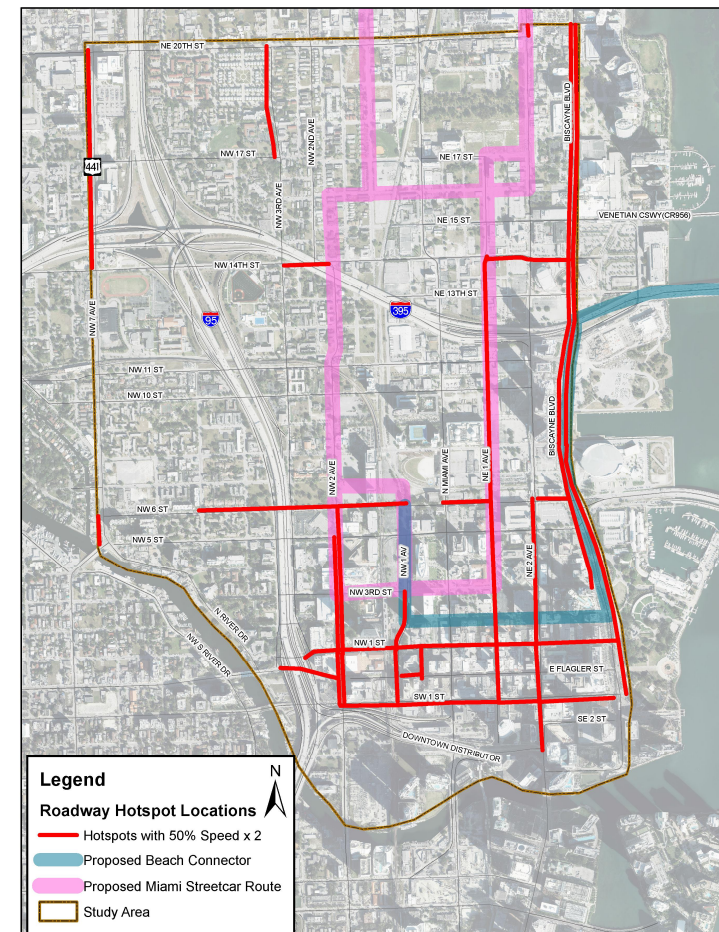
- Average during peaks of three variables
  - Bus speed (MDT only)
  - Bus vehicle volume
  - Bus passenger volume
- 50<sup>th</sup> Percentile speed given weight of x 2
- Scoring system





# HOT SPOT LOCATIONS

- North – South
  - Biscayne Blvd
  - NE / SE 1<sup>st</sup> Ave
  - NE / SE 2<sup>nd</sup> Ave
  - NW 2<sup>nd</sup> Ave
- East – West
  - NE / NW 1<sup>st</sup> St
  - SE / SW 1<sup>st</sup> St
  - NE / NW 6<sup>th</sup> St



# BUS LANE WARRANTS

## VOLUME WARRANTS FOR CURB BUS LANES

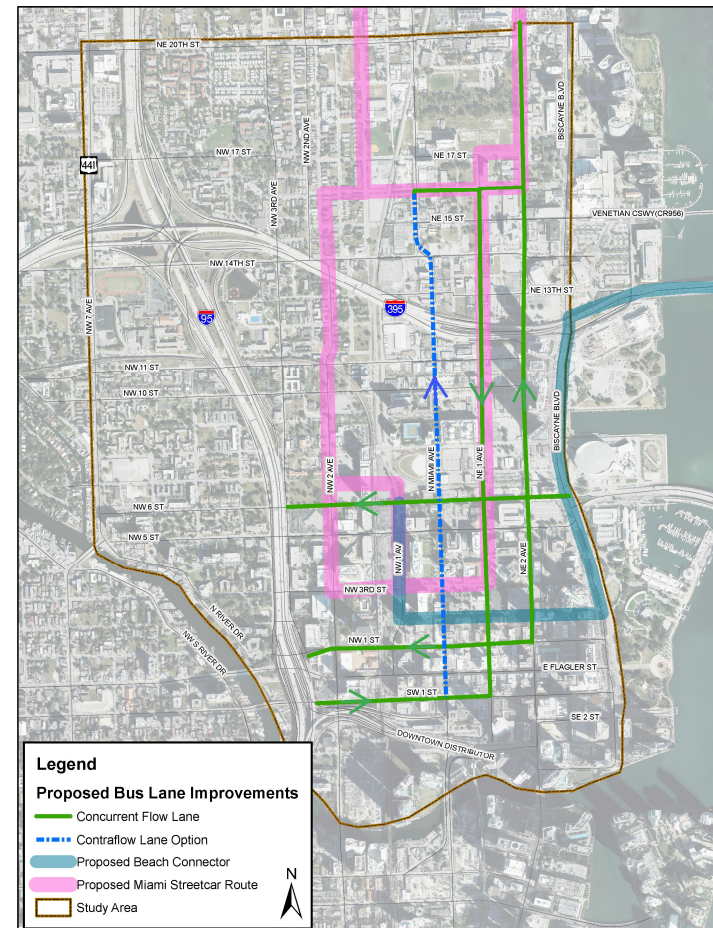
Curb Bus Lane	Minimum Daily Bus Volume	Range in One-Way Peak-Hour Volume	
		Bus	Passengers
Concurrent flow			
In CBD	200	20–30	800–1,200
Outside CBD	300	30–40	1,200–1,600
Contraflow			
Short segment	200	20–30	800–1,200
Extended segment	400	40–60	1,600–2,400

*Source: NCHRP Report 155, Table 43 (2).*

CBD = central business district.

# POTENTIAL BUS LANE IMPROVEMENTS

- Concurrent flow lane
  - NE / SE 2<sup>nd</sup> Ave
  - NE / SE 1<sup>st</sup> Ave (move streetcar operations to Miami Ave)
  - NE 6<sup>th</sup> St
  - NE 1<sup>st</sup> St
  - SE 1<sup>st</sup> St
- Contraflow lane option?
  - N Miami Ave (streetcar operations along NE 1<sup>st</sup> Ave)



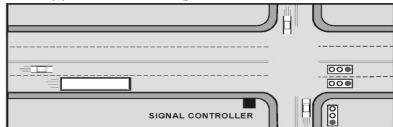
# INTERSECTION PRIORITY WARRANTS

## ■ Intersection priority warrants

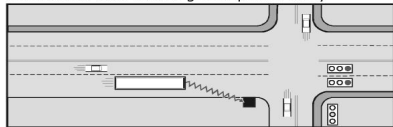
- Transit signal priority (green extension / red truncation)
  - LOS in C-D range
  - Special bus turn need

### RED TRUNCATION

Bus approaches red signal



Signal controller detects bus; terminates side street green phase early

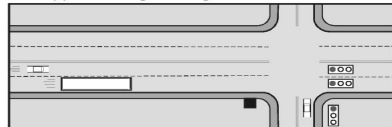


Bus proceeds on green signal

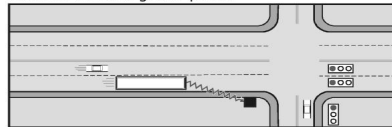


### GREEN EXTENSION

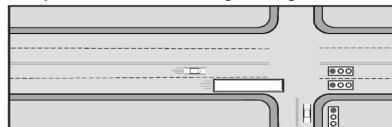
Bus approaches green signal



Signal controller detects bus; extends current green phase



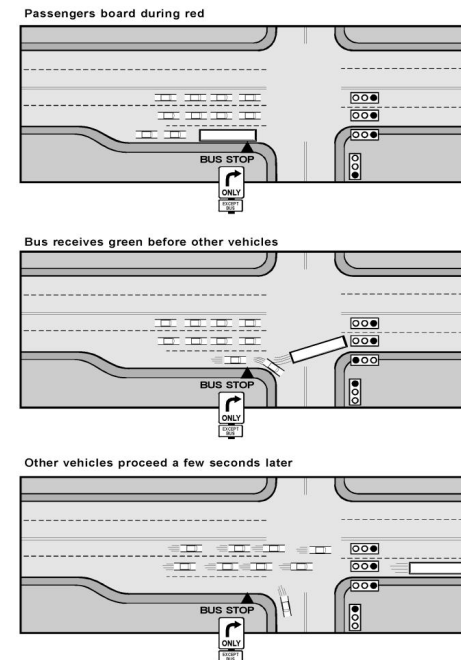
Bus proceeds on extended green signal



Source: Transit Capacity and Quality Service Manual, TCRP Report 118, 2007

## ■ Queue jump

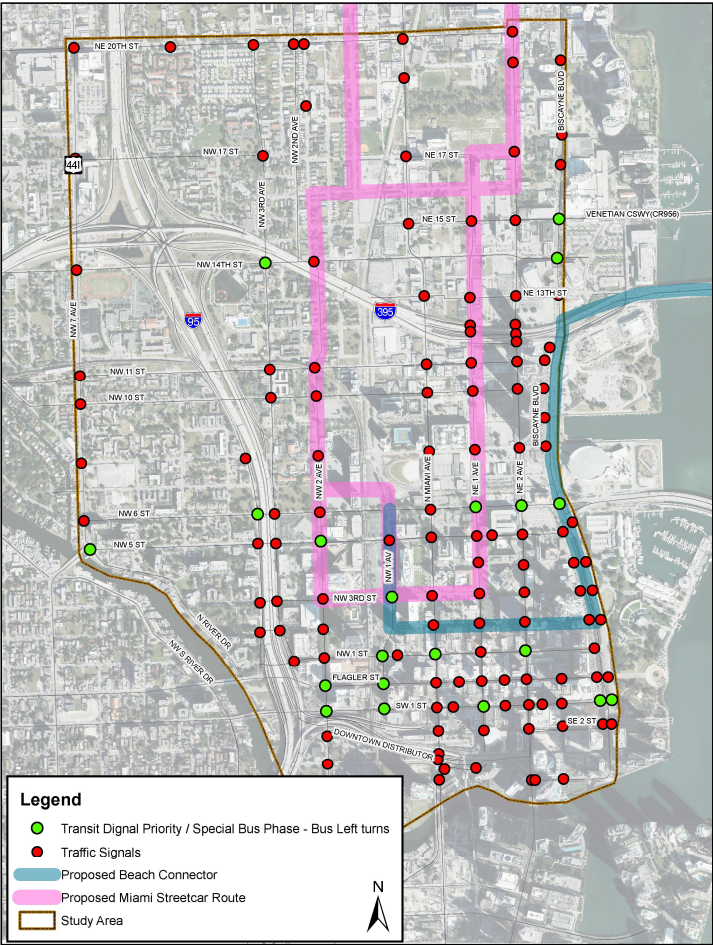
- Availability of auxiliary lane
- Green time available for special phase



Source: Transit Capacity and Quality Service Manual, TCRP Report 118, 2007



# POTENTIAL INTERSECTION PRIORITY TREATMENTS





# FURTHER EVALUATIONS

- Bus travel time savings analysis
- Intersection operations analysis
  - Queue jump / TSP impacts
- Parking / local access analysis
  - More extensive parking occupancy survey
  - Loading zone assessment
- MDT / Miami Trolley route modification assessment



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