Miami Corridor Analysis Report

For the

Beach Corridor Rapid Transit Project

Project Development and Environment (PD&E) Study

Prepared for:

MIAMI-DADE DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

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August 2018

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1 Introduction

1.1 Project Description

The Miami-Dade County Department of Transportation and Public Works (DTPW) is conducting a Project Development and Environment (PD&E) study for the Beach corridor in collaboration with the Federal Transit Administration (FTA) and Florida Department of Transportation (FDOT). A Tier One Evaluation considered six alternative technologies to provide rapid-transit connections between the Midtown Miami/Design District, Downtown Miami, and Miami Beach (**Figure 1-1**). The Tier One Evaluation studied a connection to Fifth Street/Alton Road in Miami Beach. DTPW identified the following transit technologies (modes) for consideration in the Beach Corridor Rapid Transit Project Tier One Evaluation:

- Automated guideway transit (Metromover)
- Streetcar/light rail transit
- Heavy rail transit (Metrorail)
- Bus rapid transit
- Aerial cable transit
- Monorail
- Automated transit systems

Figure 1-1 | Study Area

1.2 Project Purpose Overview

The purpose of the project is to increase the person-throughput to the Beach corridor's major origins and destinations via a rapid transit technology. Project need includes the following:

- Connect to and provide direct, convenient, and comfortable rapid-transit service to serve existing and future planned land uses
- Provide enhanced interconnections with Metrorail, Tri-Rail, Brightline, Metromover, and Metrobus routes; Broward County Transit (BCT) bus routes; Miami and Miami Beach circulators; jitneys; shuttles; taxis; Transportation Network Companies (TNCs); and/or other supporting transportation services
- Promote pedestrian- and bicycle-friendly solutions in the corridors of the study area

1.3 Project Need Overview

The Beach corridor traverses an area that is at the epicenter of population and economic growth within Miami-Dade County. The central business district (CBD) area and Miami Beach have undergone rapid population and employment increases over the past decade, a trend that is projected to continue over the next 20 years. The population densities in the study area are among the highest in the nation, with Downtown Miami (CBD) at 17,800 persons per square mile and Miami Beach at 11,500 persons per square mile, per the 2010 U.S. Census. Downtown Miami saw a dramatic 172 percent increase in population density over the last decade.

Due to the region's appealing qualities, such as its temperate climate; attractive beaches; and convenient access to the Caribbean and Latin America, South Florida, and Miami-Dade County, it has become an important tourist destination for both national and international visitors. The county hosts millions of annual visitors and seasonal residents. Visitors typically access the study area via tour bus, taxi, or rental car. Miami Beach and Downtown Miami are the two most popular locations for overnight stays, lodging 60 percent of all 2012 visitors with approximately 5.8 million and 2.4 million overnight guests, respectively. Additionally, four of the six most-visited attractions are in close proximity to the Beach corridor, including South Beach, the beaches, Lincoln Road, and Downtown Miami. The study area also contains PortMiami. In 2013, 4.1 million cruise ship passengers used the port, up from 3.4 million in 2000. This high rate of tourism generates additional demand for travel, produces additional trips within the area, and contributes to traffic and subsequently roadway congestion. The 2012 Visitor Industry Overview, a survey that reached 13.4 percent of all visitors that year, listed traffic congestion as the top negative aspect of trips to greater Miami. Traffic congestion has been the top-ranked problem in each of the last five annual surveys.

The project corridor includes three distinct segments of travel demand and origin/destination pairs: an east–west connection between Miami Beach and downtown Miami (approximately 5 miles), and a north–south connection between the Design District/Midtown and downtown Miami (approximately 3 miles); as well as Design District/Midtown to Miami Beach (approximately 8 miles).

In the east–west segment, I-195 is operating at capacity and I-395 is experiencing traffic volumes that exceed its capacity by more than 50 percent. Existing bus transit service in the east–west corridor serves more than 17,000 riders per day, with the two most frequent routes at 72 percent and 89 percent of their existing capacity, respectively.

The north–south segment is served by several local streets, operating at between 50 and 90 percent of capacity. The most frequent bus service in the north–south segment operates at 87 percent capacity, while Metromover operates at 85 percent capacity.

1.4 Tier One Analysis Results

The Tier One evaluation demonstrated that the recommended modes differ in their suitability to sub-areas of the study corridor. Four distinct segments were identified for consideration in Tier Two.

- Design District
- Downtown Miami

- Bay Crossing
- Miami Beach.

The recommended Tier Two study areas for alignment alternatives by mode are as follows:

- **Monorail:** Recommended for study of alignment alternatives in the Design District, Downtown Miami, and Bay Crossing segments.
- **Metromover:** Recommended for study of alignment alternatives in all segments (Design District, Downtown Miami, Bay Crossing and Miami Beach).
- **BRT/Express Bus:** Recommended for study of BRT and/or Express Bus from Downtown to Convention Center (with a repurposed typical section along the Causeway and a dedicated lane in Miami Beach) and Express Bus along a freeway loop alignment using I-95, I-195, I-395 in Miami and 5th street, Washington and Alton Roads in the Miami Beach segment.
- **LRT/Streetcar:** Recommended for study of alignment alternatives in the Design District, Bay Crossing, and Miami Beach segments.

1.4.1 Public Involvement in Tier 1

The Beach Corridor Rapid Transit Project public involvement effort included one agency/elected official kickoff meeting, two public kickoff meetings, several one-on-one meetings with elected officials, the City of Miami and the City of Miami Beach. During the public meetings, a conceptual alignment along North Miami Avenue from Downtown to Design District in the City of Miami was presented. In subsequent presentations to individual stakeholder groups, comments were received regarding the study of additional north/south corridor alignments instead of North Miami Avenue. At the time of an Overtown Community Advisory Board (OCAB) presentation (October 19, 2017), all technologies were being considered within all segments of the study area. A request was received by the OCAB to study the light rail at-grade option further west along NW 2nd Avenue instead of NW 1st Avenue as shown in Figure 1-1. However, as detailed above in the Tier 1 results, the light rail at-grade alignment was removed from further consideration south of I-395 due to the difficulty of introducing a new mode, that would require a dedicated lane, into already congested downtown streets. The Overtown community and the NW 2nd Avenue area is already served by Metromover, thus, any elevated Metromover extensions studied would serve this area. Results of the corridor analysis will be presented to the interested stakeholders.

Therefore, the purpose of this corridor analysis report presents the main analysis conducted for two additional corridors: NE 2nd Avenue and Biscayne Boulevard from Downtown to the Design district, in comparison to the previously studied North Miami Avenue. The corridor analysis only considered technologies recommended to proceed into Tier 2 as outlined above, further generalized as elevated (Metromover and Monorail) and at-grade (Light Rail Transit) for simplicity of evaluation.

2 Corridor Analysis

2.1 Alternate Corridor Descriptions

2.1.1 North Miami Avenue

The limits for comparison along North Miami Avenue are from just south of I-395 to north of I-195 as depicted in **Figure 2.1.** North Miami Avenue is a county-maintained roadway. From just south of I-395 to NW 17th Street, the corridor is generally a 3-lane, one-way roadway carrying vehicular traffic southbound. From NW 17th Street to just north of I-195 the corridor generally consists of a 4-lane, undivided roadway with a center, left turn lane. Concrete sidewalks, bicycle lanes, some on-street parking and street lighting exist throughout the corridor. The posted speed limit is 30-MPH.

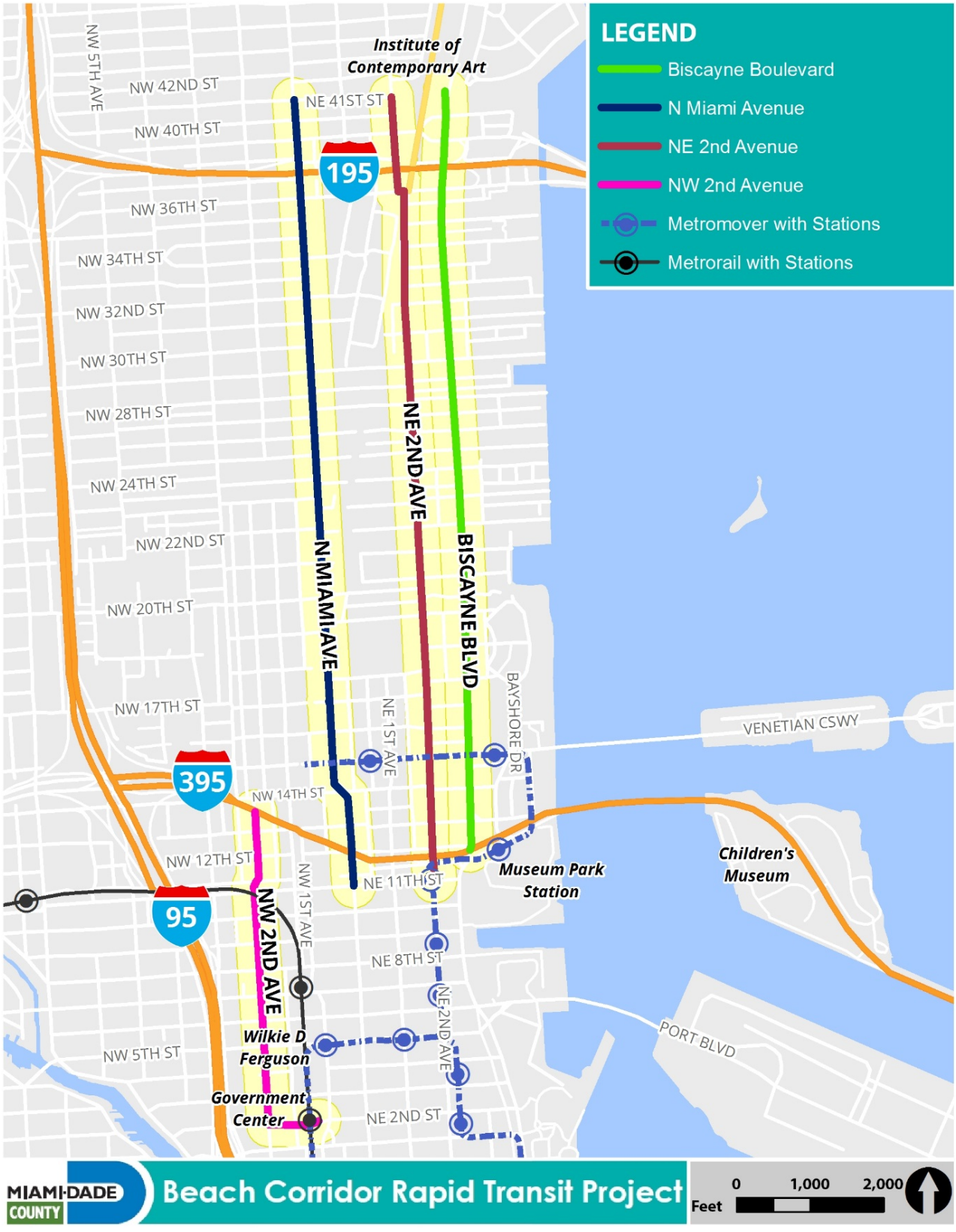


Figure 2-1 | Alternate Corridors

Notable features of this corridor include the reverse curves in the roadway alignment at the NW 14th Street intersection, the above grade crossing of the Metromover at NW 15th Street, the at-grade crossing of the Florida East Coast Railway (FEC) at NW 19th Street, extensive overhead utilities (particularly along the west side of the road), and the Shops at Midtown at the north end of the corridor.

City of Miami land uses include mostly general commercial and industrial although the corridor is experiencing extensive residential and retail redevelopment.

2.1.2 NE 2nd Avenue

The second corridor analyzed is along NE 2nd Avenue from just south of I-395 to north of I-195 as depicted in **Figure 2.1.** NE 2nd Avenue is a county-maintained roadway. The corridor generally consists of a 4-lane, undivided roadway. Concrete sidewalks and some lighting exist along the corridor. The posted speed limit is 30-MPH.

Notable features of this corridor include the above grade crossings of the Metromover just south of I-395 and at NE 15th Street, the pedestrian overpass just north of NE 15th Street, overhead utilities (particularly along the west side of the road), and segments with constrained right-of-way adjacent to the FEC at the north end of the corridor.

City of Miami land uses include general commercial, office, some mixed residential uses and industrial/institutional at the southern end.

2.1.3 Biscayne Boulevard

The third corridor analyzed is along Biscayne Boulevard (SR 5) from just south of I-395 to north of I-195 as depicted in **Figure 2.1**. Biscayne Boulevard is a part of the State Highway System (SHS) and maintained by the Florida Department of Transportation (FDOT). The corridor generally consists of a 4-lane, undivided roadway with a center, left turn lane. Wide concrete sidewalks with landscaping strips (grass or Palm trees) and some decorative street lighting exists along the corridor. The posted speed limit is 30-MPH.

Notable features of the corridor include the pedestrian overpass at the Adriene Arsht Center and the above grade crossings of the Metromover just south of I-395 and at NE 15th Street.

City of Miami land uses include mixed use and residential uses, office, some general commercial and institutional at the southern end.

2.1.4 NW 2nd Avenue

NW 2nd Avenue, as depicted in **Figure 2.1**, was considered at the request of the OCAB. NW 2nd Avenue is a county-maintained roadway. The corridor generally consists of a 2-lane, undivided roadway. Concrete sidewalks and some on-street parking exist along the corridor. The posted speed limit is 30-MPH.

The existing Metromover system is located one block to the east and runs parallel from NW 5th Street and to the south. Based on the proximity of the Metromover line along the corridor, an elevated transit alternative (Metromover, monorail) would be redundant and has not been further analyzed as part of this study. As mentioned previously, the at-grade light rail alternative is not being further considered south of I-395. Therefore, no additional analysis was conducted for NW 2nd Avenue.

2.2 Maintenance Facility Identification

2.2.1 Vehicle Maintenance and Storage Facility

For purposes of determining whether one corridor along the Miami side of the Beach Corridor conceptual alignment has more likelihood of accommodating a future vehicle maintenance and storage facility (VMSF), a preliminary assessment of potential sites was conducted. This assessment assumes that a new VMSF will be required to store, service and maintain light rail vehicles

(LRVs) for revenue service on the Beach Corridor line. If other technologies are chosen as the preferred (Metromover or Bus Rapid Transit), existing storage facilities provided by DTPW will be analyzed for accommodation of new service vehicles. The assessment is therefore for the most stringent requirement of providing a new VMSF assumption for a new technology. The VMSF would be designed to accommodate new vehicles to provide DTPW with the ability to run any LRV on any operating line segment. The VMSF will be designed and configured to handle an ultimate capacity of LRV's to be determined in the Environmental Impact Statement phase of the project and would include the following vehicle maintenance activities:

- Daily servicing (interior cleaning, sanding, and daily inspections)
- Exterior washing
- Scheduled vehicle inspections
- Unscheduled running repairs
- Component changeouts including truck removals
- Minor glass and panel replacements
- Fleet modifications and campaigns
- Major vehicle repairs, scheduled vehicle overhauls and all major component repairs and overhauls

Facilities would also be provided to accommodate the following:

- Rail Operations (Transportation)
- Materials Management
- Rail Systems Maintenance (Track, Traction Power, Signals, and Communications)
- Facilities Maintenance

A needs analysis will be performed as part of the EIS phase to develop a program of requirements for the new VSMF. It is anticipated that at a minimum the following will be required:

- One drive-through automatic exterior car washer
- Two inspection/repair pit positions with car rooftop access platforms
- Two in-ground car hoists
- One vehicle position designed to facilitate the removal and replacement of car roof level components
- Spare truck and component storage
- Some minor component repair capability
- Office and welfare areas for the Vehicle Maintenance, Operations (Transportation) and Rail Systems Maintenance departments
- Materials Management main parts storeroom for vehicle and corridor components
- A Facilities Maintenance shop and office
- Indoor parking/storage bays for specialized non-revenue vehicles (i.e., salt truck, crane trucks, boom trucks, and platform truck)
- Outdoor storage for Systems Maintenance materials
- Yard and shop substation(s)

The LRV storage tracks and the daily LRV servicing (sanding) track would accommodate three cars at a minimum. Based on current unknown fleet projections and VMSF building footprint, it is broadly estimated that a minimum site size of four acres will be necessary.

The fleet capacity and building size is to be confirmed during the preliminary engineering design phase of the project.

Site Considerations

The basic premise of site considerations is to minimize non-revenue track to access the proposed site. Based on the above assumptions four sites were identified: 1) North Miami Avenue at NE 17th Terrace; 2) Biscayne Boulevard at NE 33 street; 3) Biscayne Boulevard at NE 26 street; 4) NE 15th street and NE 1 court – school board site.

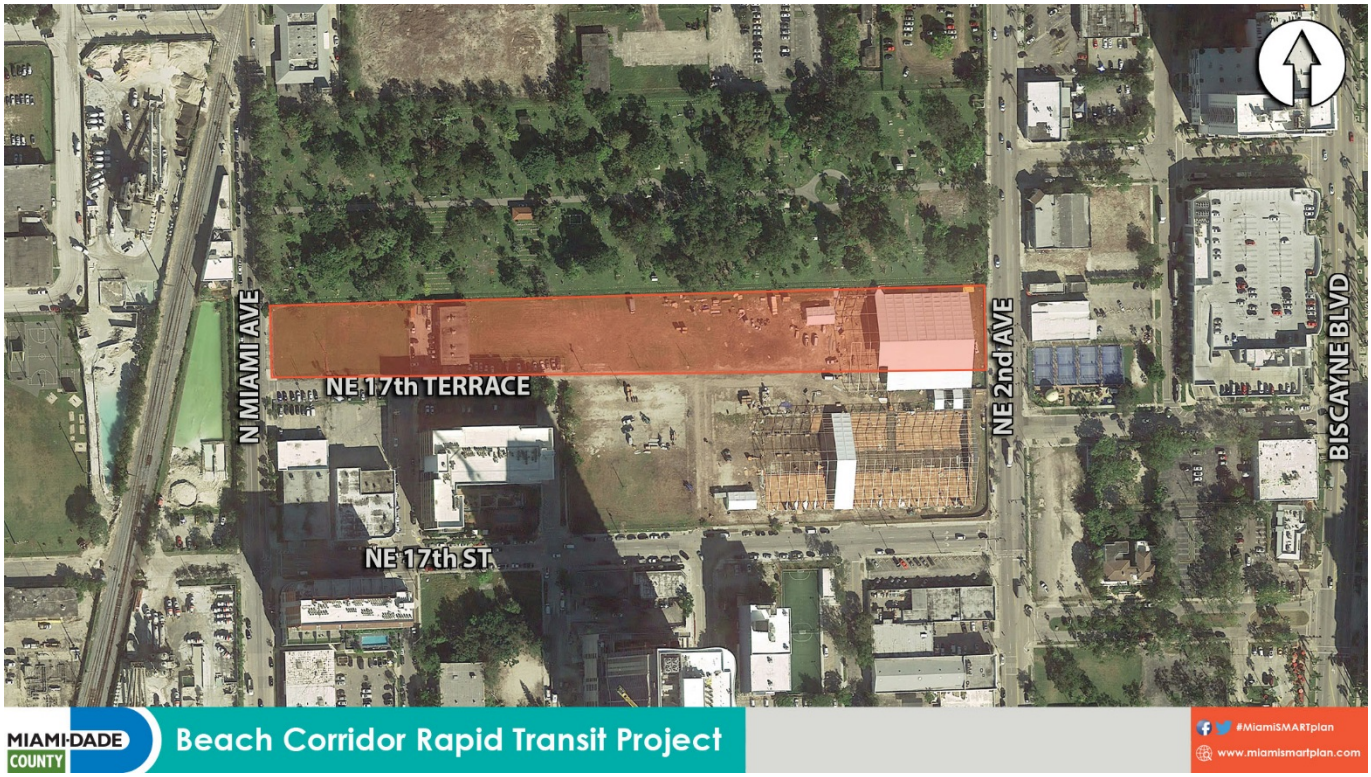


Figure 2-2 | North Miami Avenue/17th Terr.

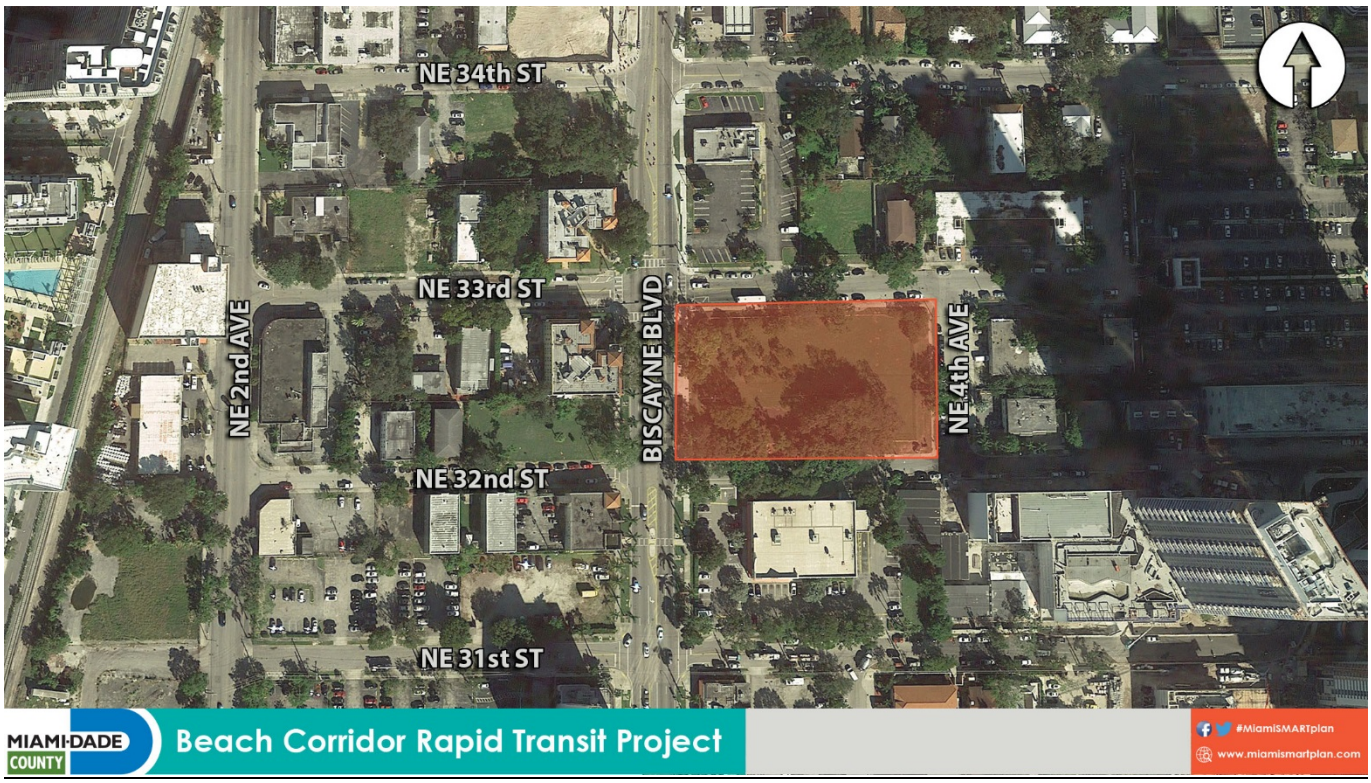


Figure 2-3 | Biscayne/33rd street

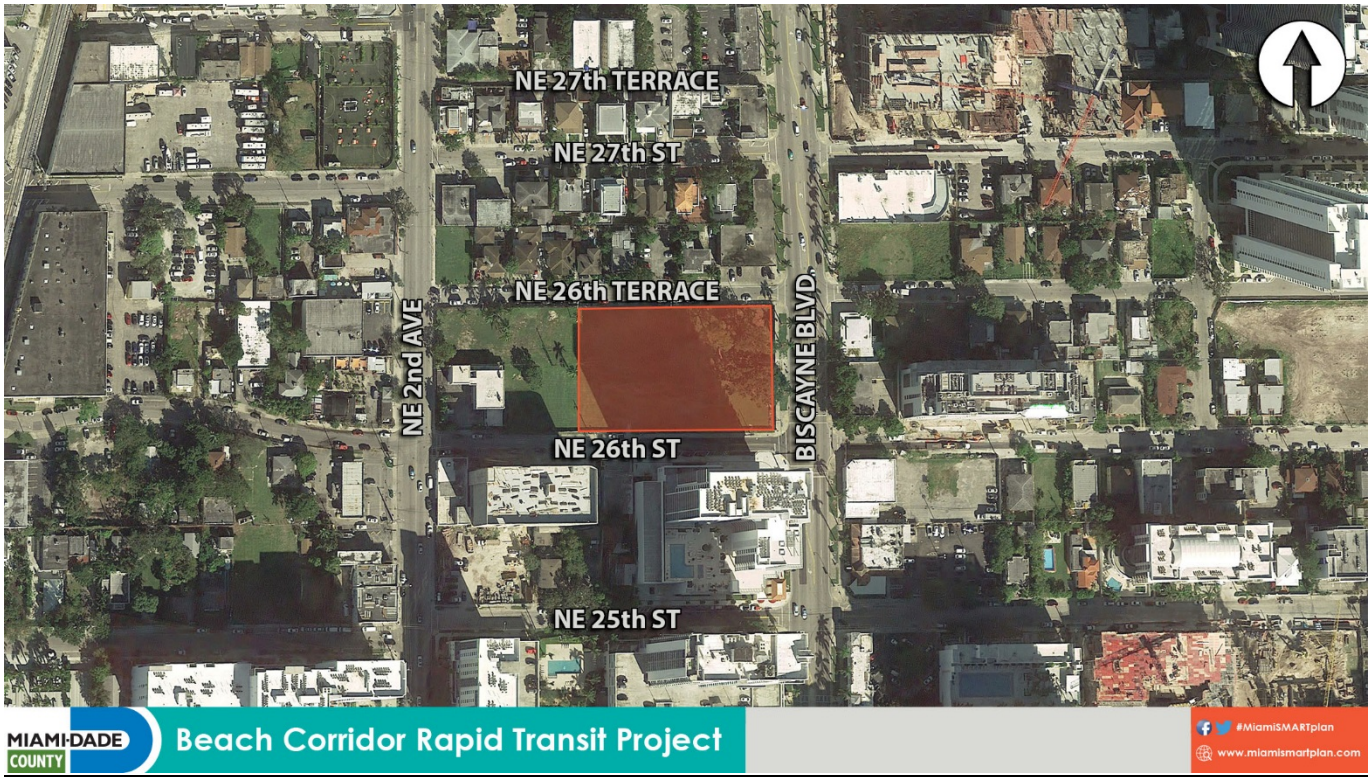


Figure 2-4 | Biscayne/26th street

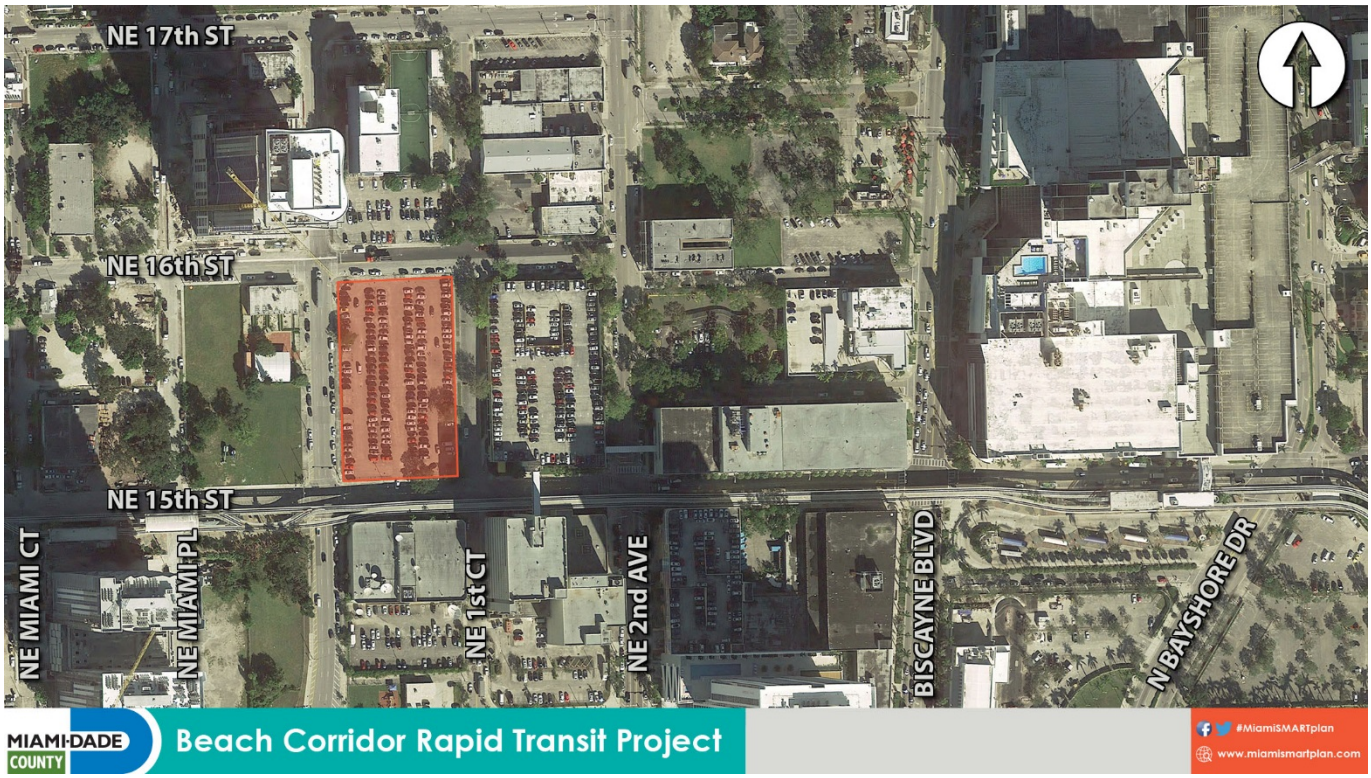


Figure 2-5 | NE 15th St/1 court

The sites identified along North Miami Avenue and NE 15th Street could accommodate service either along a NE 2nd Avenue alignment or a North Miami Avenue alignment. Several sites identified along Biscayne Boulevard would accommodate a service along this corridor. Based on this preliminary review, it appears that all three corridors can accommodate the more stringent requirement for a new VMSF on a four-acre site.

Safety and Security features to be included in the VMSF relate to fencing and CCTV cameras. Fencing options would depend on adjacent land use areas to minimize visual impacts. Noise and vibration would be associated with any proposed maintenance facility.

2.3 Existing Environmental Conditions

As part of the Beach Corridor alternatives analysis, the existing environmental conditions of the three main conceptual alternative alignments were evaluated. The desktop analysis involved downloading the most recent data layers from the Florida Geographic Data Library (FGDL) for each environmental resource and clipping the data to a buffer surrounding each alignment in ArcGIS. The buffer radius used in the analysis varied for each environmental resource and is specified in the sections below. Environmental maps depicting analysis for each resource is included in **Appendix A**.

A matrix was developed to compare the impacts and benefits to resources between the three alternatives and between an at-grade or elevated option for each alternative (**Table 2-1**). Positive impacts, or benefits were assigned a "+" and negative impacts were assigned a "-". If there was no involvement or no impact or benefit, a "0" was assigned. The following describes the findings of the desktop analysis.

2.3.1 Social and Economic

2.3.1.1 Demographics

The demographic data was obtained by conducting a search in the Efficient Transportation Decision Making (ETDM) Environmental Screening Tool (EST), using a one-quarter mile buffer for each corridor. Data was obtained from the 2016 American Community Survey. The population is greatest in the Biscayne Boulevard corridor (17,765). The median income of this area is also the highest ($71,450). This corridor also has the highest percentage of college graduates (50.63%) and the smallest percentage of housing units with no vehicle (10.14%). The North Miami Avenue corridor has the smallest population (9,417) but the largest percentage of housing units without a vehicle (24.05%). The North Miami Avenue corridor also has the lowest median household income ($36,359), the lowest percentage of college graduates (31.88%), the highest minority population percentage (84.97%) and the highest percentage of persons aged 20-64 who are disabled (10.78%). These demographic characteristics are between each of these values for the NE 2nd Avenue corridor. NE 2nd Avenue has a population of 16,740, 46.86% of which are college graduates and 72.57% are minorities. The median household income is $52,067 and 11.38% of the housing units do not have a vehicle. Based on the demographic data, the benefit to the surrounding community would be the greatest for the North Miami Avenue corridor whether the system is at-grade or elevated.

2.3.1.2 Community Facilities

The presence of community facilities in each alternative corridor was gauged using a one-quarter mile buffer. A map of these facilities is shown in **Appendix A**. Based on the data, the North Miami Avenue corridor and the NE 2nd Avenue corridor have a greater number of community facilities nearby than the Biscayne Boulevard corridor; 98 and 97 compared to 75, respectively. In comparing just the North Miami Avenue and NE 2nd Avenue corridors, it appears that there are more cultural centers (32), schools (14), group care facilities (17) and religious centers (16) within the North Miami Avenue corridor. In addition to this, the facilities appear to be closer to the project corridor in the North Miami Avenue corridor, increasing the accessibility of riders to the facilities.

There are positive benefits of increased accessibility to these facilities along both these corridors whether there is an at-grade system or an elevated system.

2.3.1.3 Mobility

Each alternative corridor provides a parallel facility to I-95 linking I-395 and I-195 providing greater accessibility to the Downtown Miami core area. Each alternative presented would also be compliant with safety and Americans with Disabilities Act (ADA) guidelines.

There are currently two Metromover stations on NE 15th Street: one is located between North Miami Avenue and NE 2nd Avenue and the second is just east of the intersection with Biscayne Boulevard. Therefore, all three alternative corridors would have access to Metromover. However, along North Miami Avenue, service will soon also be provided by the Brightline (high-speed rail), which leads to the Metrorail station on North Miami Avenue. Thus, there will be additional modes of public transit available near the North Miami Avenue corridor. For increased mobility, an elevated technology may be preferred to allow for easier connections to Metromover, higher speed and reduced travel times. Portions of the at-grade option may be in mixed traffic, resulting in delays and reduced travel times.

2.3.1.4 Aesthetics

While the aesthetical impacts of an at-grade system would be minimal for the three alternative corridors, an elevated system may cause an obstruction of view or change the viewshed. Of the three alternatives presented, the Biscayne Boulevard corridor would be aesthetically impacted the most by an elevated alternative because it has the highest residential land use percentage (18.68%) compared to that of the NE 2nd Avenue corridor (16.56%) and the North Miami Avenue corridor (15.99%). Biscayne Boulevard also has extensive landscaping that would be impacted with either an elevated alternative or overhead catenary from a light rail system. Additionally, the Biscayne Boulevard corridor is closer to Biscayne Bay, and an elevated system parallel to the waterfront is more likely to detract from the view.

2.3.1.5 Relocation Potential

The three alternative corridors are generally within the current right-of-way. Elevated options may require small right-of-way impacts for columns. However, no displacement is anticipated at this time.

2.3.2 Cultural

2.3.2.1 Historic/Archaeological

In regard to historical and archaeological features within the alternative corridors, a 300-foot buffer was used. The locations of these features can be seen in **Appendix A**. The Biscayne Boulevard corridor has the most historical resources eligible for the National Register of Historic Places (NRHP), potentially eligible for the NRHP and not evaluated by State Historic Preservation Officer (SHPO). Seven sites eligible for the NRHP, 22 potentially eligible for the NRHP and 90 not evaluated by SHPO. The North Miami Avenue corridor has the least amount of historical resources, with only four eligible for the NRHP, one potentially eligible for the NRHP and 20 not evaluated by SHPO. The resources are also generally further away from the roadway in the North Miami Avenue corridor. The NE 2nd Avenue corridor has four sites eligible for the NRHP, three sites are potentially eligible and 49 sites that have not been evaluated by the SHPO. Both the North Miami Avenue corridor and NE 2nd Avenue corridor are adjacent to the City of Miami Cemetery, which is a historical cemetery eligible for the NRHP. For this reason, an at-grade option may be preferred to reduce the possibility of damage to the cemetery due to vibration during installation of deep foundations for elevated columns.

2.3.2.2 Recreational Sites

A 200-foot buffer was used to analyze potential impacts to recreational sites (**Appendix A**). The recreational sites within the three alternative corridors include one park and three trails. Biscayne Park lies within 200 feet of the NE 2nd Avenue corridor. The only trail present within 200 feet of both the NE 2nd Avenue and the North Miami Avenue corridors is the All Aboard Florida Rail with Trail, which parallels the Florida East Coast (FEC) Railway. However, the Biscayne Boulevard corridor has two trails present within its 200-foot buffer: the M-Path Metrorail Trail and the East Coast Greenway. These trails coincide at this location. The M-Path is a 10-mile, urban trail only in Miami-Dade County underneath the Metrorail line, whereas, the East Coast Greenway is a 3,000-mile, mostly off-road trail from Key West, Florida to Calais, Maine at the Canadian border. Nonetheless, the addition of transit, whether at-grade or elevated, is not anticipated to impact any of the recreational sites.

2.3.3 Natural

2.3.3.1 Wetlands and Other Surface Waters

According to the National Wetlands Inventory, there are no wetlands present within a 200-foot buffer of the three alternative corridors presented within this report. Therefore, a 0 was assigned for each of the alternatives, at-grade or elevated.

2.3.3.2 Protected Species and Habitat

Each alternative corridor falls entirely within the United States Fish and Wildlife Service (USFWS) Consultation Areas (CA) for the West Indian manatee, piping plover, American Crocodile, Atlantic Coast Plants, and Florida Bonneted Bat. While the likelihood of protected species being in the project limits is minimal, any encounter with wildlife is deemed to have a potentially negative impact regardless of the elevated or at-grade technology selected.

2.3.3.3 Coastal

There are no coastal areas of significance within 200 feet of the three alternative corridors. The 200-foot buffer zones of the three alternative corridors are not within seagrass, mangrove or aquatic preserve areas.

2.3.3.4 Floodplains

FEMA floodplain data was evaluated for a 200-foot buffer around each alternative corridor. According to FEMA floodplain data, the entirety of the North Miami Avenue corridor lies outside of the 100-year floodplain. Only five percent of the NE 2nd Avenue corridor is within the 100-year floodplain. However, 52 percent of the Biscayne Boulevard corridor is within a 100-year floodplain, zone AE with flood depths greater than three feet during a 100-year flood. Considerations for transit within a 100-year floodplain would be required for the Biscayne Boulevard corridor, whether at-grade or elevated.

2.3.4 Physical

2.3.4.1 Noise and Vibration

Residences were considered the primary noise-sensitive receptors and community features were of secondary importance. Of the three alternative corridors, North Miami Avenue is least populated with residents within the one-quarter mile buffer evaluated; the other two alternative corridors having more than 80 percent more residents within a quarter mile of the proposed corridor. In addition, there are other community features within the proposed alternative corridors that may potentially be sensitive to noise and vibration effects such as schools, cultural centers, government buildings, healthcare facilities, parks, religious centers, recreational trails and historic resources. While the Biscayne Boulevard corridor has fewer community features, based on the

substantially lower number of residences along the North Miami Avenue corridor, the overall effect of noise and vibration is potentially lowest for the North Miami Avenue corridor.

2.3.4.2 Air Quality

The current data on the United States Environmental Protection Agency (USEPA) website indicates that the three alternative corridors are not located within a USEPA-designated Air Quality Maintenance or Non-Attainment Area. Therefore, the Clean Air Act conformity requirements do not apply at this time. While potential impacts to air quality could occur as a result of emissions from equipment and dust generated from construction activities, no permanent effects to air quality are anticipated. As such, the three alternative corridors present remain viable options in this regard, whether they are at-grade or elevated.

2.3.4.3 Contamination

Three buffers were used for the review of contaminated sites: 500 feet for contaminated sites and brownfields; 1,000 feet for non-landfill solid waste sites and a half-mile for landfills, National Priority List (NPL) and Comprehensive Environmental Response, Compensation and Liability (CERCLA) Superfund sites. Contaminated sites for the three alternatives are shown in **Appendix A**.

Regarding brownfields, the entire area, all three corridors are within the Miami Area Brownfields. Both the North Miami Avenue corridor and the NE 2nd Avenue corridor contain one brownfield site and the Biscayne Boulevard corridor also has one brownfield site within 500 feet. Regarding potential contamination sites, the North Miami Avenue corridor has seven contaminated sites compared to nine in the Biscayne Boulevard corridor and 16 in the NE 2nd Avenue corridor. There are also two solid waste sites within 1,000 feet of the NE 2nd Avenue and North Miami Avenue corridors while only one solid waste site within 1,000 feet of the Biscayne Boulevard corridor. There are no landfill, NPL or CERCLA Superfund sites within a half of a mile radius of any of the three alternative corridors.

A more detailed analysis of contamination in the existing right-of-way would be required to determine the impacts of at-grade versus elevated structures. However, it is generally believed that there would be less impact with elevated transit options due to less opportunity for conflict with contaminated sites.

Table 2-1 is a summary of the corridor evaluation from an environmental assessment perspective. As indicated, from a social and economic perspective, the North Miami Avenue corridor scored best; for the cultural and natural assessment all the corridors had similar ratings; and for the physical assessment the North Miami Avenue corridor had the potential for least impact with respect to noise and vibration.

Table 2-1 | Summary of Relative Environmental Impacts and Benefits for Each Alternative Corridor

ALTERNATIVE	N MIAMI AVENUE		NE 2ND AVENUE		BISCAYNE BOULEVARD	
	At-grade	Elevated	At-grade	Elevated	At-grade	Elevated
Social and Economic						
Demographics	+ + +	+ + +	+ +	+ +	+	+
Community Facilities	+ + +	+ + +	+ +	+ +	+	+
Mobility	+ + +	+ + + +	+ +	+ + +	+	+ +
Aesthetics	0	—	0	—	0	— —
Relocation Potential	0	0	0	0	0	0
Cultural						
Historical/Archeological Resources	—	— —	—	— —	—	— —

Table 2-1 | Summary of Relative Environmental Impacts and Benefits for Each Alternative Corridor						
ALTERNATIVE	N MIAMI AVENUE		NE 2ND AVENUE		BISCAYNE BOULEVARD	
	At-grade	Elevated	At-grade	Elevated	At-grade	Elevated
Recreational Facilities	0	0	0	0	0	0
Natural						
Wetlands and Other Surface Waters	0	0	0	0	0	0
Protected Species and Habitat	—	—	—	—	—	—
Coastal	0	0	0	0	0	0
Floodplain	0	0	0	0	—	—
Physical						
Contamination	— —	—	— —	—	— —	—
Noise	—	—	— —	— —	— —	— —
Air Quality	0	0	0	0	0	0

+, ++, +++ or ++++ = Relative Benefit

- or -- = Relative Adverse Impact

0 = No Impact or Benefit

2.4 Transportation and Ridership Analysis

2.4.1 Land Use Capture analysis

The study corridor consists of two segments, a north-south connection between the Design District and Downtown Miami, and an east-west connection between Downtown Miami and Miami Beach. For the north-south segment, alternative alignments along three parallel corridors were evaluated to enable maximum transit benefit to this area: NE 2nd Avenue, North Miami Avenue, and Biscayne Boulevard.

The parallel corridor alternatives have quite different levels of population and employment density today and are anticipated to continue to do so in the future as indicated in **Table 2-2** and **Table 2-3** below. It should be noted that the data here (population and employment estimates by traffic analysis zone [TAZ] prepared by Miami-Dade County for transportation modeling purposes) differs slightly from that used earlier in Section 2.3.1.1 which accessed through FDOT's Environmental Screening Tool and originates from the Census's American Community Survey which includes more information on income and education etc. does not include employment. Additionally, the polygons used to query the data are station-based walk buffers as opposed to ¼ mile offset from the corridor centerline.

Miami Avenue currently has the lowest densities of both population and employment; the relative 2015 population densities along NE 2nd Avenue are 60 percent higher than North Miami Avenue, and for Biscayne Boulevard they are 100 percent higher than Miami Avenue, making Biscayne Boulevard the most productive location for a major transit investment based on existing conditions.

Table 2-2 | Station Area Demographics – ¼ mile station catchment area						
	North Miami Avenue		NE 2nd Avenue		Biscayne Boulevard.	
	2015	2040	2015	2040	2015	2040
Population	8,700	20,500	13,600	36,700	20,600	49,200
Employment	6,300	8,600	9,100	12,800	9,900	13,700
Relative Density	1.0x		1.6x		2.0x	

Table 2-3 | Growth – 2015 to 2040			
	North Miami Avenue	NE 2nd Avenue	Biscayne Boulevard.
Population	+136%	+170%	+139%
Employment	+38%	+40%	+40%

When looking at the growth for the three corridors from 2015 to 2040, NE 2nd Avenue demonstrates the greatest future potential relative to today, but Biscayne Boulevard will remain the largest potential market for transit trips – due essentially to the large condominium buildings along and to the east of the roadway. The relative growth along North Miami Avenue is the smallest, but only marginally lower than for Biscayne Boulevard.

2.4.2 Transportation Analysis

In addition to a review of demographic conditions and growth (above), additional factors were reviewed to evaluate the relative attractiveness of the three alternate corridors,

- Travel conditions including posted speed and congestion based on peak period travel speed, and
- Ridership potential

Travel Conditions on the existing network do not apply to elevated modes that operate in a dedicated guideway, but are relevant to surface modes i.e. light rail/streetcar and bus/BRT if those are to operate in a mixed traffic scenario. For the purposes of this study, the at-grade modes are assumed to operate in a dedicated lane, but there may be localized segments where mixed traffic operation is required for overall transportation network optimization.

Table 2-4 below indicates the average peak period (7-9 am and 4-6 pm) travel speeds by direction for North Miami Avenue and Biscayne Boulevard based on 2017 HERE traffic probe data obtained through the National Performance Measures Research Data Set (NPMRDS[1]).

Figure 2-6 on the following page shows relative speeds by direction and time of day for these two roads in the study segments. NE 2nd Avenue is not covered under the HERE data set.

Table 2-4 | Corridor Speeds					
	North Miami Avenue		NE 2nd Avenue	Biscayne Boulevard.	
Posted speed (mph)	30		30	30	
Direction	SB	NB		SB	NB

[1] https://npmrds.ritis.org/analytics/

Peak period travel speed	15	13	n/a	16	8

As indicated, there is not a great deal of difference in the travel conditions along the three corridors based on these data. The greatest differential is that Biscayne Boulevard operates five miles per hour slower than North Miami Avenue during the afternoon peak in the northbound direction. During the morning peak period, Biscayne Boulevard operates one mile-per hour faster than North Miami Avenue southbound. Posted speeds are the same for each corridor. These data points do not point to any great benefit of one alternative roadway over another.

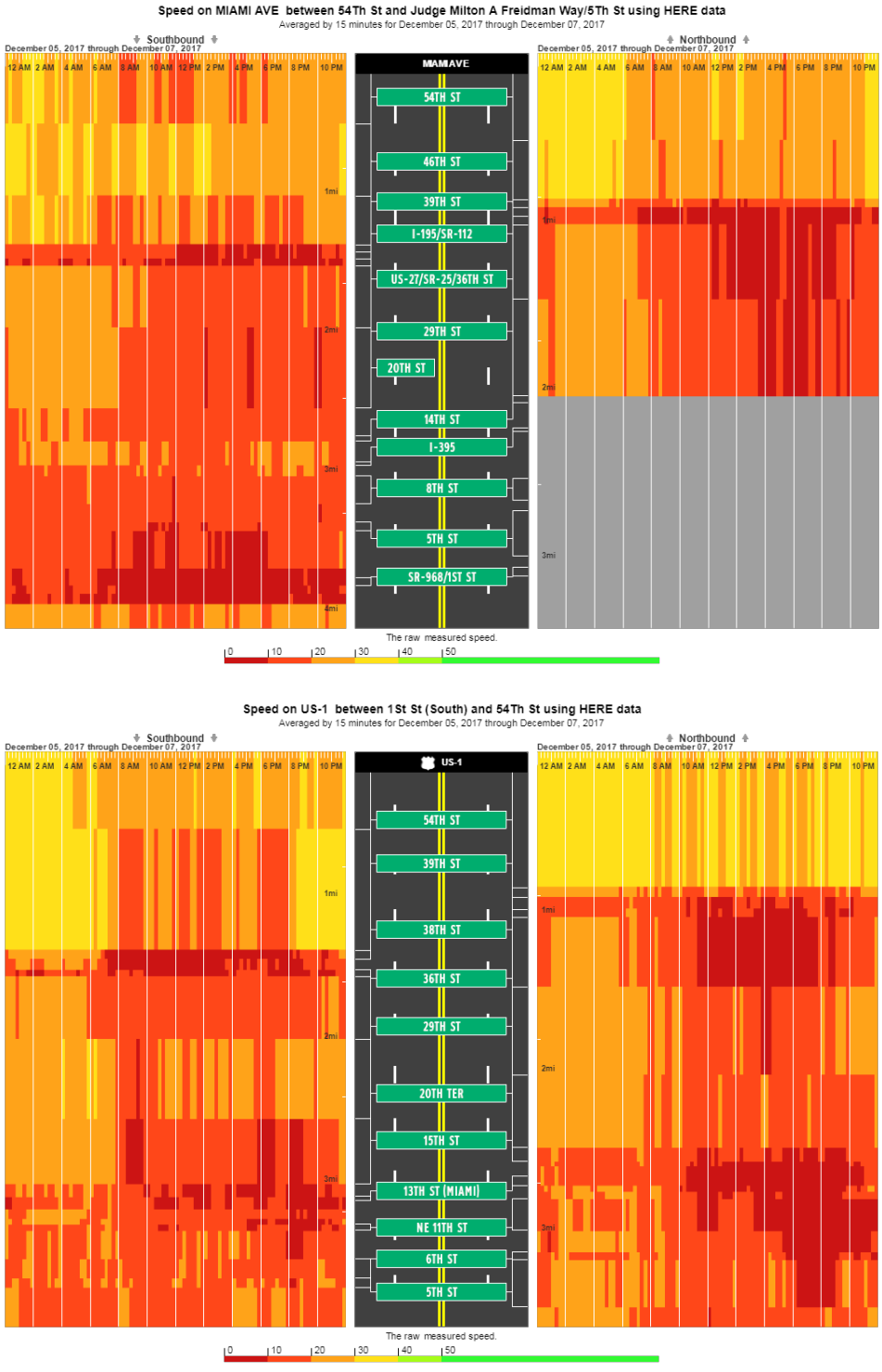


Figure 2-6 | Comparison of Weekday Travel and Speeds by Time and Direction

2.4.3 Ridership potential

To evaluate the differential in transit ridership potential between the three alternate corridors, the study team used the Federal Transit Administration's Simplified Trips on Project Software or STOPS model[2]. The FDOT has developed a Southeast Florida STOPS planning model for fixed guideway transit projects in the three-county region[3] and this was used for this task.

Results of the STOPS model analysis for current year conditions are shown in **Table 2-5** below.

Table 2-5 | Forecast Daily Ridership – Current Year

	North Miami Avenue	NE 2nd Avenue	Biscayne Boulevard.
Ridership	11,200	10,700	11,400

To ensure an apples-to-apples comparison, light rail transit was assumed in this application. Six stations were assumed along each of the three corridors, at roughly the same cross-streets e.g. N 36th Street.

As indicated in **Table 2-5,** there is very little difference in forecast ridership between the three alternatives. Despite its lower population density, North Miami Avenue has a higher ridership projection than NE 2nd Avenue, and only marginally lower than Biscayne Boulevard. This is influenced by two factors: North Miami Avenue currently has no bus service where the other alternatives have at least two, and the distance between the three corridors is relatively small, making walking between them feasible. The forecasts produced here assumed no changes to existing bus service – this is consistent with the preliminary forecast methodology used for other SMART Plan corridors.

In summary, from a transportation and ridership perspective, the Biscayne Boulevard corridor has the higher existing population and employment density, but all three corridors will experience significant growth between 2015 and 20140 due to their proximity to existing transit and the Miami Central Business District.

2.5 Engineering Analysis

2.5.1 Typical Sections

Existing and proposed typical sections for the three corridors appear in **Figure 2-7** - **Figure 2-15**. Proposed typical sections for the at-grade and elevated alternatives were developed to minimize impacts along the corridors and adhere to American Association of State Highway and Transportation Officials (AASHTO) and FDOT roadway design criteria.

Each corridor was evaluated for the potential impacts of implementing the proposed typical sections. Impacts to right-of-way, businesses and/or building structures, utilities, number of vehicular travel lanes, on-street parking, alignment geometry and landscaping were considered. A matrix was developed for each corridor to detail the proposed impacts (see **Appendix B**). A photo log supplements the matrices, providing an image of the specific impacts listed in the matrices (see **Appendix C**). As indicated previously, due to the at-grade LRT alternative no longer being considered south of I-395 and the proximity of existing Metromover, there was no analysis of the NW 2nd Avenue corridor to this level of detail.

North Miami Avenue

At-Grade LRT: As shown in Figure 2-8, the proposed LRT typical section eliminates one lane of travel in each direction as well as all on-street parking. Minor reductions in sidewalk width would also occur. This typical section shows bike lanes which is consistent with the TPO's Bike Lane Master Plan for this corridor.

Elevated (Metromover / Monorail): Figure 2-9 shows the elevated alternative along the east side of the corridor. Where the support columns of the guideway are located, the existing sidewalk width would be reduced. This figure shows a column with 6-ft diameter

[2] https://www.transit.dot.gov/funding/grant-programs/capital-investments/stops-%E2%80%93-documentation-and-software
[3] http://www.fsutmsonline.net/index.php?/user_groups/comments/sefl_stops_planning_model/

which is consistent with the columns for the existing Metromover system. No vehicular travel lanes are eliminated. On-street parking would be impacted at the locations where the guideway columns are placed. The number of parking spaces impacted would depend on the column spacing and side of the street on which the guideway is located. This typical section shows bike lanes which is consistent with the TPO's Bike Lane Master Plan for this corridor.

NE 2nd Avenue

At-Grade LRT: As shown in Figure 2-11, the proposed LRT typical section eliminates one lane of travel in each direction. Minor reductions in sidewalk width would also occur.

Elevated (Metromover / Monorail): Figure 2-12 shows the elevated alternative along the east side of the corridor. Where the support columns of the guideway are located, the existing sidewalk width would be reduced. This figure shows a column with 6-ft diameter which is consistent with the columns for the existing Metromover system.

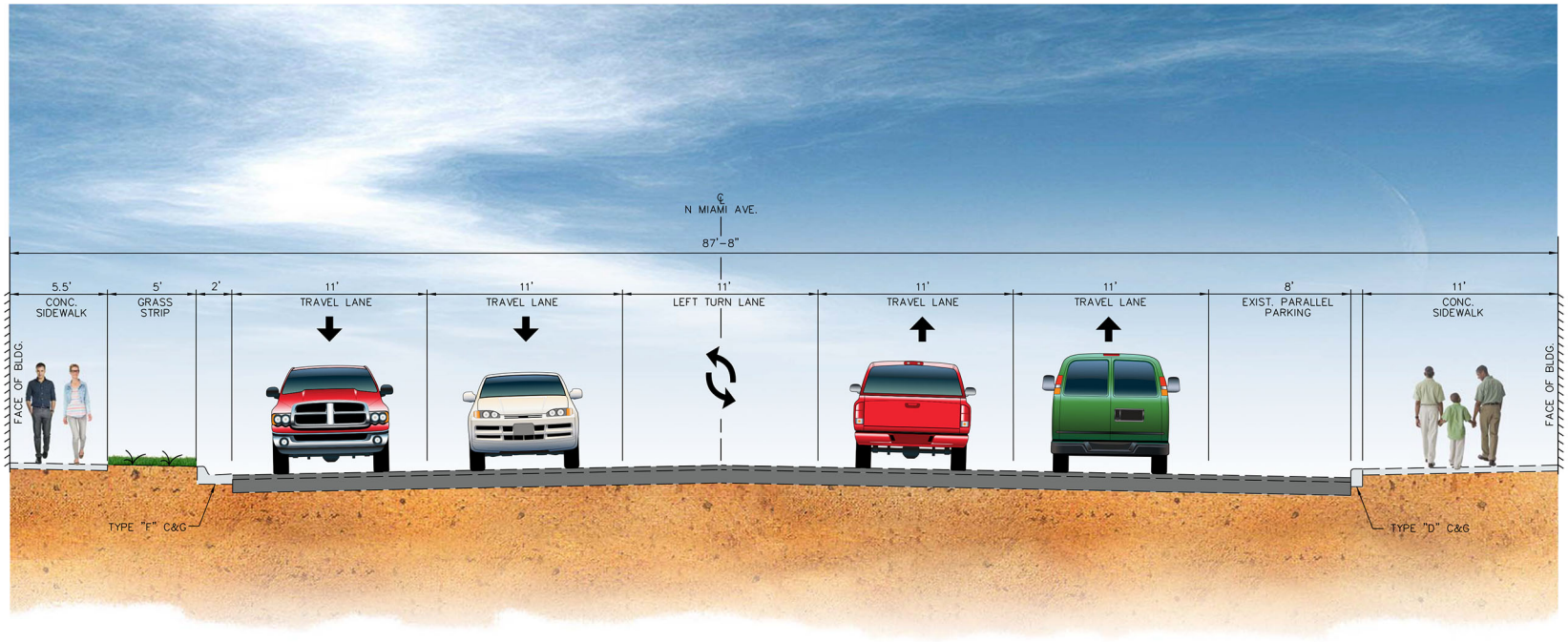
Biscayne Boulevard

At-Grade LRT: As shown in Figure 2-14, the proposed LRT typical section does not reduce the number of vehicular travel lanes, but eliminates the landscaping along the sidewalks. The wide sidewalks along this corridor are reduced be several feet.

Elevated (Metromover / Monorail): Figure 2-15 shows the elevated alternative along the east side of the corridor. Where the support columns of the guideway are located, the existing sidewalk width would be reduced. This figure shows a column with 6-ft diameter which is consistent with the columns for the existing Metromover system. The landscaping below the guideway would be impacted.

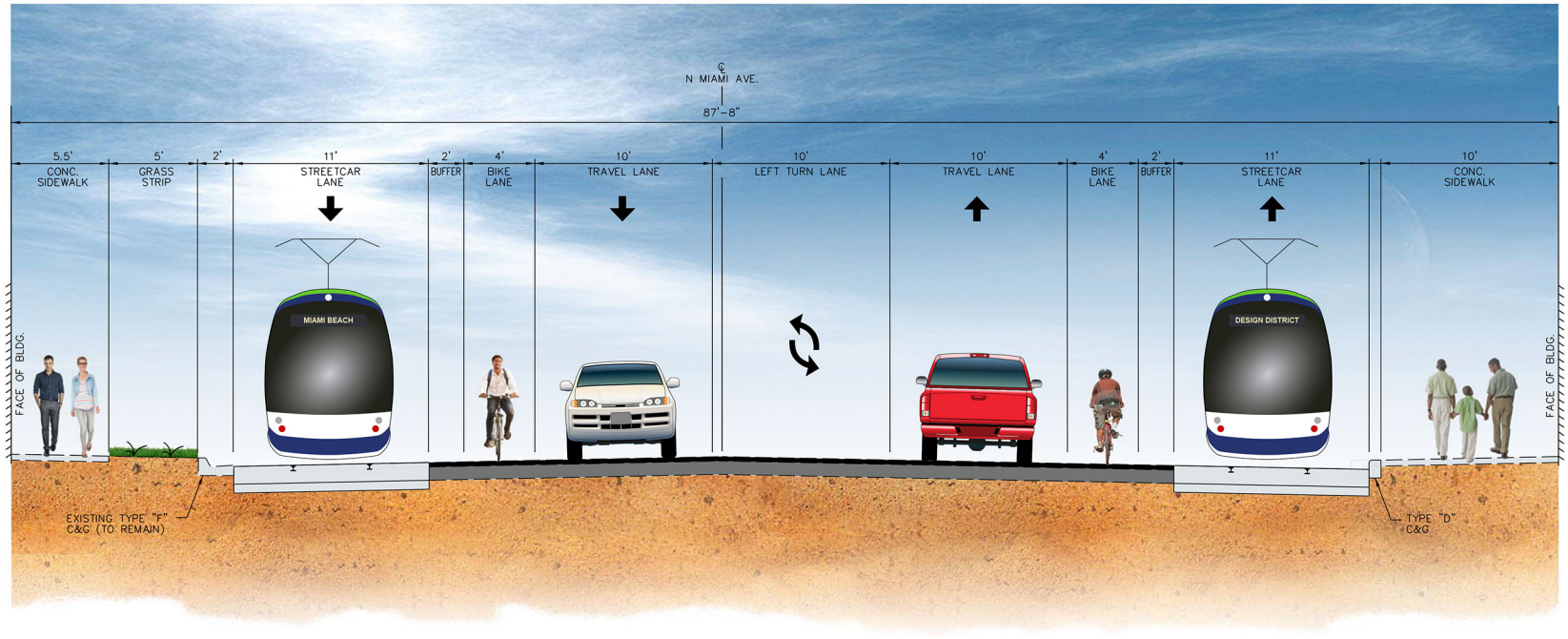
2.5.2 Potential Cost Assessment

An estimate of the capital cost of implementing an at-grade and elevated transit mode along each corridor was analyzed using impact matrices **(see Appendix B).** The ability to construct a transit mode within a corridor is correlated to the number of anticipated impacts. In general, as the number of impacts increases, cost increases. Property acquisition and utility relocations were the costliest impacts. North Miami Avenue and Biscayne Boulevard are the only corridors that may require minimal purchase of additional right-of-way to accommodate the proposed transit modes. NE 2nd Avenue had the most engineering and right-of-way challenges.



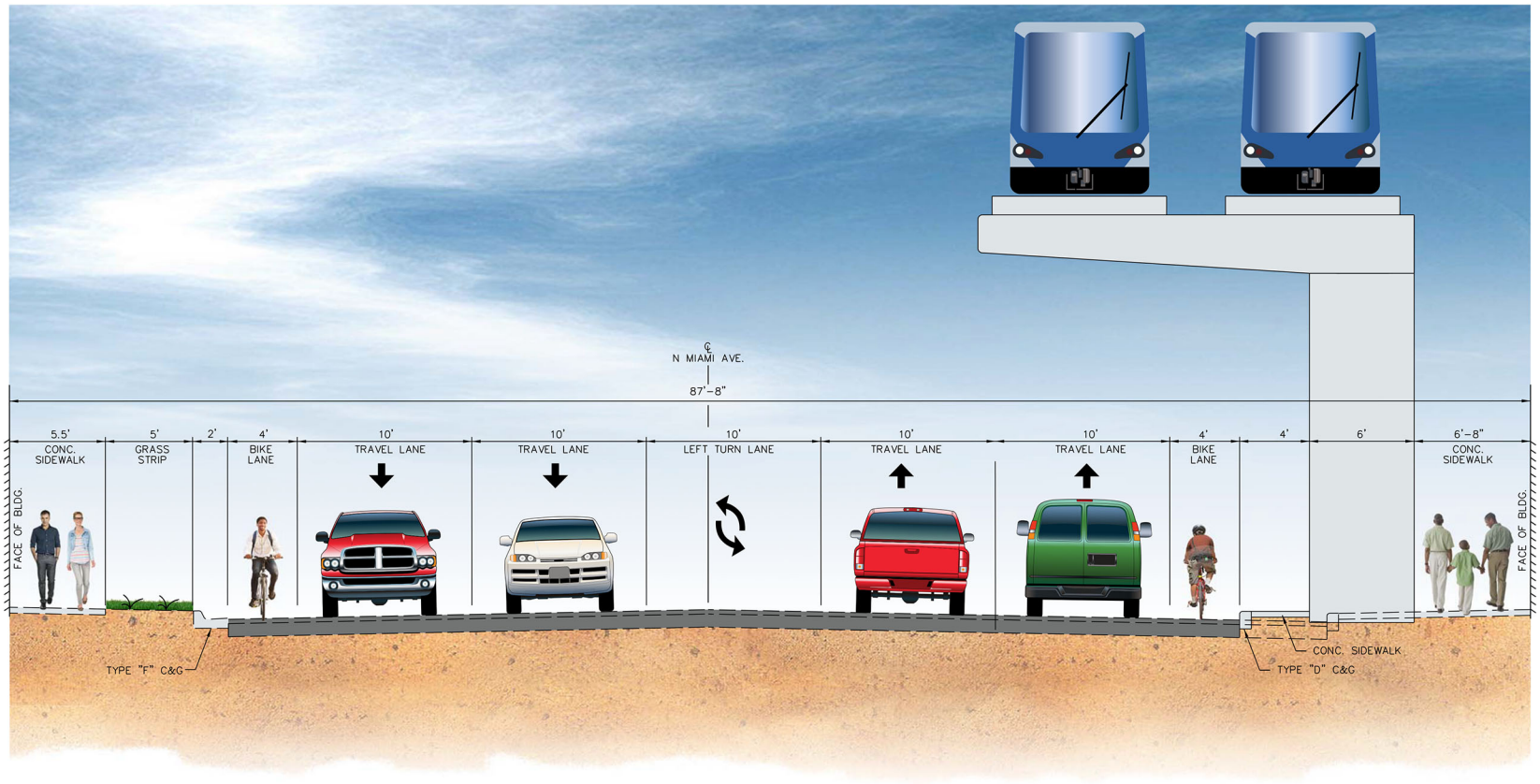
Existing Typical Section - North Miami Avenue
(just south of NW 33rd Street)

Figure 2-7 | Existing Typical Section of North Miami Avenue



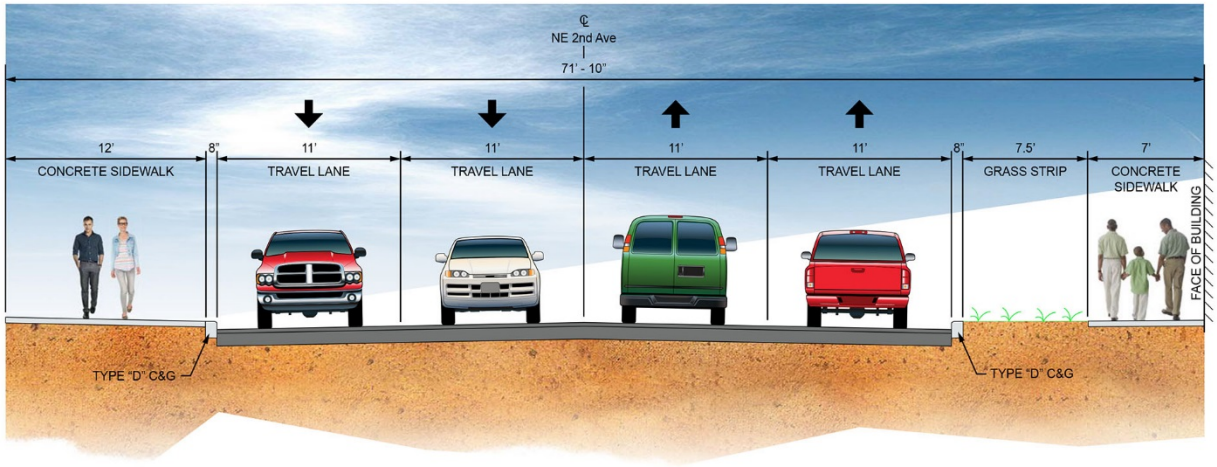
Proposed Typical LRT Section - North Miami Avenue
(just south of NW 33rd Street)

Figure 2-8 | Proposed Typical LRT Section on North Miami Avenue



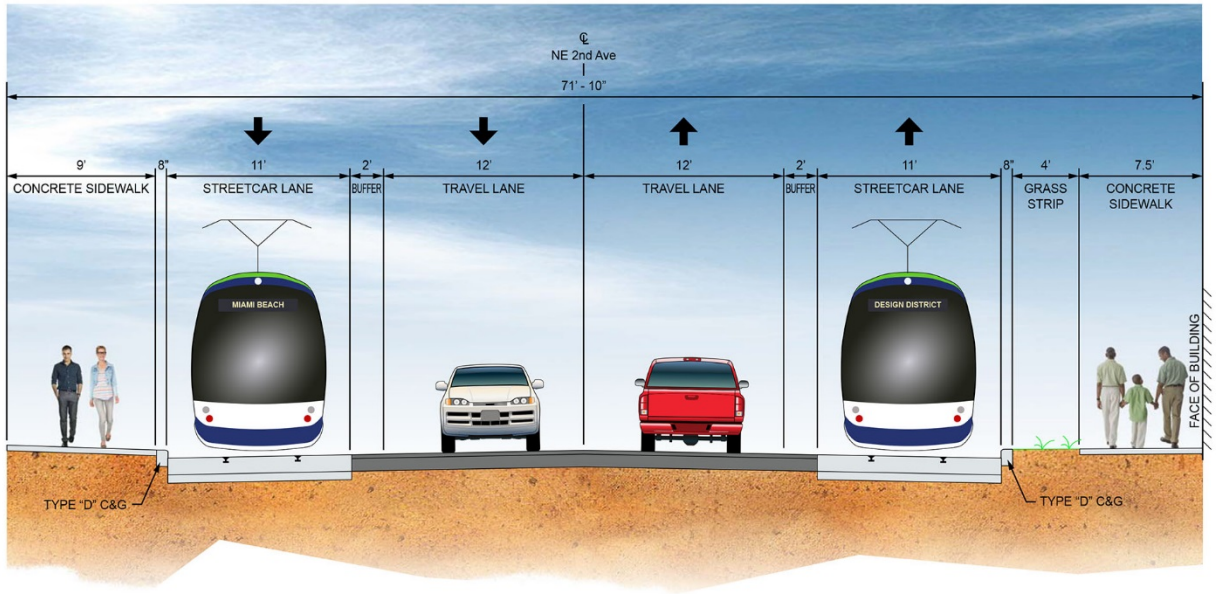
Proposed Typical Metromover Section - North Miami Avenue
(just south of NW 33rd Street)

Figure 2-9 | Proposed Typical Metromover Section on North Miami Avenue



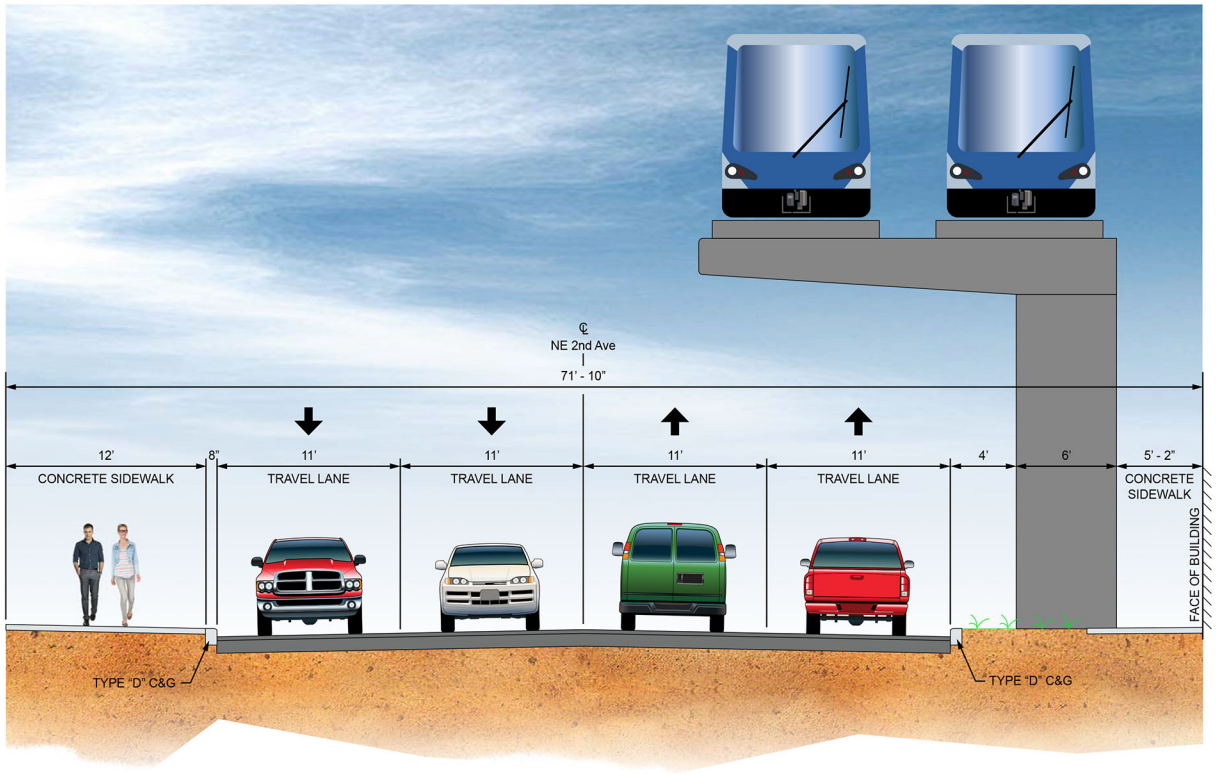
Existing Typical Section - NE 2nd Avenue
(just south of NE 21st Street)

Figure 2-10 | Existing Typical Section of NE 2nd Avenue



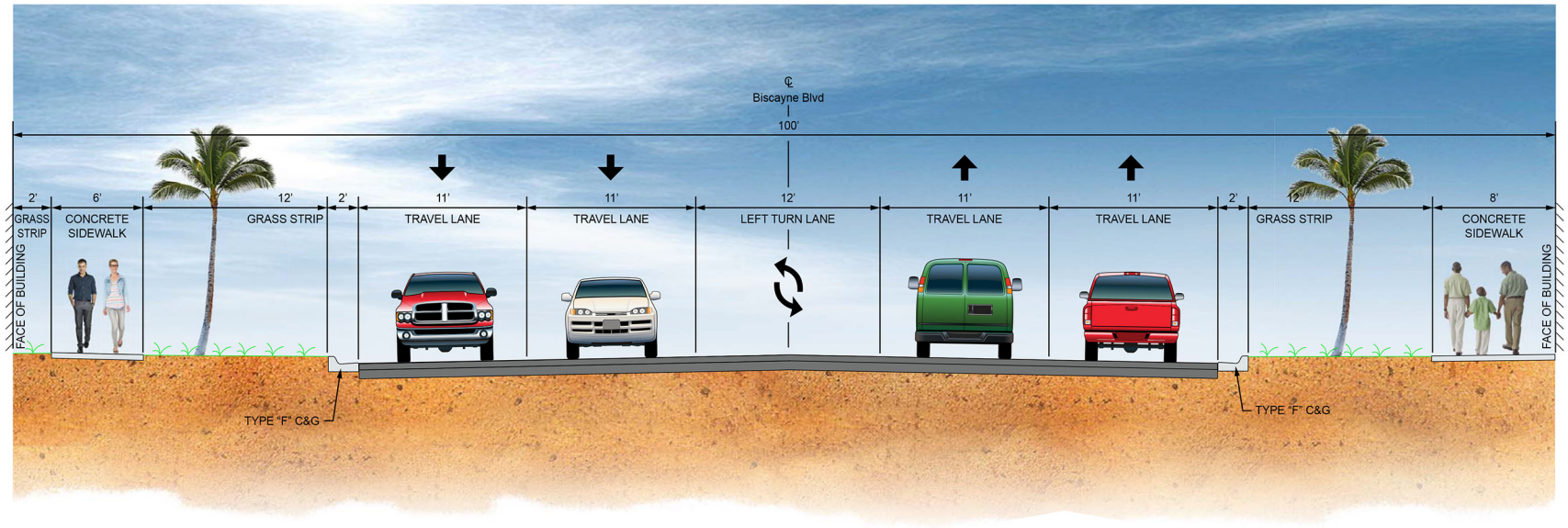
Proposed Typical Section - NE 2nd Avenue
(just south of NE 21st Street)

Figure 2-11 | Proposed Typical LRT Section on NE 2nd Avenue



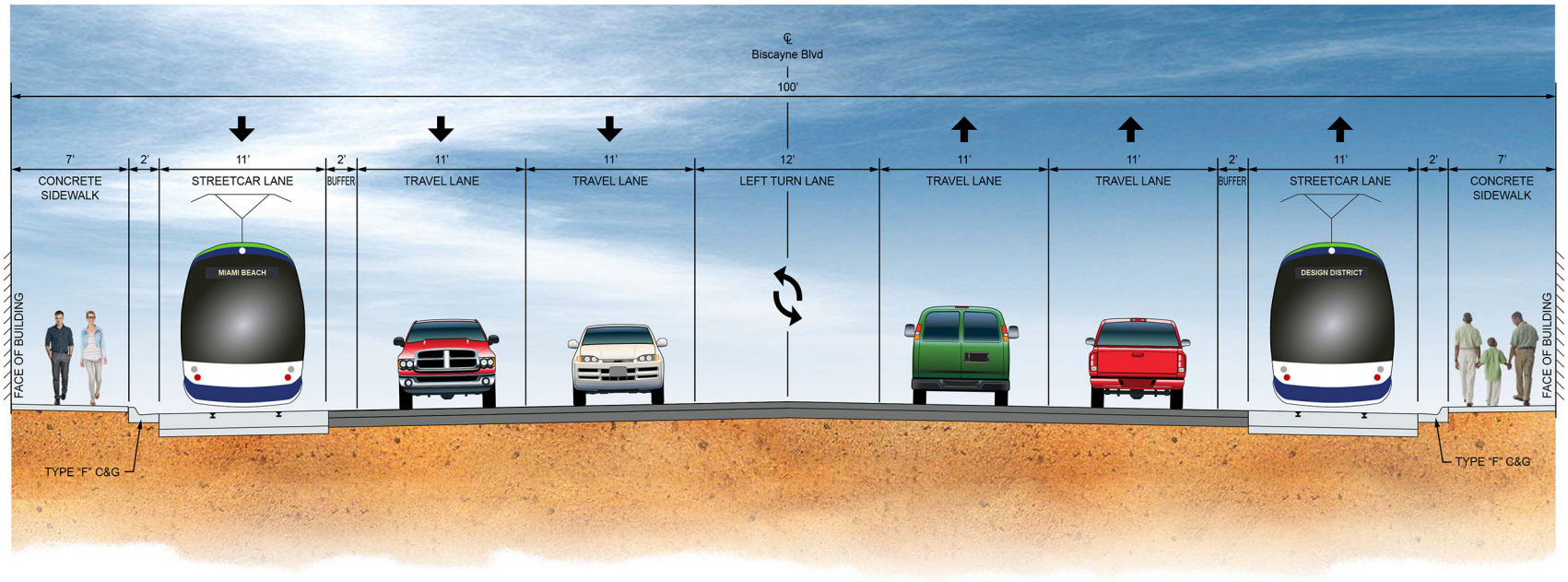
Proposed Typical Section - NE 2nd Avenue
(just south of NE 21st Street)

Figure 2-12 | Proposed Metromover Typical Section on NE 2nd Avenue



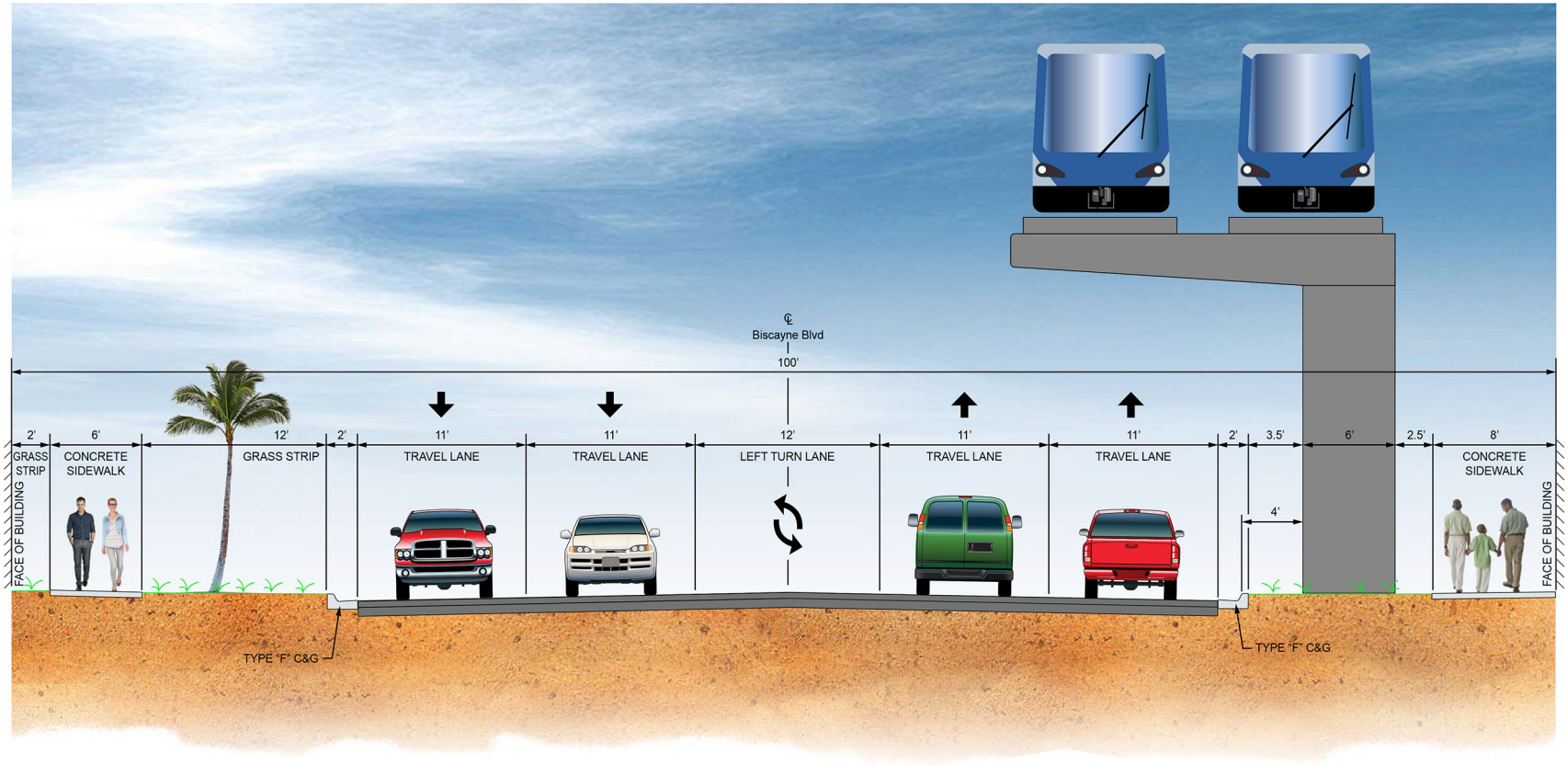
Existing Typical Section – Biscayne Boulevard
(just south of NE 30th Street)

Figure 2-13 | Existing Typical Section of Biscayne Boulevard



Proposed Typical Section – Biscayne Boulevard
(just south of NE 30th Street)

Figure 2-14 | Proposed LRT Typical Section on Biscayne Boulevard



Proposed Typical Section – Biscayne Boulevard
(just south of NE 30th Street)

Figure 2-15 | Proposed Metromover Typical Section on Biscayne Boulevard

2.5.3 Feasibility

For purposes of assessing engineering feasibility, corridor alignments were reviewed (see **Figure 2-16** - **Figure 2-21)**. In general, for the at-grade transit options, it was assumed that a vehicular lane for dedicated transit would be required. The feasibility of implementing either transit mode along a corridor is greatly influenced by right-of-way constraints, impacts to vehicular travel, parking, utilities and geometric constraints.

The following sections detail these factors for each corridor and transit option (at-grade / elevated).

2.5.3.1 Right-Of-Way

North Miami Avenue

At-Grade LRT: Right-of-way acquisition not anticipated.

Elevated (Metromover / Monorail): Right-of-way acquisition not anticipated.

NE 2nd Avenue

At-Grade LRT: Right-of-way acquisition anticipated. The existing right-of-way along NE 2nd Avenue varies from roughly 60-FT to 90-FT.

Elevated (Metromover / Monorail): Right-of-way acquisition anticipated. The elevated transit option would require the purchase of additional right-of-way at two locations (between NE 25th Street and NE 27th Street, between NE 34th Street and NE 35th Street).

Biscayne Boulevard

At-Grade LRT: Right-of-way acquisition not anticipated.

Elevated (Metromover / Monorail): Right-of-way acquisition not anticipated.

2.5.3.2 Vehicular Travel Lanes

North Miami Avenue

At-Grade LRT: It is anticipated that one (1) vehicular travel lane in each direction will be eliminated.

Elevated (Metromover / Monorail): No vehicular travel lanes are to be eliminated. Existing lane widths to be reduced.

NE 2nd Avenue

At-Grade LRT: It is anticipated that one (1) vehicular travel lane in each direction will be eliminated.

Elevated (Metromover / Monorail): At three (3) locations a vehicular travel lane would be eliminated if additional right-of-way is not acquired.

Biscayne Boulevard

At-Grade LRT: No vehicular travel lanes would be eliminated. Assuming existing landscape buffer would be repurposed for transit.

Elevated (Metromover / Monorail): No vehicular travel lanes would be eliminated.

2.5.3.3 Parking

North Miami Avenue

At-Grade LRT: Elimination of all on-street parking is anticipated.

Elevated (Metromover / Monorail): Elimination of some on-street parking is anticipated. On-street parking would be impacted at the locations where the guideway columns are placed. The number of parking spaces impacted would depend on the column spacing and the side of the street on which the guideway is located.

NE 2nd Avenue

At-Grade LRT: Limited on-street parking exists along this corridor, the majority of which is located south of NE 17th Street. It is anticipated that these spaces will be eliminated.

Elevated (Metromover / Monorail): No impacts to on-street parking anticipated.

Biscayne Boulevard

At-Grade LRT: There is no on-street parking along this segment of the corridor, therefore, no impacts to parking.

Elevated (Metromover / Monorail): There is no on-street parking along this segment of the corridor, therefore, no impacts to parking.

2.5.3.4 Utilities

North Miami Avenue

At-Grade LRT: Impacts to underground and overhead utilities are anticipated.

Elevated (Metromover / Monorail): Numerous impacts to overhead utilities are anticipated. Impacts to utilities will vary based on the location of the elevated guideway (left or right side of street). Frequent shifts in the horizontal alignment of an elevated guideway would be required to avoid impacting some utilities, however such an alignment would come at an increased cost of construction.

NE 2nd Avenue

At-Grade LRT: Impacts to underground and overhead utilities are anticipated.

Elevated (Metromover / Monorail): Impacts to overhead utilities are anticipated. Impacts to utilities will vary based on the location of the elevated guideway (left or right side of street).

Biscayne Boulevard

At-Grade LRT: Impacts to underground and overhead utilities are anticipated.

Elevated (Metromover / Monorail): Impacts to underground and overhead utilities are anticipated. The impacts would be less than those associated with an at-grade transit option.

2.5.3.5 Guideway Geometry

North Miami Avenue

At-Grade LRT: Potential geometric constraints are aniticipated at the overpasses for I-395 and I-195 as well as at the FEC RR crossing. Traversing these intersecting facilities at-grade is feasible, however would most likely increase construction costs. An LRT car could likely run off-wire in these areas. No cross street or median/driveway closures are anticipated to accommodate the at-grade option.

Elevated (Metromover / Monorail): Traversing I-195 and the FEC RR crossing would require increasing span lengths and raising the profile of the elevated guideway so as to provide the required vertical clearance. This will result in increases to the overall construction cost. No cross street or median/driveway closures are anticipated to accommodate an elevated option.

NE 2nd Avenue

At-Grade LRT: Potential geometric constraints are aniticipated at the overpasses for I-395 and I-195 as well as at the FEC RR crossing. Traversing these intersecting facilities at-grade is feasible, however would most likely would increase construction costs. An LRT car could run off-wire at these locations. No cross street or median/driveway closures are anticipated to accommodate the at-grade option.

Elevated (Metromover / Monorail): Traversing I-195 and the FEC RR crossing would require increasing span lengths and raising the profile of the elevated guideway so as to provide the required vertical clearance. This will result in increases to the overall construction cost.

On NE 2nd Avenue it may not be feasible to connect an elevated guideway to the existing Metromover line along NE 15th Street due to vertical profile (geometric) constraints. A vertical alignment would not be able to achieve vertical clearance over the pedestrian overpass located approximately 70-ft north of the Metromover line if it is to tie into the existing guideway.

To avoid further impacts to vehicular travel lanes or right-of-way acquisition, frequent shifts in the horizontal alignment of an elevated guideway would be required along NE 2nd Avenue. Straddle bents and additional columns would be needed to support shifts in the horizontal alignment of the guideway. This would increase construction costs making the elevated transit mode less feasible.

No cross street or median/driveway closures are anticipated to accommodate an elevated option.

Biscayne Boulevard

At-Grade LRT: Potential geometric constraints are aniticipated at the overpasses for I-395 and I-195. Traversing these intersecting facilities at-grade is feasible, however would likely increase construction costs. An LRT car could run off-wire in these areas. No cross street or median/driveway closures are anticipated to accommodate the at-grade option.

Elevated (Metromover / Monorail): Traversing I-195 would require increasing span lengths and raising the profile of the elevated guideway so as to provide the required vertical clearance. This will result in increases to the overall construction cost. No cross street or median/driveway closures are anticipated to accommodate an elevated option.

2.5.4 Summary Engineering Evaluation

In analyzing the feasibility of the proposed transit modes there was a notable difference between NE 2nd Avenue and the other two corridors. The existing right-of-way along NE 2nd Avenue varies from roughly 60-FT to 90-FT. Over much of the corridor, additional width is required to accommodate an elevated or at grade transit option. On NE 2nd Avenue it may not be feasible to connect an elevated guideway to the existing Metromover line along NE 15th Street due to vertical profile (geometric) constraints. A vertical alignment would not be able to achieve vertical clearance over the pedestrian overpass located approximately 70-ft north of the Metromover line if it is to tie into the existing guideway. The elevated transit option was also found to require the purchase of additional right-of-way at two locations (between NE 25th Street and NE 27th Street, between NE 34th Street and NE 35th Street). To avoid further impacts to vehicular travel lanes or right-of-way acquisition, frequent shifts in the horizontal alignment of an elevated guideway would be required along NE 2nd Avenue making the elevated transit mode less feasible.

The primary limitations along North Miami Avenue and Biscayne Boulevard are impacts to utilities and landscaping. Only known above grade utility impacts were considered. Unique to North Miami Avenue would be potential impacts to on-street parking at various locations. As shown in the North Miami Avenue typical section Figures 2-8 and 2-9, proposed bicycle lanes are accommodated consistent with the TPO's Bike Lane Master Plan for this corridor.

Along both North Miami Avenue and Biscayne Boulevard there is also a potential for geometric constraints for a transit crossing of I-395, I-195 and at the FEC RR crossing. Traversing these intersecting facilities is possible, however would most likely increase construction costs. The feasibility of either transit option along Biscayne Boulevard would be constrained by the existing

landscaping along the corridor, which is significantly more prevalent than along North Miami Avenue. However, as indicated in Figure 2-14, the landscape strip along Biscayne Boulevard could be used to accommodate transit.

The right-of-way widths along North Miami Avenue (average 70-ft) and Biscayne Boulevard (100-ft min) within the study limits are larger than that of NE 2nd Avenue (60-ft min). The large right-of-way widths could better accommodate the footprint of the proposed transit modes, resulting in lower capital costs. The feasibility of implementing the proposed transit options along the corridors was found to be most limited along NE 2nd Avenue. Regardless of the right-of-way width, utility impacts are anticipated as is typical in urban areas. All three corridors were found to have geometric challenges to implementing the proposed transit options. The most severe geometric challenge is along NE 2nd Avenue by the NE 15th St intersection. As previously addressed, vertical constraints would limit the ability to tie an extension of the Metromover system to the existing line at this location.

Figure 2-16 | Proposed LRT Alignment on North Miami Avenue

Figure 2-17 | Proposed Metromover Alignment on North Miami Avenue

Figure 2-18 | Proposed LRT Alignment on NE 2nd Avenue

Figure 2-19 | Proposed Metromover Alignment on NE 2nd Avenue

Figure 2-20 | Proposed Alignment of LRT on Biscayne Boulevard

Figure 2-21 | Proposed Metromover Alignment on Biscayne Boulevard

2.6 Evaluation of Alternate Corridors

The findings of the corridor analysis for North Miami Avenue, NE 2nd Avenue and Biscayne Boulevard are summarized in **Table 2-6** for each category assessed (Environmental, Transportation and ridership, and Engineering). The table represents a relative score for each corridor.

Table 2-6 | Corridor Comparison

	North Miami Avenue			NE 2nd Avenue			Biscayne Boulevard		
Measures	BEST	MEDIUM	WORST	BEST	MEDIUM	WORST	BEST	MEDIUM	WORST
Environmental Impacts	●	○	○	○	●	○	○	○	●
Transportation / Ridership	○	●	○	○	●	○	●	○	○
Engineering Feasibility	○	●	○	○	○	●	○	●	○

2.6.1 Conclusions of Evaluation

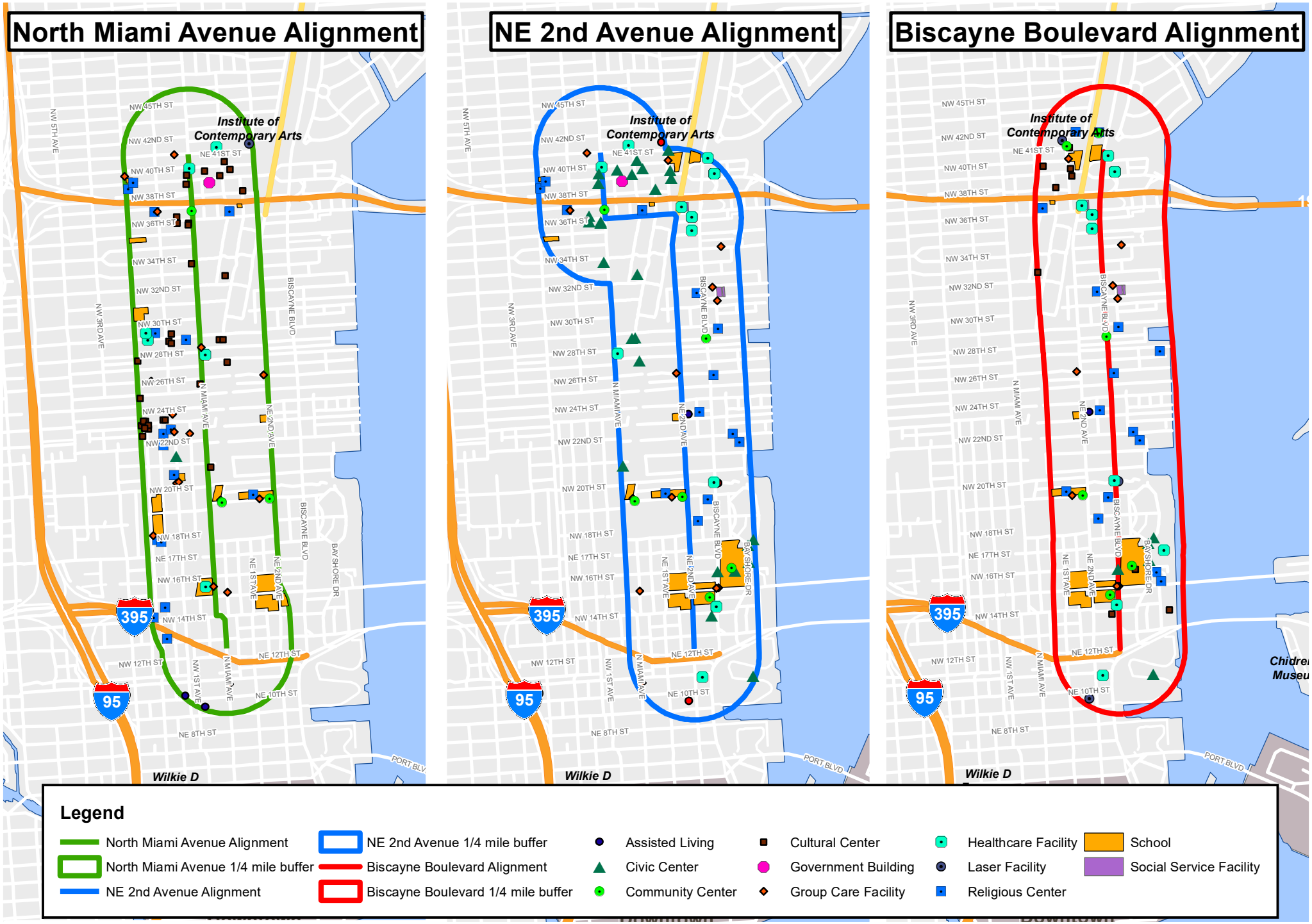
Based on the results of the analysis, it is recommended that North Miami Avenue be the selected corridor for implementation of any future transit mode.

As indicated above, from an engineering perspective, both North Miami Avenue and Biscayne Boulevard Avenue have similar geometric constraints and potential impacts to utilities. In terms of utilities, however, there was no detailed research on underground utilities along the corridors. It is anticipated the underground utilities are more prevalent and larger in size along the more established and developed Biscayne Boulevard corridor than North Miami Avenue. Landscaping impacts would be more significant along Biscayne Boulevard with either transit mode (elevated or at-grade). NE 2nd Avenue was the most constrained corridor from an engineering perspective.

With respect to land use and ridership potential, the catchment area for existing demographics and development along the Biscayne Boulevard corridor was most ripe for transit investment. However, when accounting for future growth along the corridors and ridership potential, both North Miami Avenue and Biscayne Boulevard performed similarly. As indicated, this is as a result of underlying transit service along the Biscayne Boulevard corridor in comparison to none along North Miami Avenue. It is also a result of the future growth anticipated along all the corridors.

The key swing perspective relates to potential environmental impacts. The North Miami Avenue corridor would serve more transit dependent populations and have less visual (aesthetic), noise, and vibration impacts than along Biscayne Boulevard. Additionally, over 50% of the Biscayne Boulevard corridor is in a 100-year floodplain and more susceptible to flooding which would pose engineering/resiliency challenges. Lastly, Biscayne Boulevard had the most historic resources along the corridor and North Miami Avenue had the least number, thus the potential for impacts to these resources is reduced.

A Environmental Assessment GIS Maps


North Miami Avenue Alignment
NE 2nd Avenue Alignment
Biscayne Boulevard Alignment
Institute of Contemporary Arts
Wilkie D
NW 45TH ST
NW 42ND ST
NE 41ST ST
NW 40TH ST
NW 38TH ST
NW 36TH ST
NW 34TH ST
NW 32ND ST
NW 30TH ST
NW 28TH ST
NW 26TH ST
NW 24TH ST
NW 22ND ST
NW 20TH ST
NW 18TH ST
NE 17TH ST
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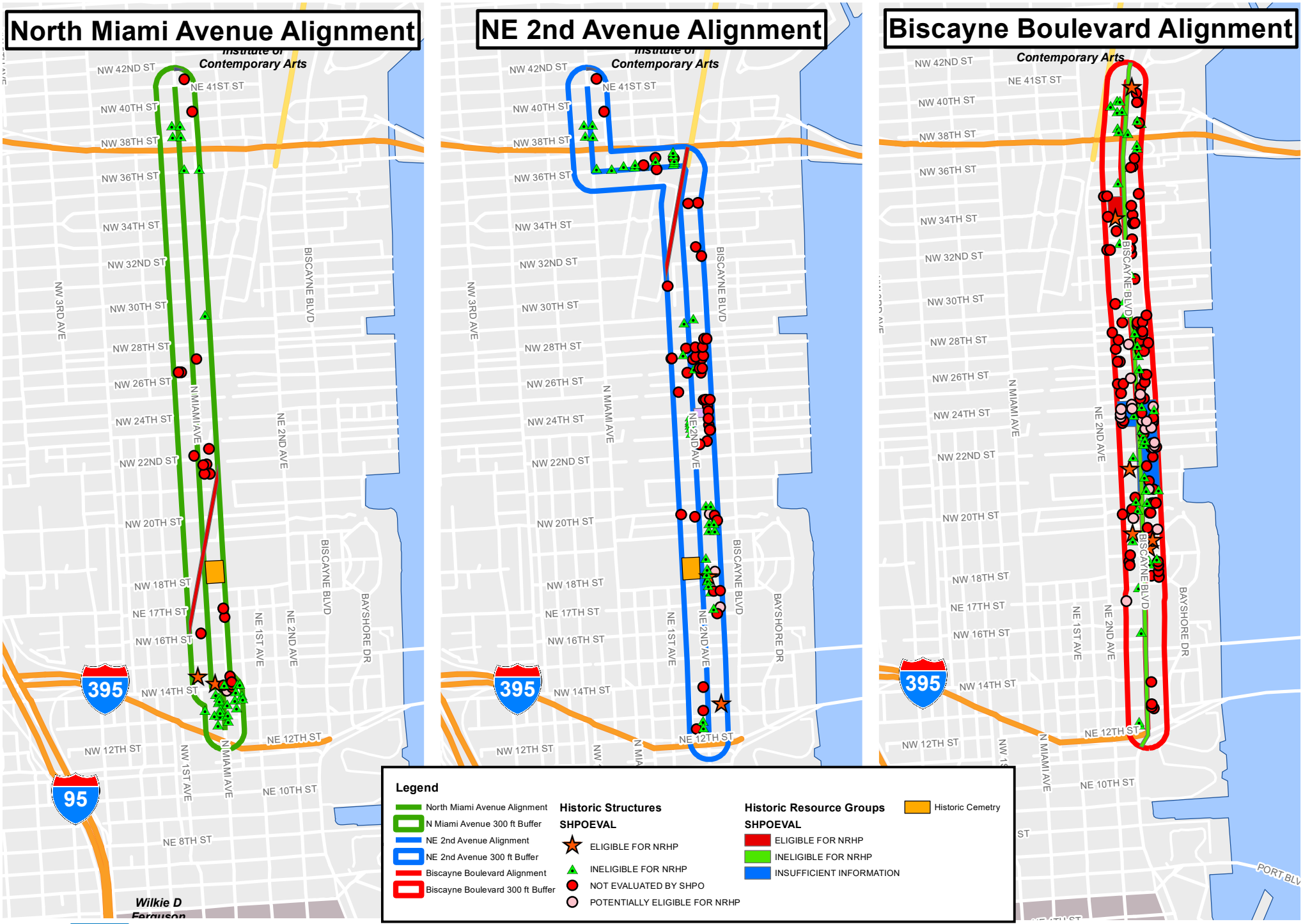
NW 12TH ST
NE 12TH ST
NE 10TH ST
NE 8TH ST
NW 5TH AVE
NW 3RD AVE
N MIAMI AVE
NW 1ST AVE
NE 1ST AVE
NE 2ND AVE
BISCAYNE BLVD
BAYSHORE DR
PORT BLVD
395
95
Legend
North Miami Avenue Alignment
North Miami Avenue 1/4 mile buffer
NE 2nd Avenue Alignment
NE 2nd Avenue 1/4 mile buffer
Biscayne Boulevard Alignment
Biscayne Boulevard 1/4 mile buffer
Assisted Living
Civic Center
Community Center
Cultural Center
Government Building
Group Care Facility
Healthcare Facility
Laser Facility
Religious Center
School
Social Service Facility
MIAMI-DADE COUNTY
Social Sites Location Map
Beach Corridor Rapid Transit Project
0
1,000
2,000
3,000
Feet

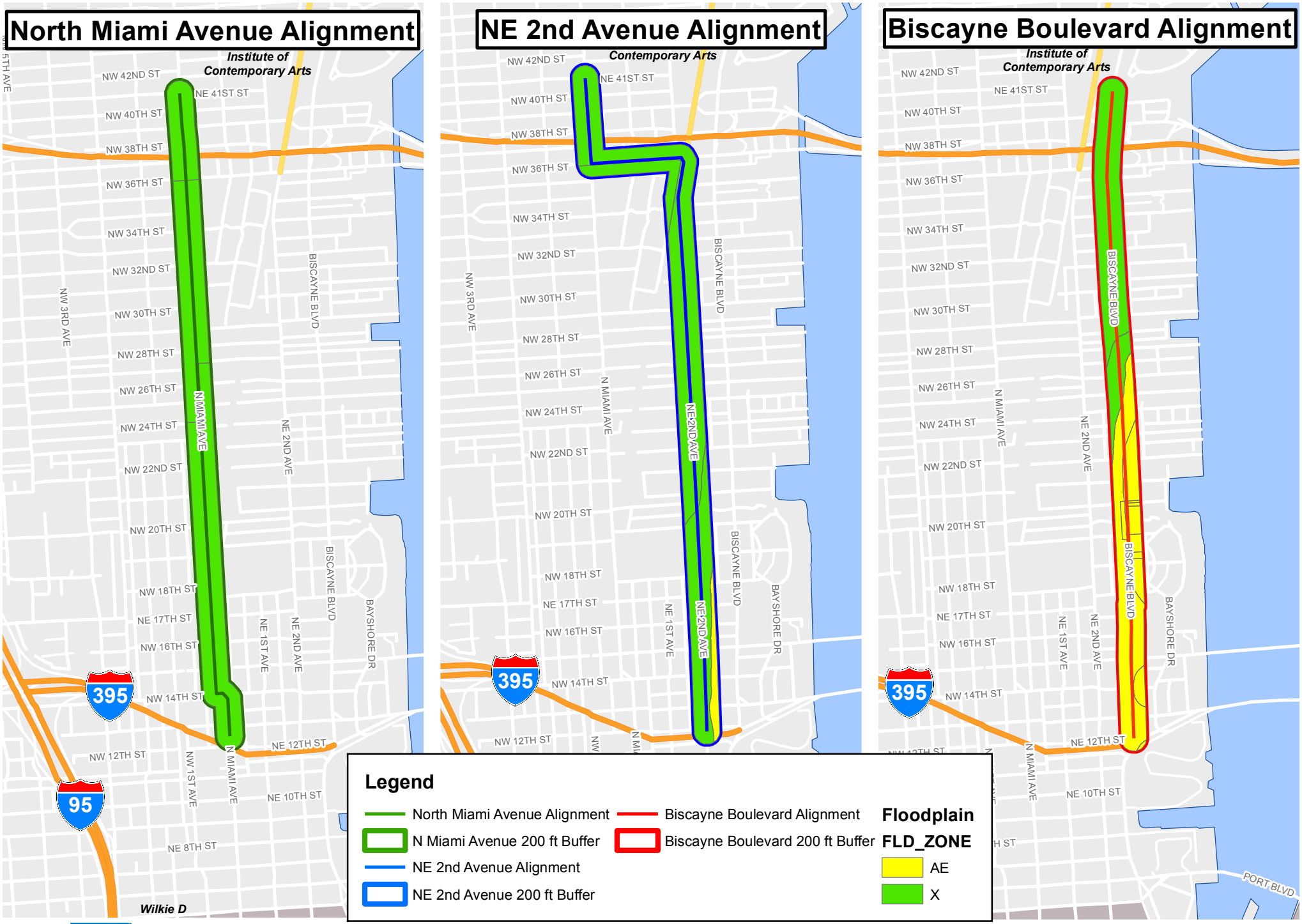


MIAMI-DADE COUNTY

Historical Features Location Map

Beach Corridor Rapid Transit Project

0 1,000 2,000 Feet

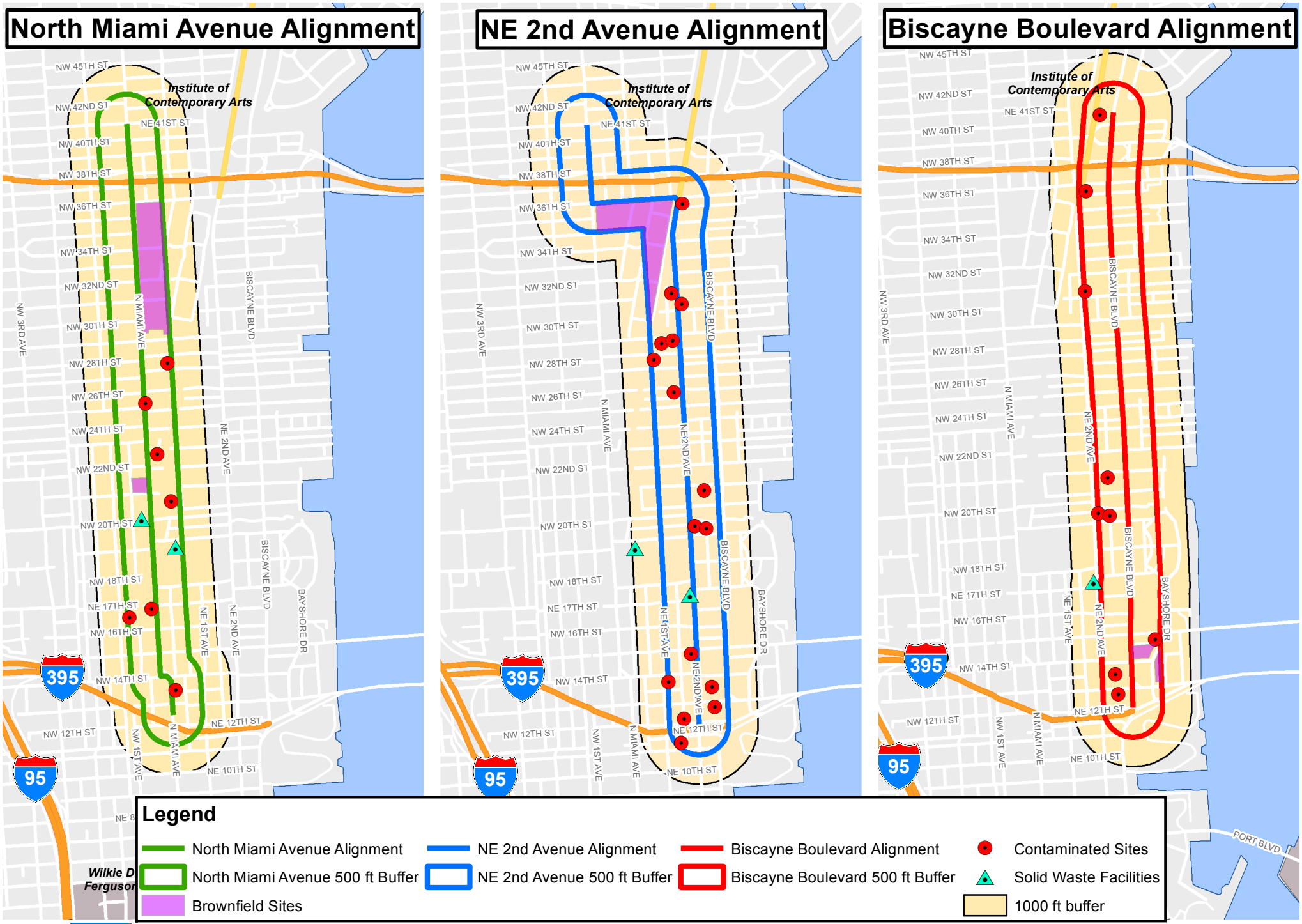


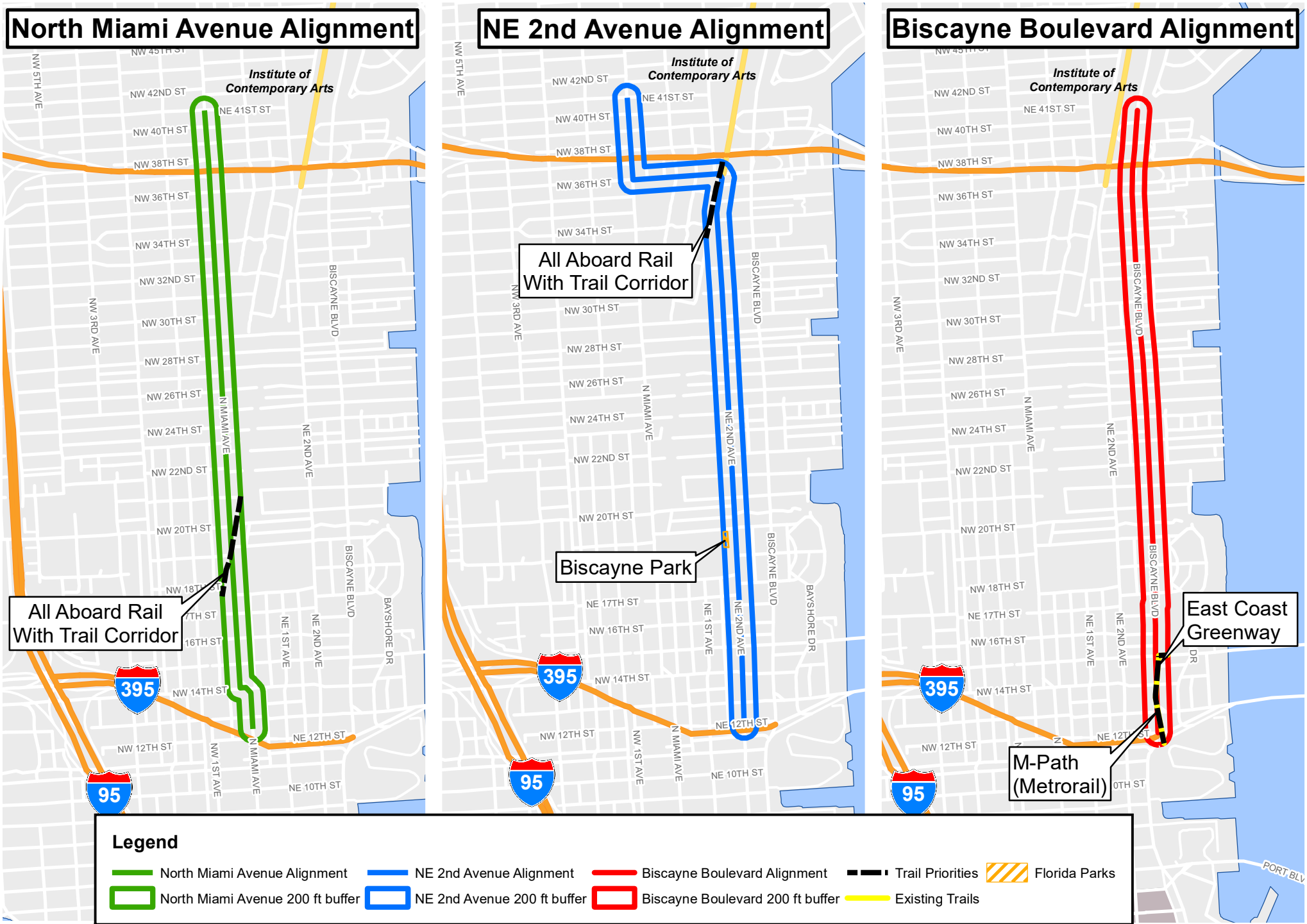
MIAMI-DADE COUNTY

Floodplains Map

Beach Corridor Rapid Transit Project

0 1,000 2,000 Feet


North Miami Avenue Alignment
NE 2nd Avenue Alignment
Biscayne Boulevard Alignment
Institute of Contemporary Arts
NW 45TH ST
NW 42ND ST
NE 41ST ST
NW 40TH ST
NW 38TH ST
NW 36TH ST
NW 34TH ST
NW 32ND ST
NW 30TH ST
NW 28TH ST
NW 26TH ST
NW 24TH ST
NW 22ND ST
NW 20TH ST
NW 18TH ST
NE 17TH ST
NW 16TH ST
NW 14TH ST
NW 12TH ST
NE 10TH ST
NW 3RD AVE
N MIAMI AVE
NW 1ST AVE
NE 1ST AVE
NE 2ND AVE
BISCAYNE BLVD
BAYSHORE DR
PORT BLVD
395
95
Legend
North Miami Avenue Alignment
North Miami Avenue 500 ft Buffer
Brownfield Sites
NE 2nd Avenue Alignment
NE 2nd Avenue 500 ft Buffer
Biscayne Boulevard Alignment
Biscayne Boulevard 500 ft Buffer
Contaminated Sites
Solid Waste Facilities
1000 ft buffer
MIAMI-DADE COUNTY
Contamination Evaluation Map
Beach Corridor Rapid Transit Project
Feet
0
1,000
2,000
3,000
4,000



MIAMI-DADE COUNTY

Section 4(f) Location Map

Beach Corridor Rapid Transit Project

B Corridor Comparison Matrix

LRT - N Miami Avenue

	Corridor	Location	Preferred Side	ROW Acquisition	Business Impact	Utilities Impacts (Y/N)		Travel Lane Reduction	Parking Impacts	Geometric Restriction	Landscaping Impact	Alignment	
		from/to	LT/RT	(Y/N)	(Y/N)	Underground	Overhead	(Y/N)	(Y/N)	(Y/N)	(Y/N)	Street Running	Elevated
1	N Miami Ave	I-395 NE 19th St	Both	N	N	Y	Y	N	Y	N	N	Y	N
2		NE 19th St NE 22nd St	Both	N	N	Y	Y	N	N	N	Y	Y	N
3		NE 22nd St NE 36th St	Both	N	N	Y	Y	N	Y	N	Y	Y	N
4		I-195	Both	N	N	Y	N	N	N	Y	N	Y	N

METROMOVER/MONORAIL - N Miami Avenue

Corridor	Location	Preferred Side	ROW Acquisition	Business Impact	Utilities Impacts (Y/N)		Travel Lane Reduction	Parking Impacts	Geometric Restriction	Landscaping Impact	Alignment	
	from/to	LT/RT	(Y/N)	(Y/N)	Underground	Overhead	(Y/N)	(Y/N)	(Y/N)	(Y/N)	Street Running	Elevated
N Miami Ave	I-395	RT	N	N	Y	N	N	Y	Y	N	N	Y
	NE 13th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 13th St NE 14th St	RT	N	N	Y	N	N	Y	N	Y	N	Y
	NE 14th St NE 15th St	RT or LT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 15th St	RT or LT	N	N	Y	N	N	N	Y	N	N	Y
	NE 15th St NE 16th St	RT or LT	N	N	Y	N	N	Y	N	Y	N	Y
	NE 16th St	RT or LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 16th St NE 17th St	RT or LT	N	N	Y	N	N	Y	N	N	N	Y
	NE 17th St	RT or LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 17th St NE 17th Ter	LT	N	N	Y	Y	N	Y	N	Y	N	Y
	NE 17th Ter	LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 17th Ter NW 19th St	RT	N	N	Y	N	N	N	N	Y	N	Y
	NW 19th St	RT	N	N	Y	N	N	N	N	Y	N	Y
	NW 19th St NW 21st St	LT	N	N	Y	Y	N	N	N	Y	N	Y
	NW 21st St NE 22nd St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 22nd St NE 23rd St	RT	N	N	Y	N	N	N	N	N	N	Y
	NE 23rd St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 23rd St NW 23rd St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NW 23rd St NE 24th St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 24th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 24th St NE 24th St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 25th St NE 25th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 25th St NE 26th St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 26th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 26th St NE 27th St	RT	N	N	Y	N	N	N	N	N	N	Y
	NE 27th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 27th St NE 28th St	RT	N	N	Y	N	N	N	N	Y	N	Y
	NE 28th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 28th St NE 29th St	RT	N	N	Y	N	N	N	N	N	N	Y
	NE 29th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 29th St I-195	RT	N	N	Y	N	N	Y	N	Y	N	Y
	I-195 NE 39th St	RT	N	N	Y	N	N	N	N	N	N	Y
	NE 39th St	RT or LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 39th St NE 41st St	RT or LT	N	N	Y	N	Y	N	N	N	N	Y

LRT - NE 2nd Avenue

Corridor	Location	Preferred Side	ROW Acquisition	Business Impact	Utilities Impacts (Y/N)		Travel Lane Reduction	Parking Impacts	Geometric Restriction	Landscaping Impact	Alignment	
	from/to	LT/RT	(Y/N)	(Y/N)	Underground	Overhead	(Y/N)	(Y/N)	(Y/N)	(Y/N)	Street Running	Elevated
NE 2nd Ave	NE 13th St NE 14th St	Both	N	N	Y	N	N	N	N	Y	Y	N
	NE 14th St NE 17th St	Both	N	N	Y	Y	N	Y	N	Y	Y	N
	NE 16th St NE 17th St	Both	N	N	Y	Y	N	Y	N	Y	Y	N
	NE 16th St NE 20th St	Both	Y	Y	Y	Y	N	N	N	N	Y	N
	NE 20th St NE 41st St	Both	Y	Y	Y	Y	N	N	N	Y	Y	N

METROMOVER/MONORAIL - NE 2nd Avenue

Corridor	Location	Preferred Side	ROW Acquisition	Business Impact	Utilities Impacts (Y/N)		Travel Lane Reduction	Parking Impacts	Geometric Restriction	Landscaping Impact	Alignment	
	from/to	LT/RT	(Y/N)	(Y/N)	Underground	Overhead	(Y/N)	(Y/N)	(Y/N)	(Y/N)	Street Running	Elevated
NE 2nd Ave	NE 15th St NE 15th Ter	LT	N	N	Y	N	N	N	Y	Y	N	Y
	NE 15th Ter NE 17th St	LT	N	N	Y	Y	N	Y	N	Y	N	Y
	NE 17th St NE 17th Ter	RT	N	N	Y	N	N	N	N	Y	N	Y
	NE 17th Ter NE 18th St	RT	N	N	Y	N	N	N	N	N	N	Y
	NE 18th St NE 19th St	RT	N	N	Y	N	N	N	N	Y	N	Y
	NE 19th St NE 25th St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 25th St NE 27th St	RT or LT	Y	N	Y	Y	N	N	N	Y	N	Y
	NE 27th St NE 26th St	RT	Y	N	Y	Y	N	N	N	Y	N	Y
	NE 27th St	LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 2nd Ter	LT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 28th St	LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 28th St NE 29th St	LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 29th St	LT	N	N	Y	Y	N	N	N	N	N	Y
	NE 29th St NE 30th St	LT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 30th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 30th St NE 31st St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 31st St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 31st St NE 32nd St	RT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 33rd St NE 34th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 34th St NE 35th St	RT	Y	Y	Y	N	N	N	N	N	N	Y
	NE 35th St NE 25th Ter	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 35th Ter	RT	N	N	Y	Y	N	N	N	N	N	Y

LRT - Biscayne Boulevard

Corridor	Location	Preferred Side	ROW Acquisition	Business Impact	Utilities Impacts (Y/N)		Travel Lane Reduction	Parking Impacts	Geometric Restriction	Landscaping Impact	Alignment	
	from/to	LT/RT	(Y/N)	(Y/N)	Underground	Overhead	(Y/N)	(Y/N)	(Y/N)	(Y/N)	Street Running	Elevated
Biscayne Blvd	I-395							N	N	Y	Y	N
	NE 13th St NE 14th St	Both	N	N	Y	Y	N	N	N	Y	Y	N
	I-195	Both	N	N	Y	Y	N	Y*	N	N	Y	N

* Impact is to bus pullout stops along NB and SB Biscayne Blvd, below I-195 overpass.

METROMOVER/MONORAIL - Biscayne Boulevard

Corridor	Location	Preferred Side	ROW Acquisition	Business Impact	Utilities Impacts (Y/N)		Travel Lane Reduction	Parking Impacts	Geometric Restriction	Landscaping Impact	Alignment	
	from/to	LT/RT	(Y/N)	(Y/N)	Underground	Overhead	(Y/N)	(Y/N)	(Y/N)	(Y/N)	Street Running	Elevated
Biscayne Blvd	NE 15th St NE 21st St	LT	N	N	Y	N	N	N	N	Y	N	Y
	NE 21st St	LT	N	N	N	Y	N	N	N	N	N	Y
	NE 21st St NE 22nd St	LT	N	N	Y	N	N	N	N	N	N	Y
	NE 22nd St	LT	N	N	N	Y	N	N	N	N	N	Y
	NE 22nd St NE 23rd Ter	LT	N	N	Y	N	N	N	N	Y	N	Y
	NE 23rd Ter	LT	N	N	N	Y	N	N	N	N	N	Y
	NE 23rd Ter NE 24th St	LT	N	N	N	N	N	N	N	N	N	N
	NE 24th St	LT	N	N	N	Y	N	N	N	N	N	N
	NE 24th St NE 25th St	LT	N	N	Y	N	N	N	N	Y	N	Y
	NE 25th St	LT	N	N	N	Y	N	N	N	N	N	Y
	NE 25th St NE 26th St	LT	N	N	Y	N	N	N	N	Y	N	Y
	NE 26th St NE 26th Ter	LT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 26th Ter NE 28th St	LT	N	N	Y	N	N	N	N	Y	N	Y
	NE 28th St NE 29th St	LT	N	N	N	Y	N	N	N	Y	N	Y
	NE 29th St NE 30th St	LT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 30th St NE 31st St	LT	N	N	Y	N	N	N	N	Y	N	Y
	NE 31st St	LT	N	N	N	Y	N	N	N	N	N	Y
	NE 31st St NE 35th St	LT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 35th St to NE 35th Ter	LT	N	N	Y	Y	N	N	N	Y	N	Y
	NE 35th Ter	LT	N	N	N	Y	N	N	N	N	N	Y
	NE 35th Ter NE 36th St	RT	N	N	Y	N	N	N	N	N	N	Y
	I-195	RT	N	N	Y	Y	N	N	N	N	N	Y
	I-195 NE 38th St	RT	N	N	Y	Y	N	N	N	N	N	Y
	NE 38th St NE 39th St	RT	N	N	Y	Y	N	N	N	Y	N	Y

C Photo Log

LRT – North Miami Avenue

Between NE 14th Street & 15th Street

LRT – North Miami Avenue

NE 15th Street

LRT – North Miami Avenue

NE 16th Street

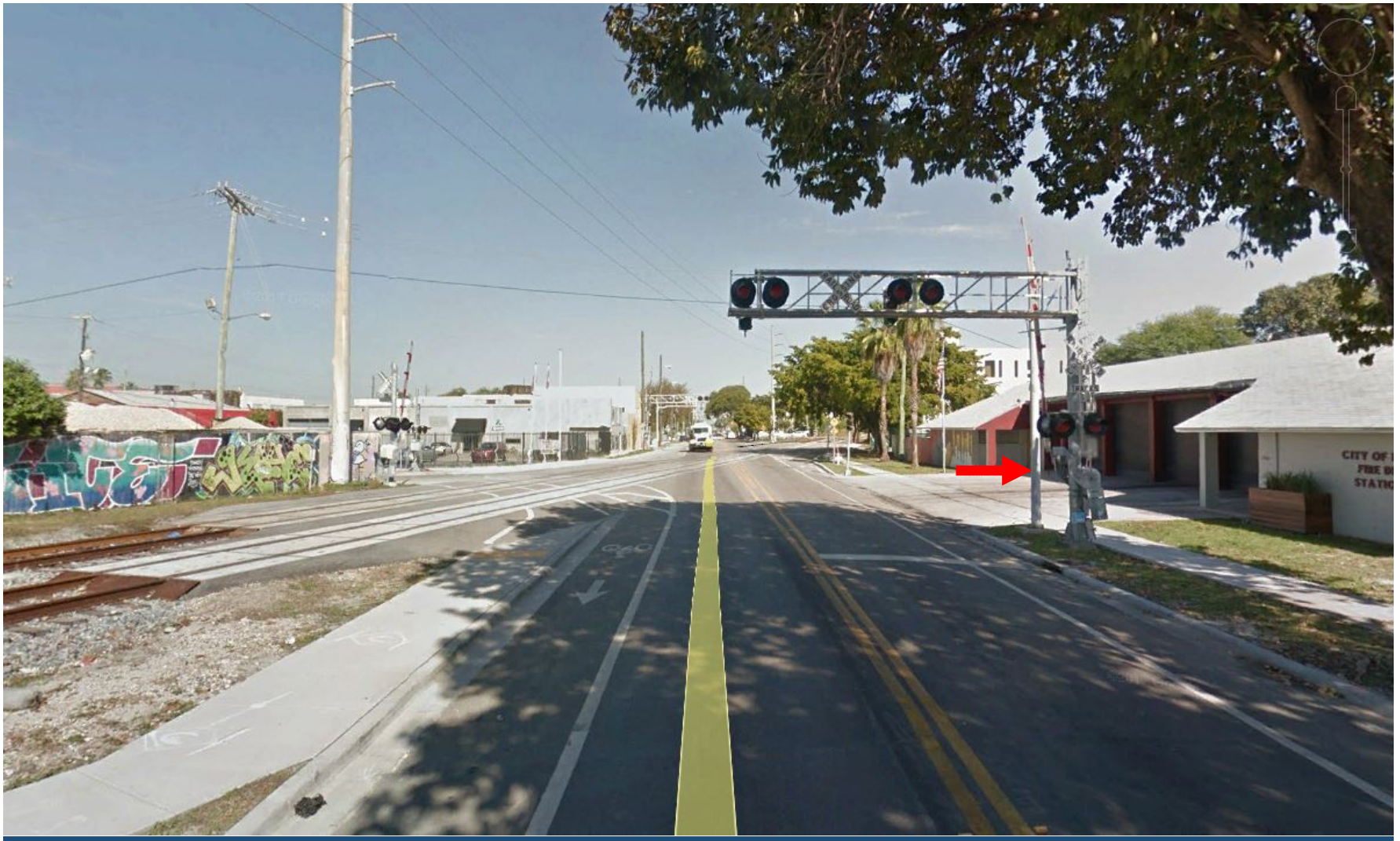
LRT – North Miami Avenue

NE 17th Terrace

LRT – North Miami Avenue

Between NE 17th Street & 19th Street

LRT – North Miami Avenue

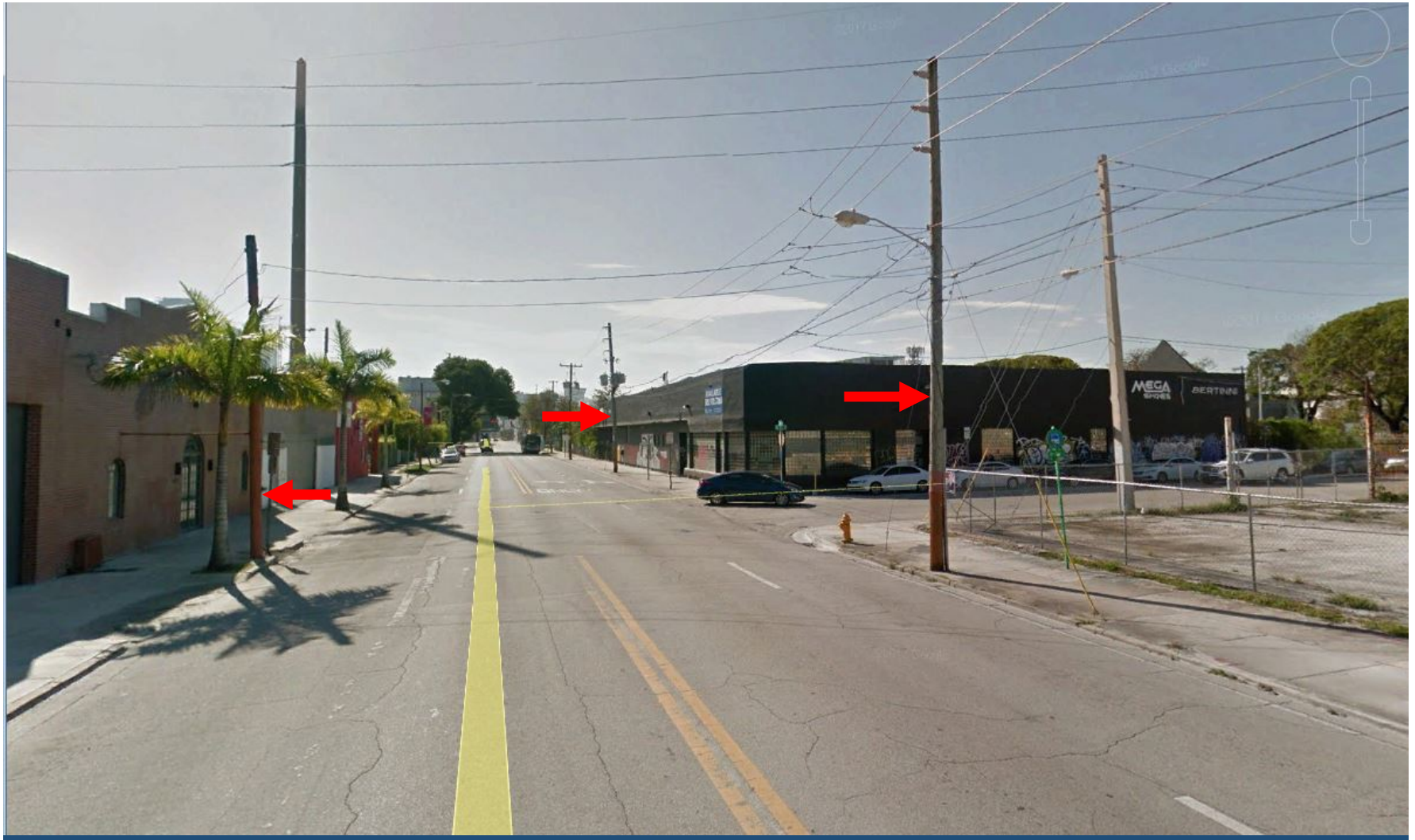


NW 19th Street

LRT – North Miami Avenue

NW 19th Street

LRT – North Miami Avenue

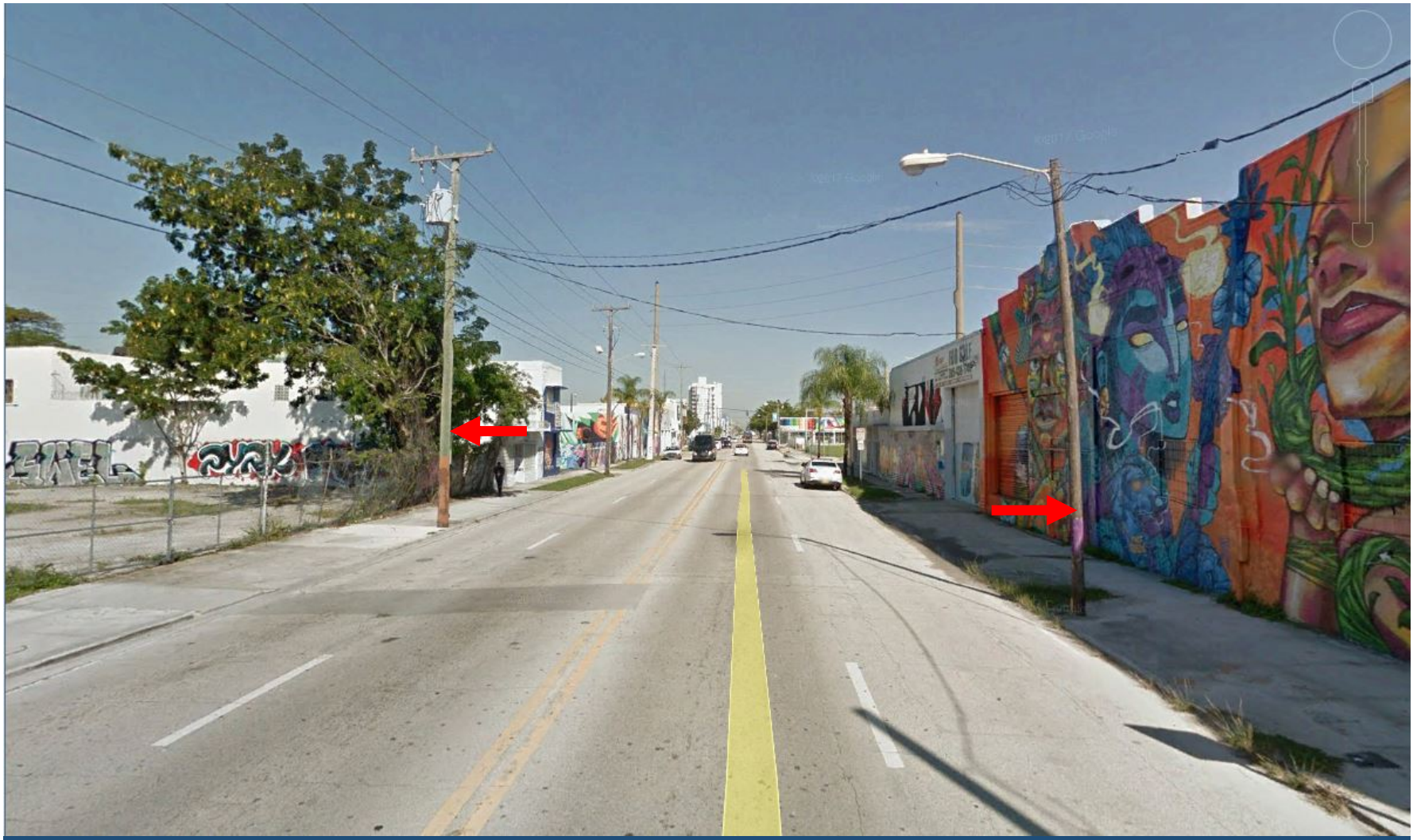


NW 21st Street (looking south)

LRT – North Miami Avenue

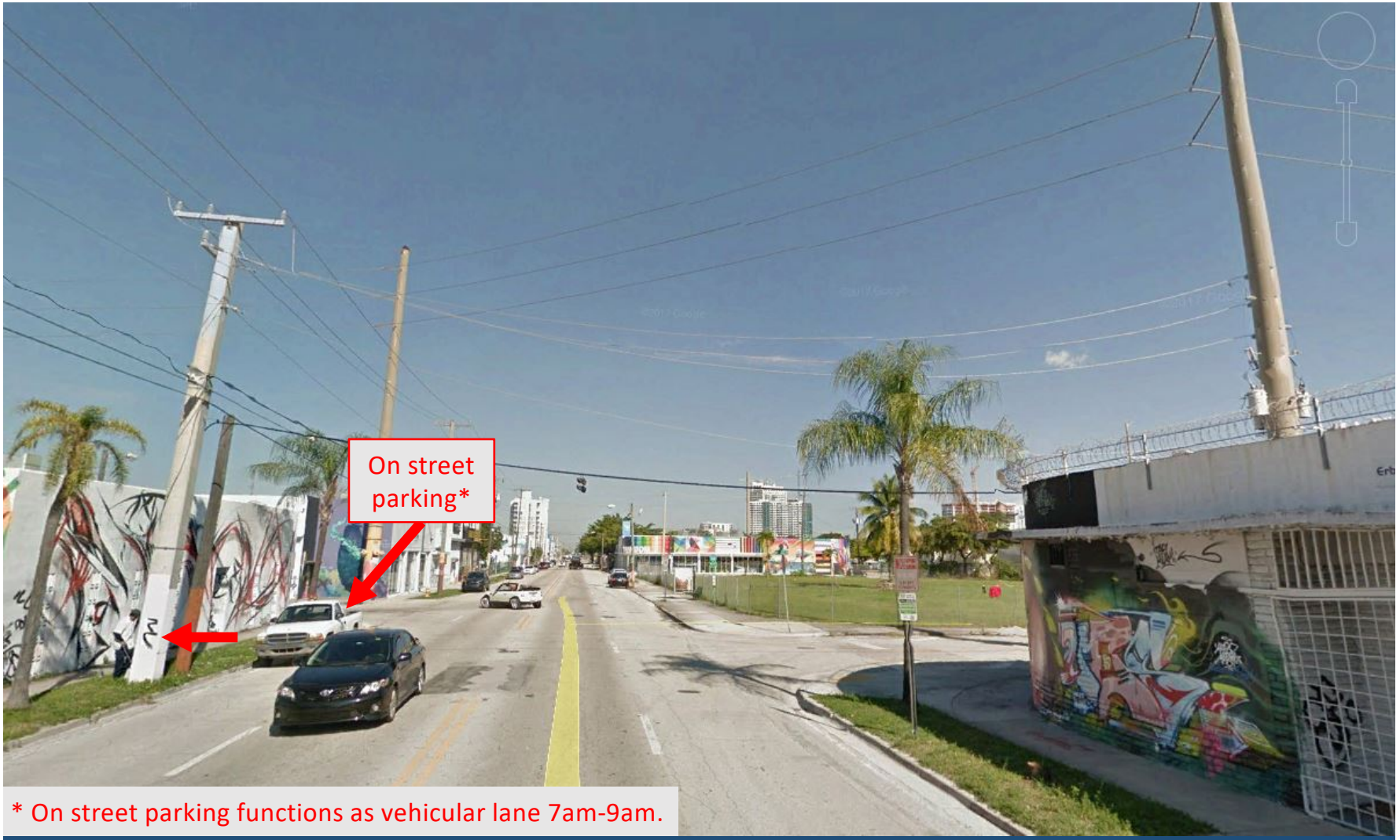
Between NE 20th Street & NW 21st Street

LRT – North Miami Avenue



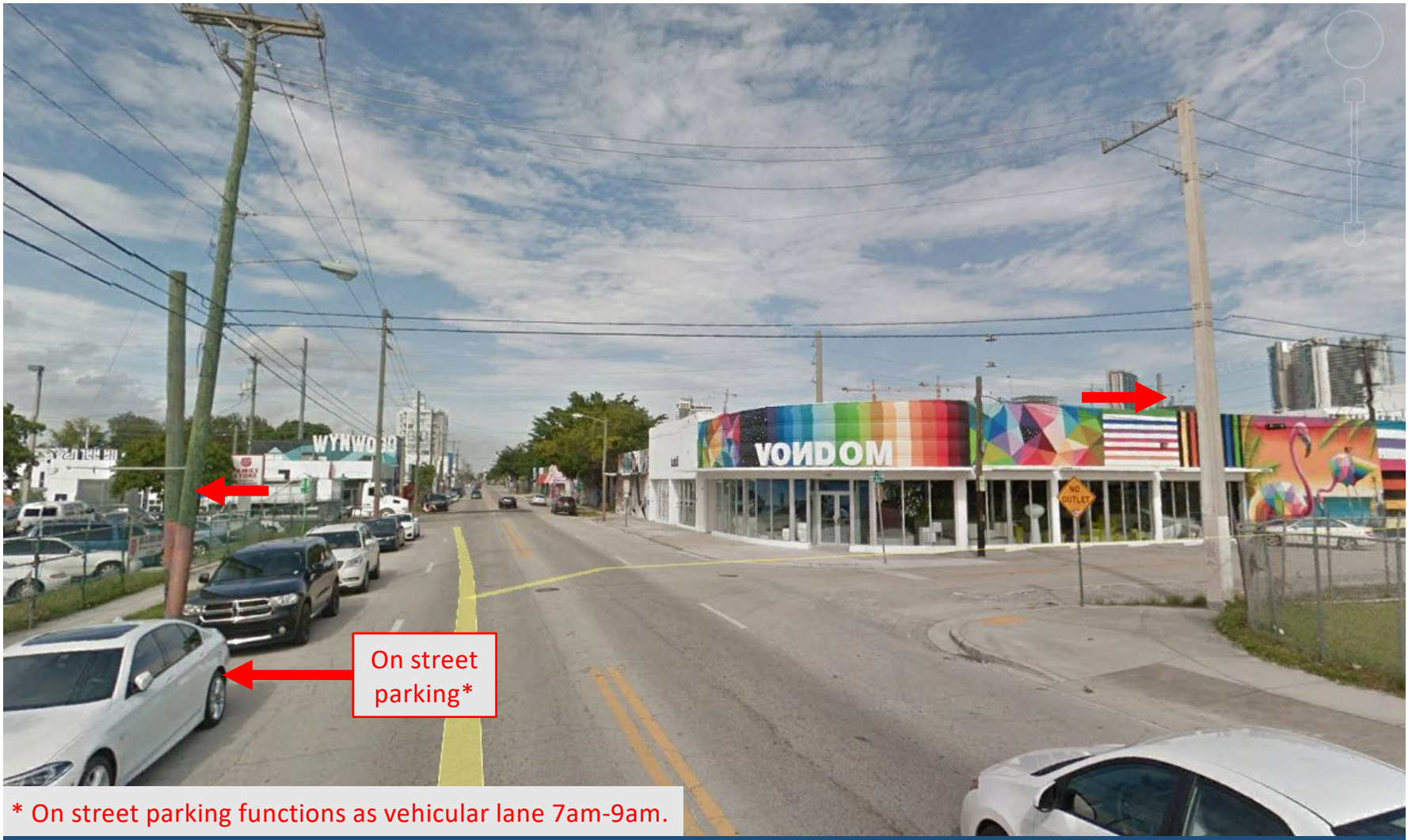
Between NE 21st Street & NE 22nd Street

LRT – North Miami Avenue

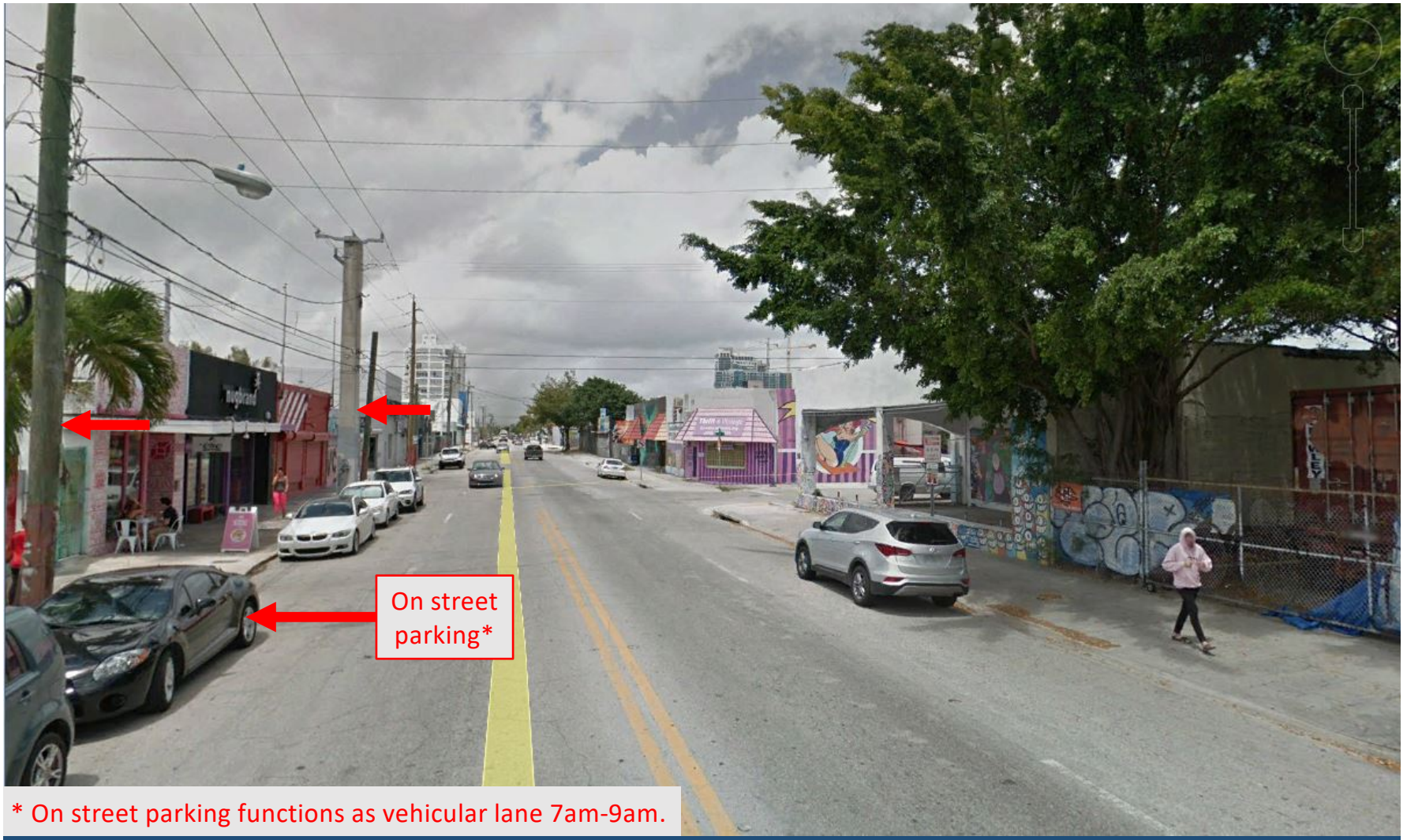


NE 22nd Street

LRT – North Miami Avenue



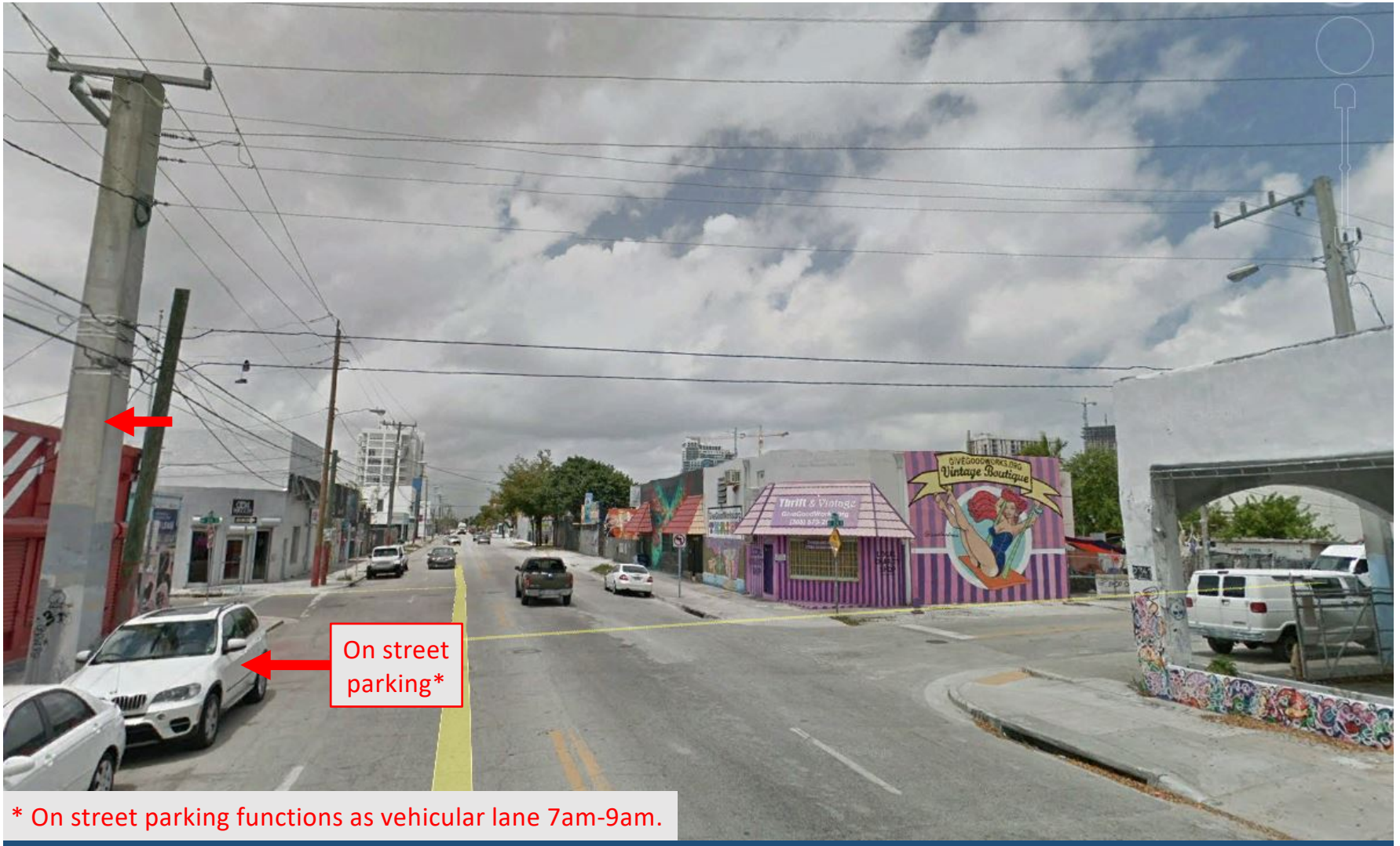
LRT – North Miami Avenue



* On street parking functions as vehicular lane 7am-9am.

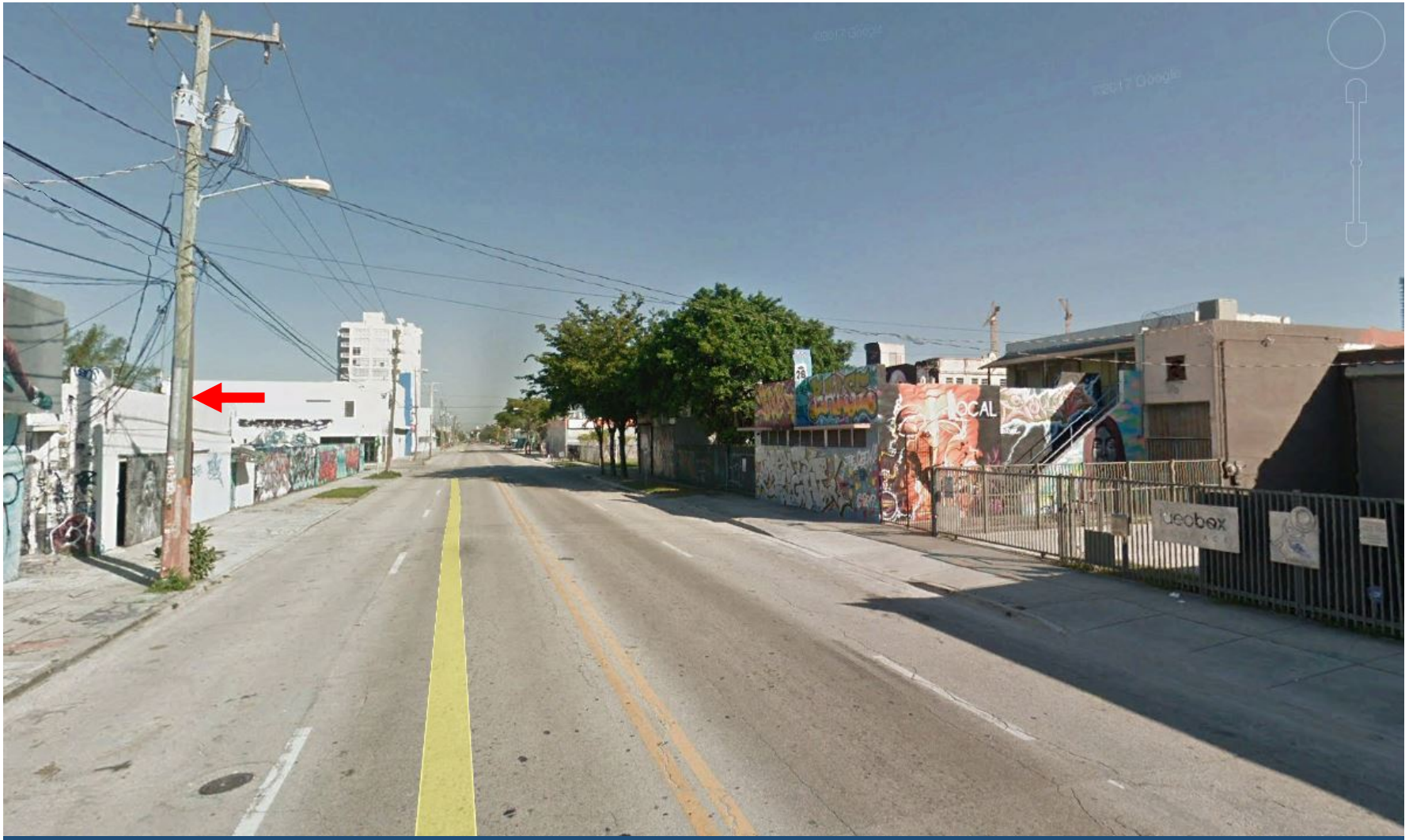
Between NW 23rd Street & NE 24th Street

LRT – North Miami Avenue



NE 24th Street

LRT – North Miami Avenue

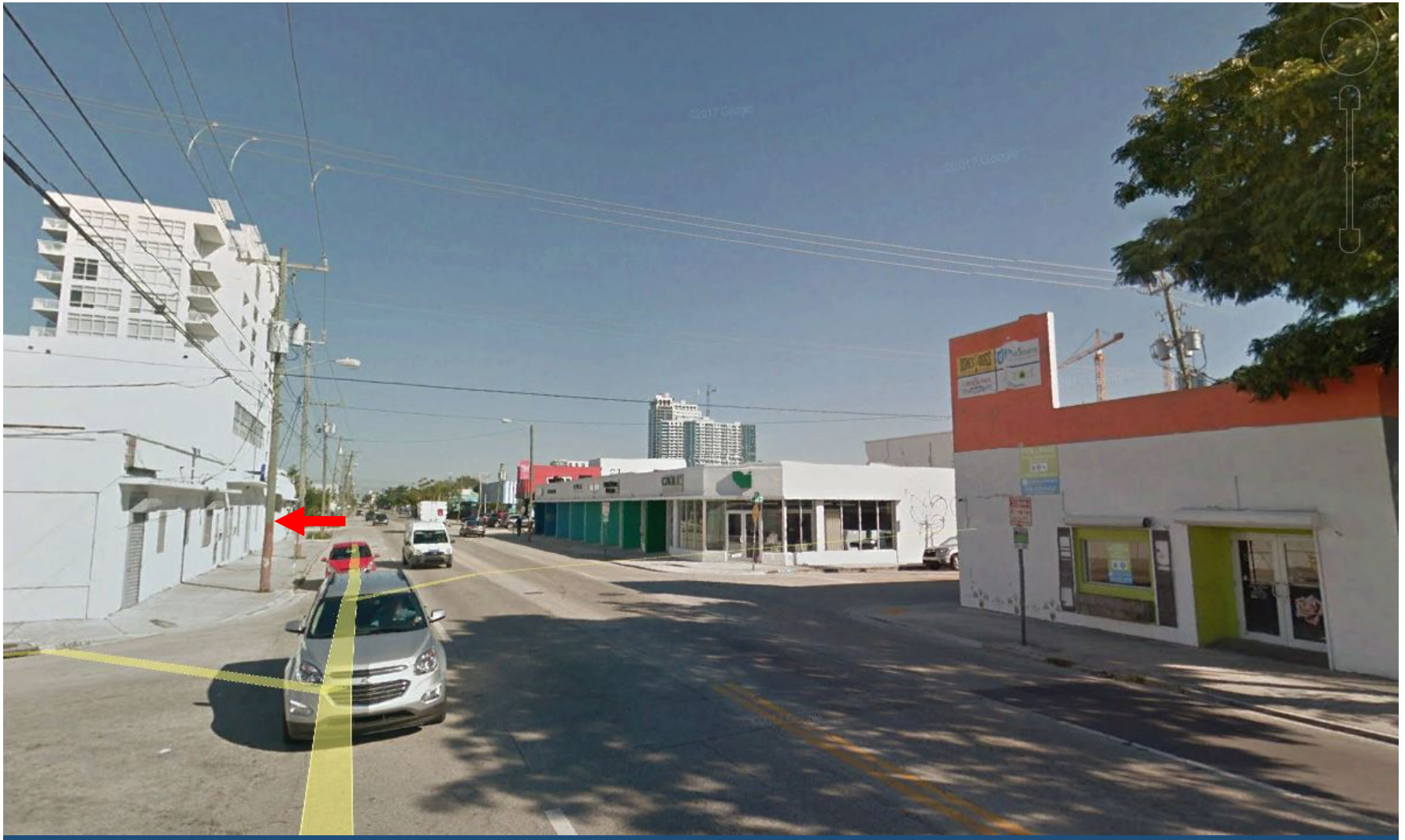


Between NE 24th Street & NE 25th Street

LRT – North Miami Avenue

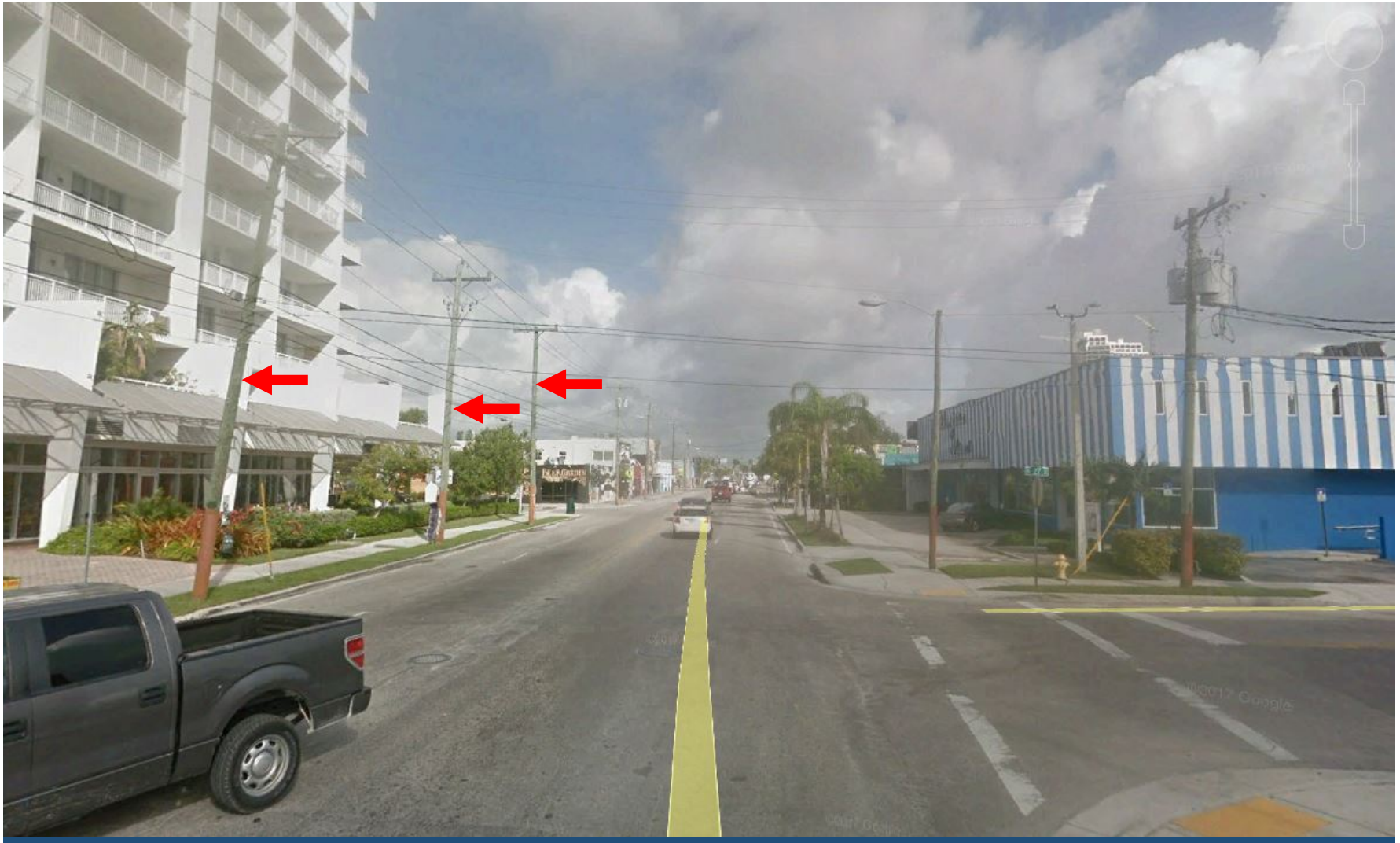
NE 25th Street

LRT – North Miami Avenue



NE 26th Street

LRT – North Miami Avenue



NE 27th Street

LRT – North Miami Avenue

NE 28th Street

LRT – North Miami Avenue

NE 29th Street

LRT – North Miami Avenue

* On street parking functions as vehicular lane 7am-9am.

Between NE 32nd Street & NE 34th Street

LRT – North Miami Avenue

I-195

LRT – North Miami Avenue

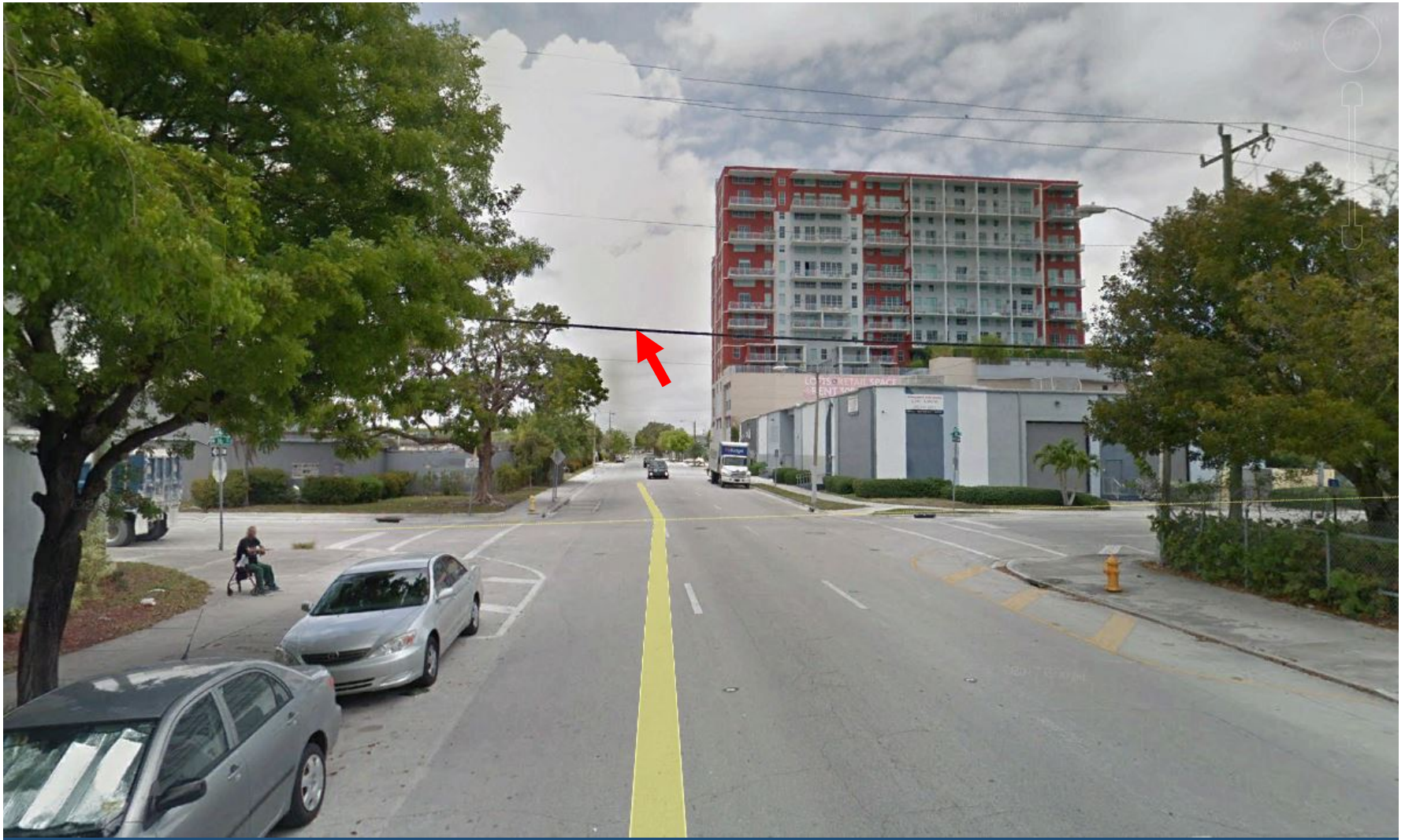
Metromover/Monorail – North Miami Avenue

Metromover/Monorail – North Miami Avenue

Between NE 14th Street & 15th Street

Metromover/Monorail – North Miami Avenue

Metromover/Monorail – North Miami Avenue



NE 16th Street

Metromover/Monorail – North Miami Avenue

Metromover/Monorail – North Miami Avenue

NE 17th Terrace

Metromover/Monorail – North Miami Avenue

Between NE 17th Street & 19th Street

Metromover/Monorail – North Miami Avenue

NW 19th Street

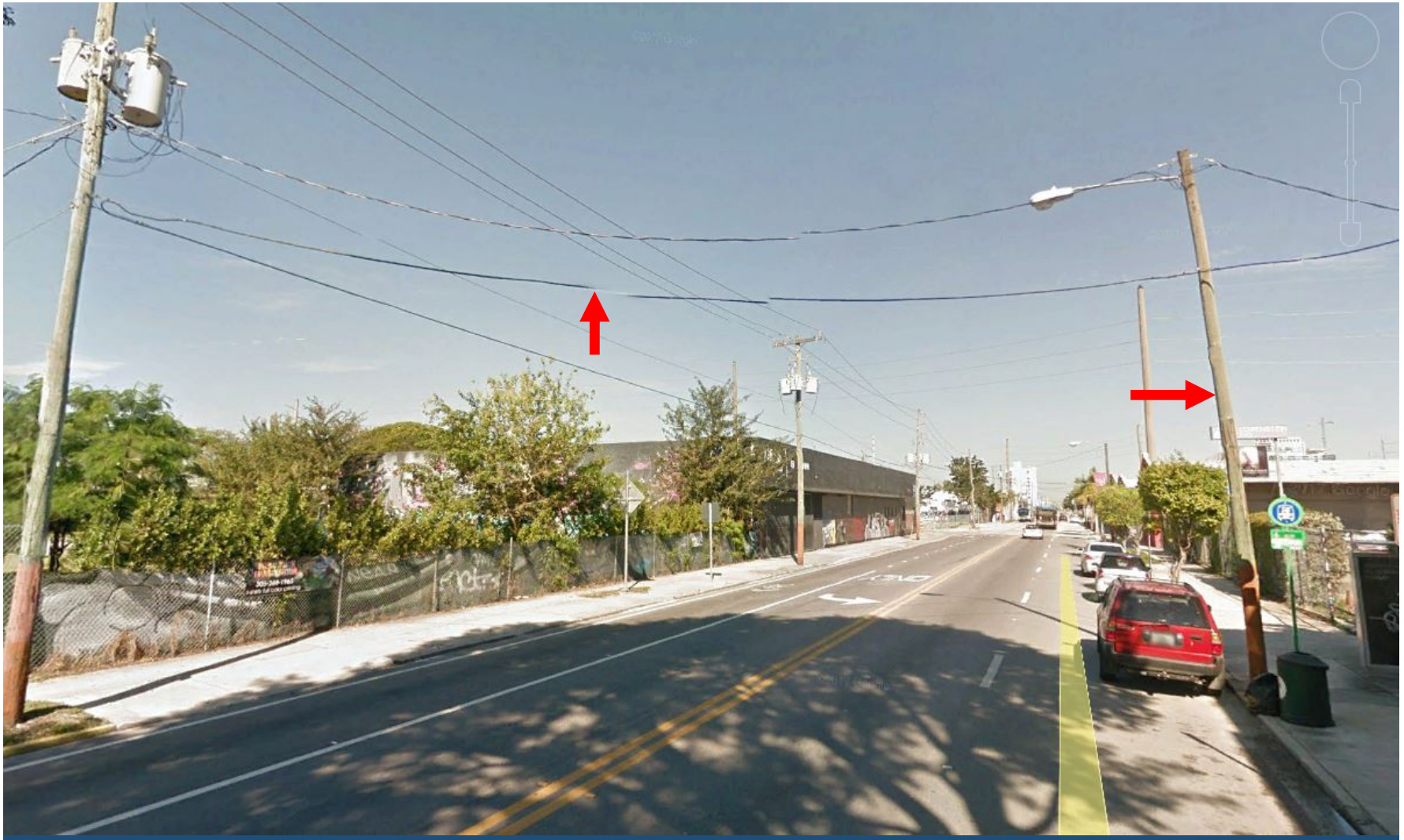
Metromover/Monorail – North Miami Avenue

NW 19th Street

Metromover/Monorail – North Miami Avenue

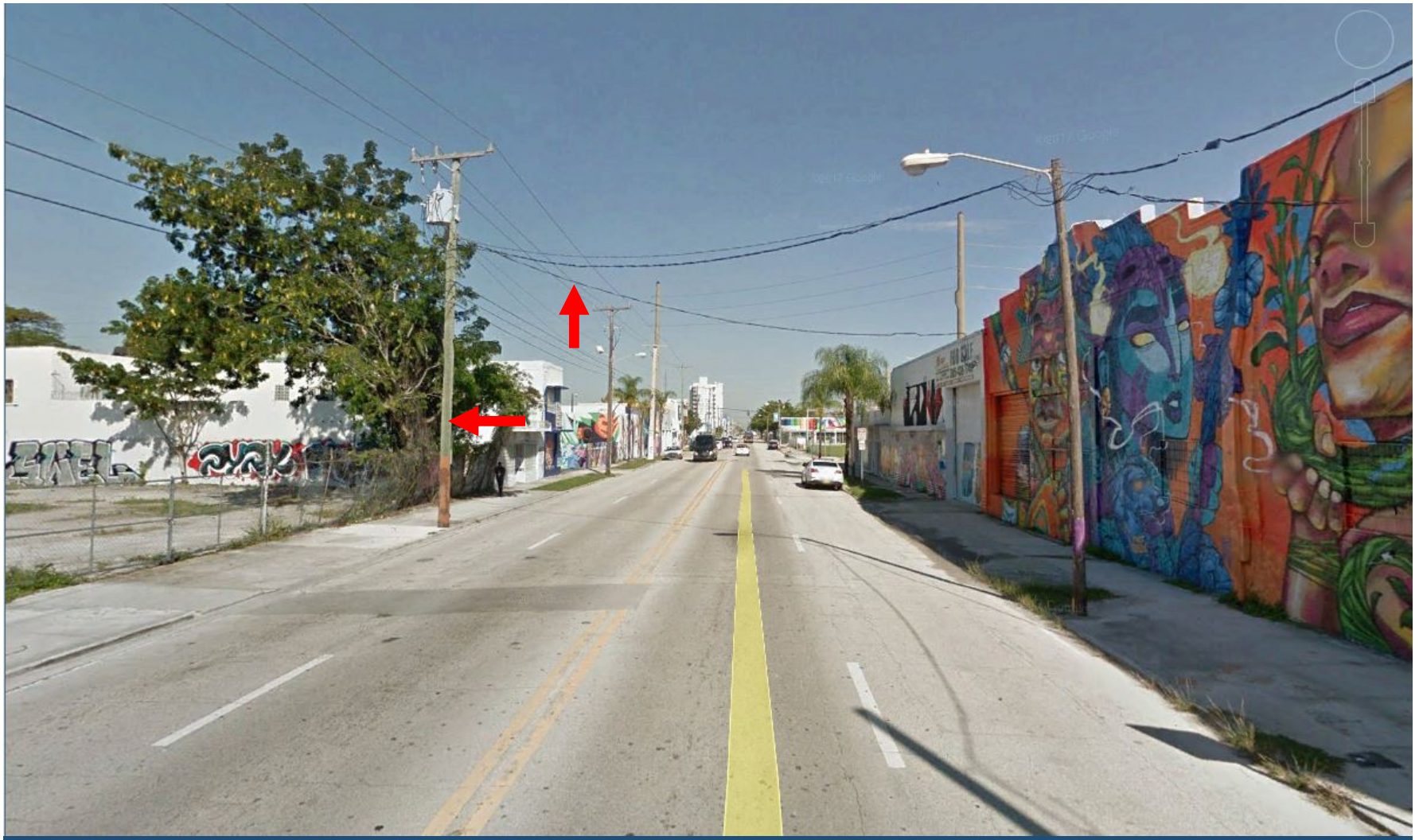
NW 21st Street (looking south)

Metromover/Monorail – North Miami Avenue



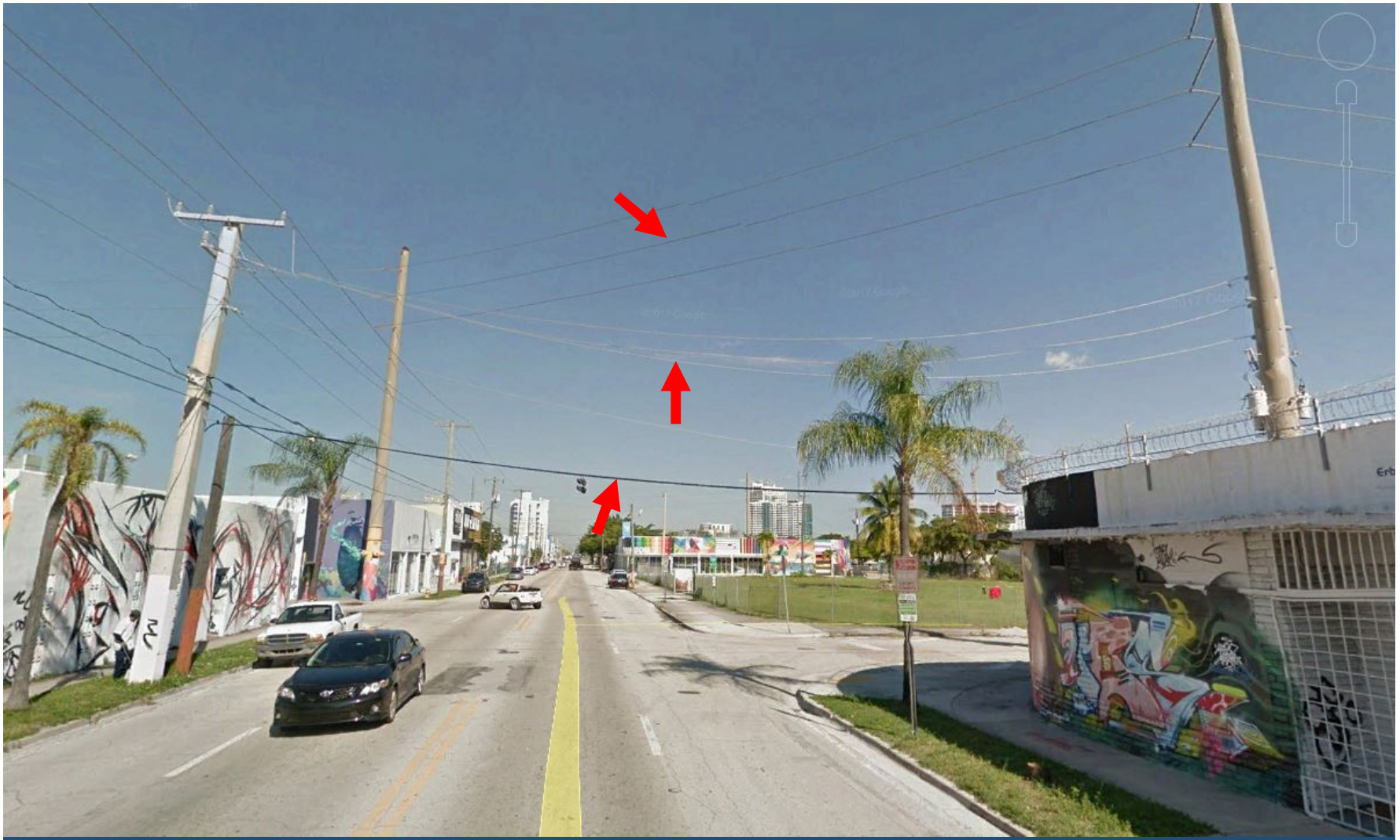
Between NE 20th Street & NW 21st Street

Metromover/Monorail – North Miami Avenue



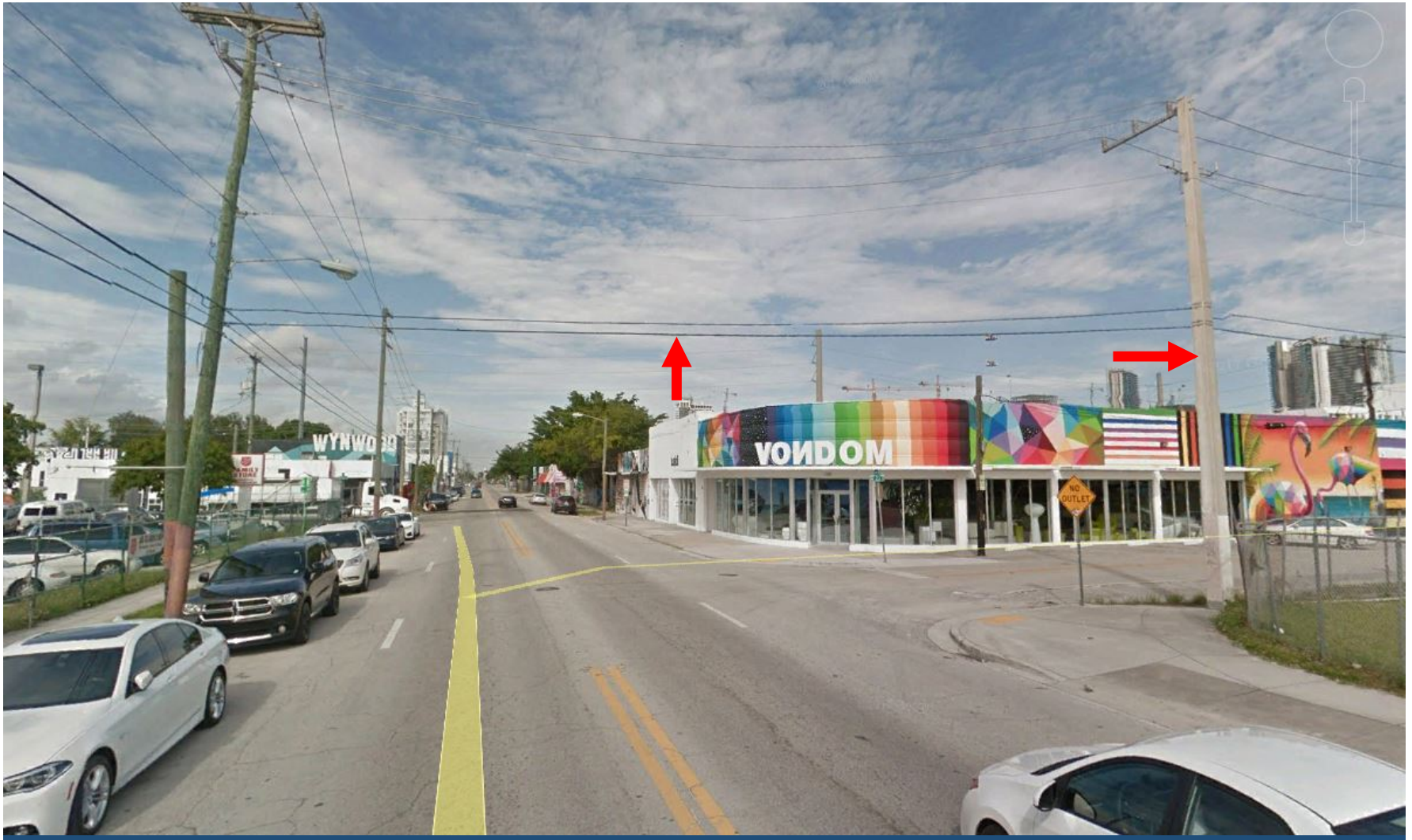
Between NE 21st Street & NE 22st Street

Metromover/Monorail – North Miami Avenue



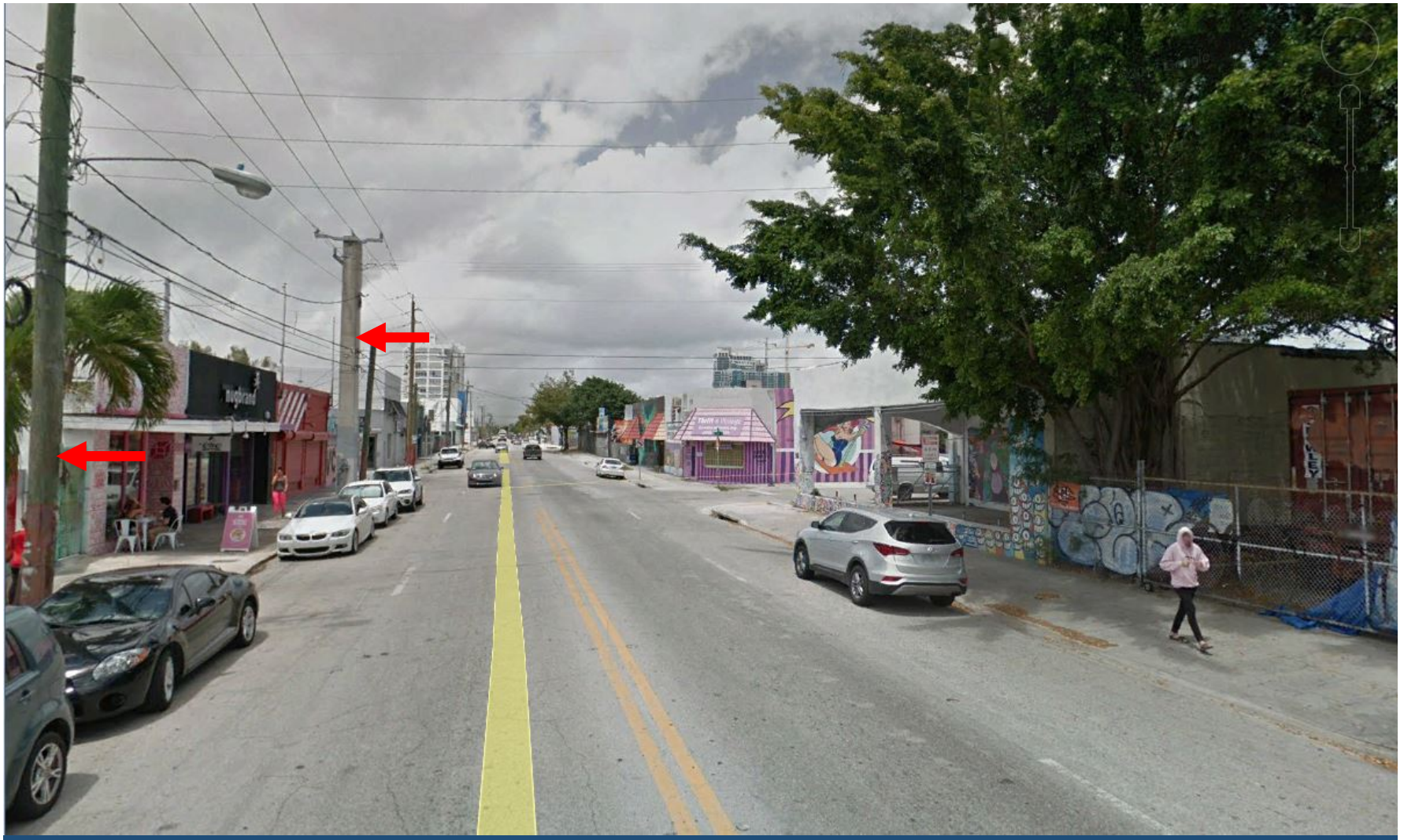
NE 22nd Street

Metromover/Monorail – North Miami Avenue



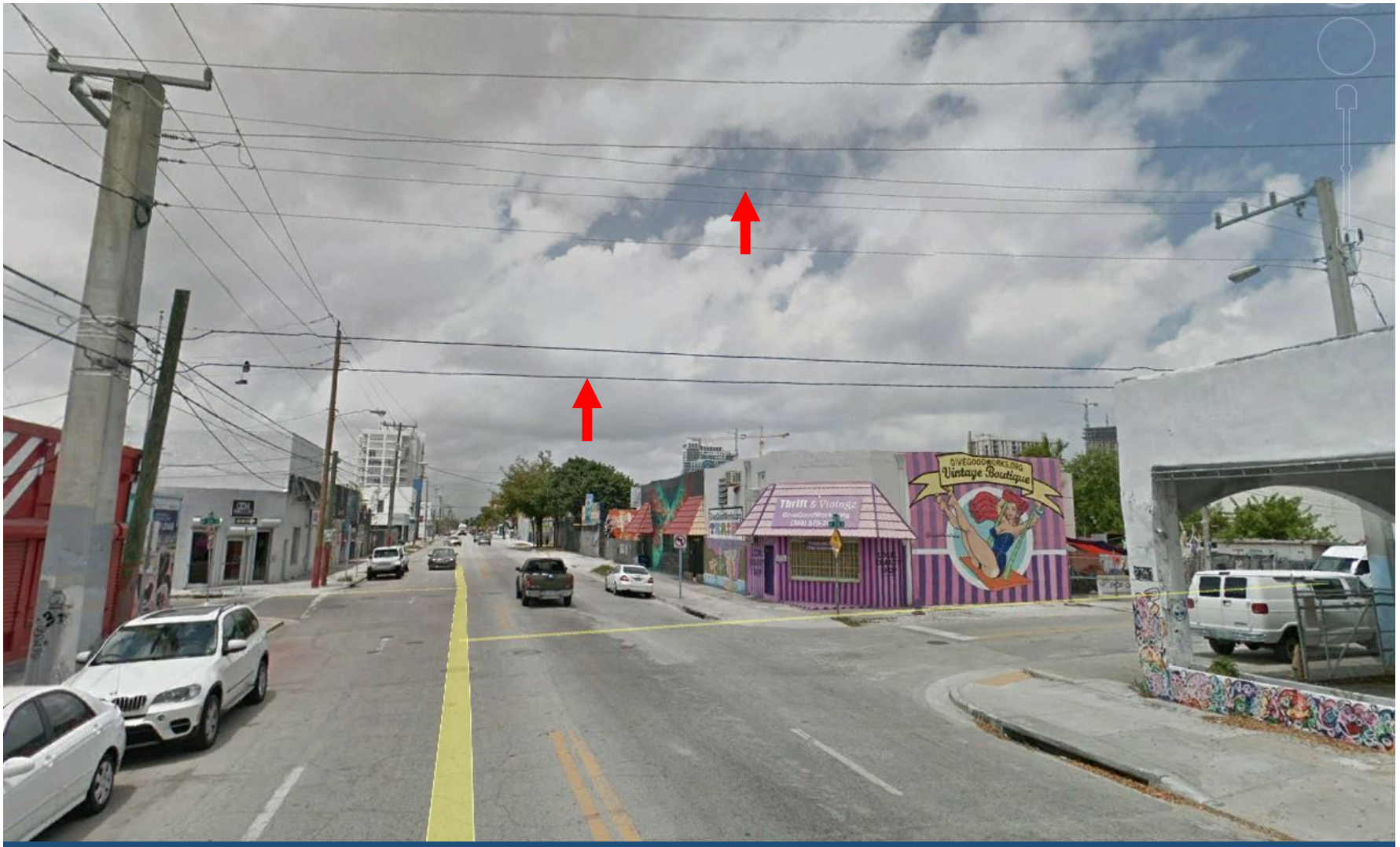
NW 23rd Street

Metromover/Monorail – North Miami Avenue



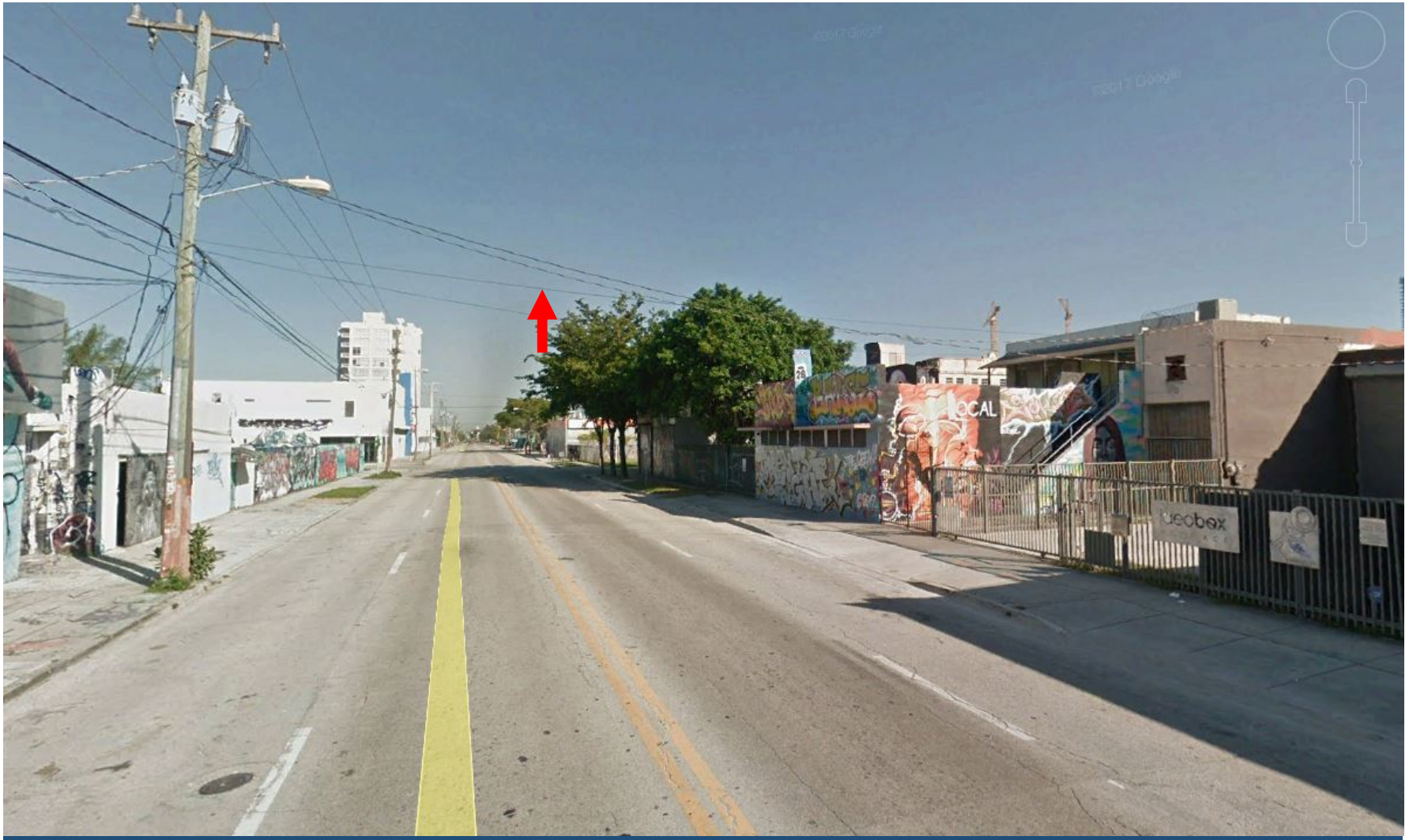
Between NW 23rd Street & NE 24th Street

Metromover/Monorail – North Miami Avenue



NE 24th Street

Metromover/Monorail – North Miami Avenue



Between NE 24th Street & NW 25th Street

Metromover/Monorail – North Miami Avenue

NE 25th Street

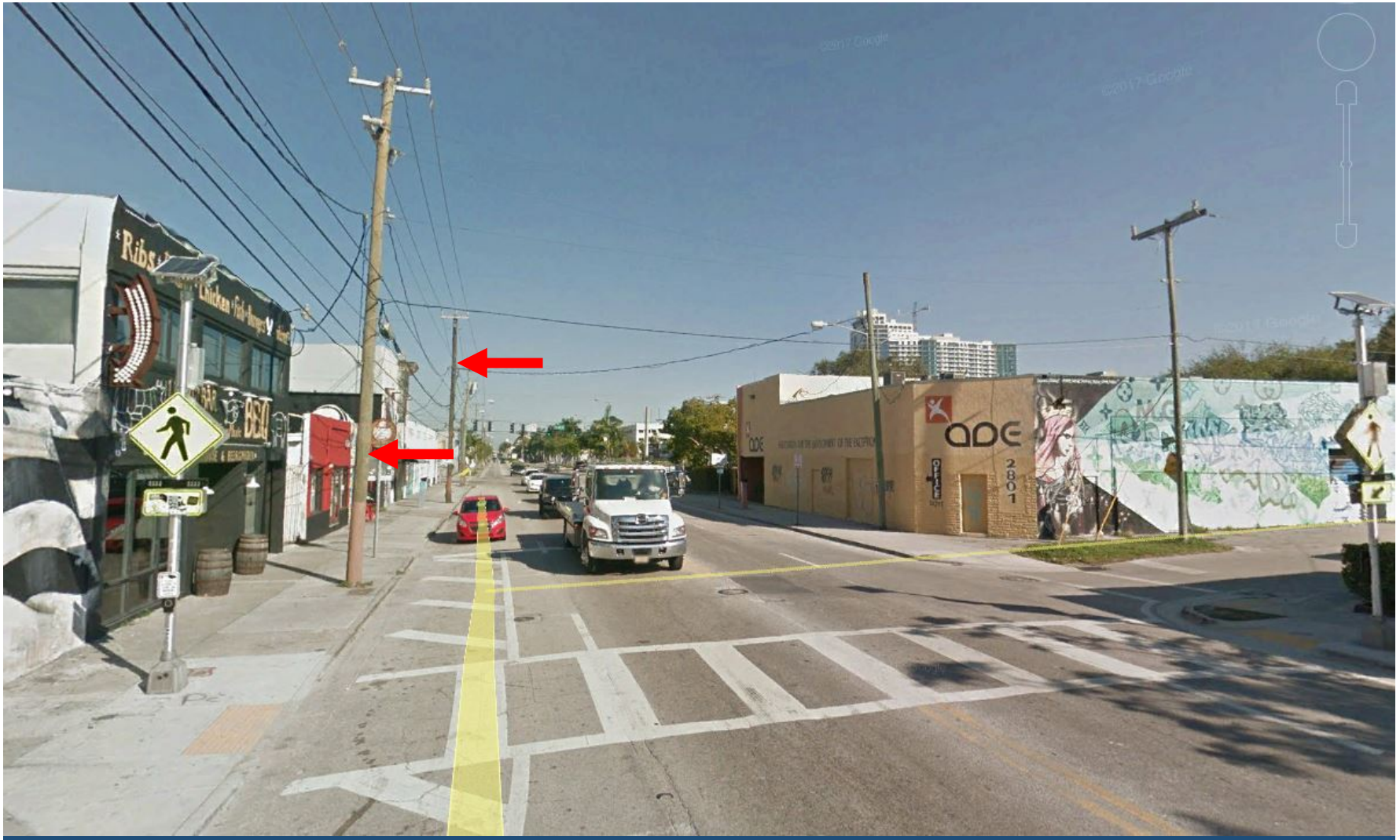
Metromover/Monorail – North Miami Avenue

NE 26th Street

Metromover/Monorail – North Miami Avenue

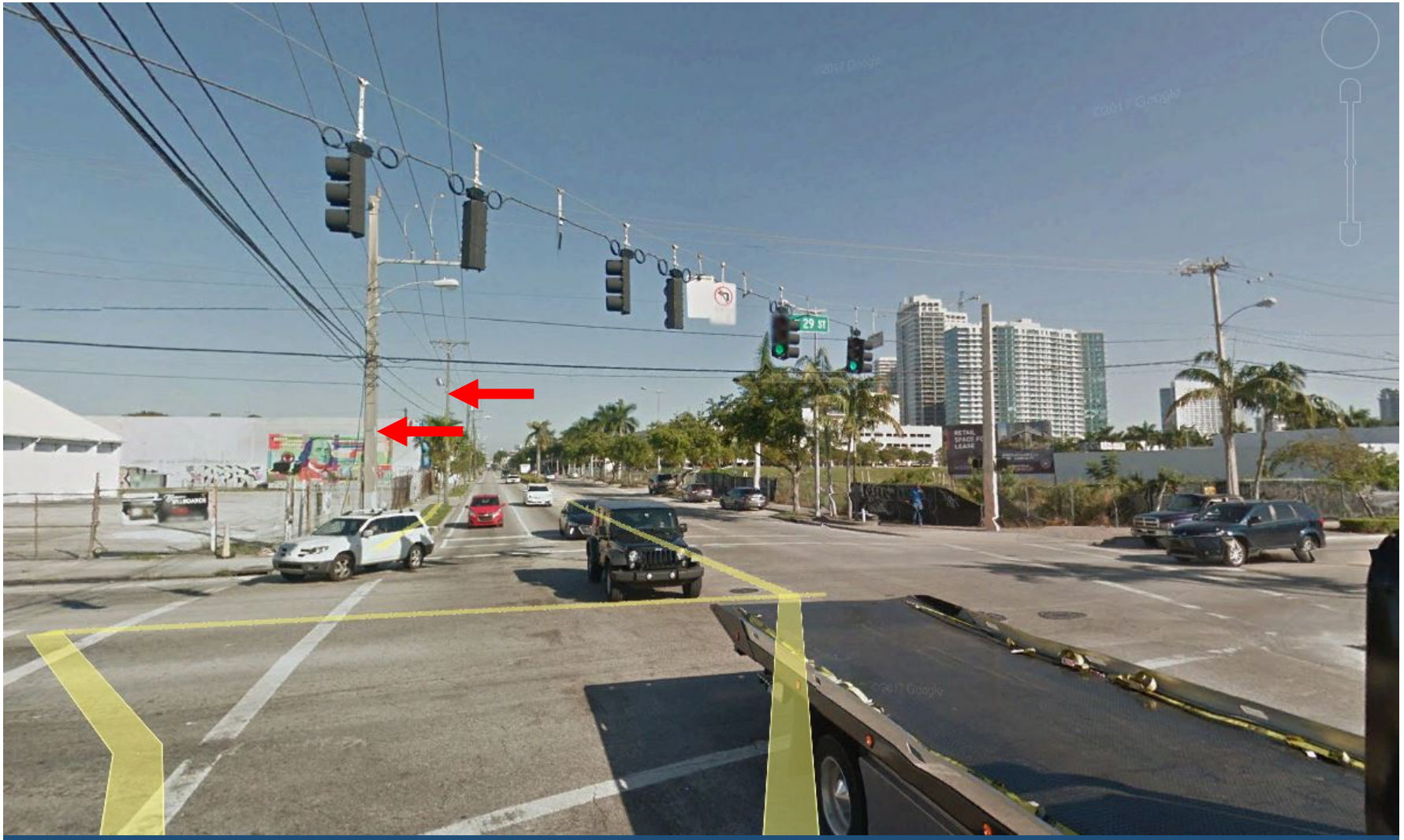
NE 27th Street

Metromover/Monorail – North Miami Avenue



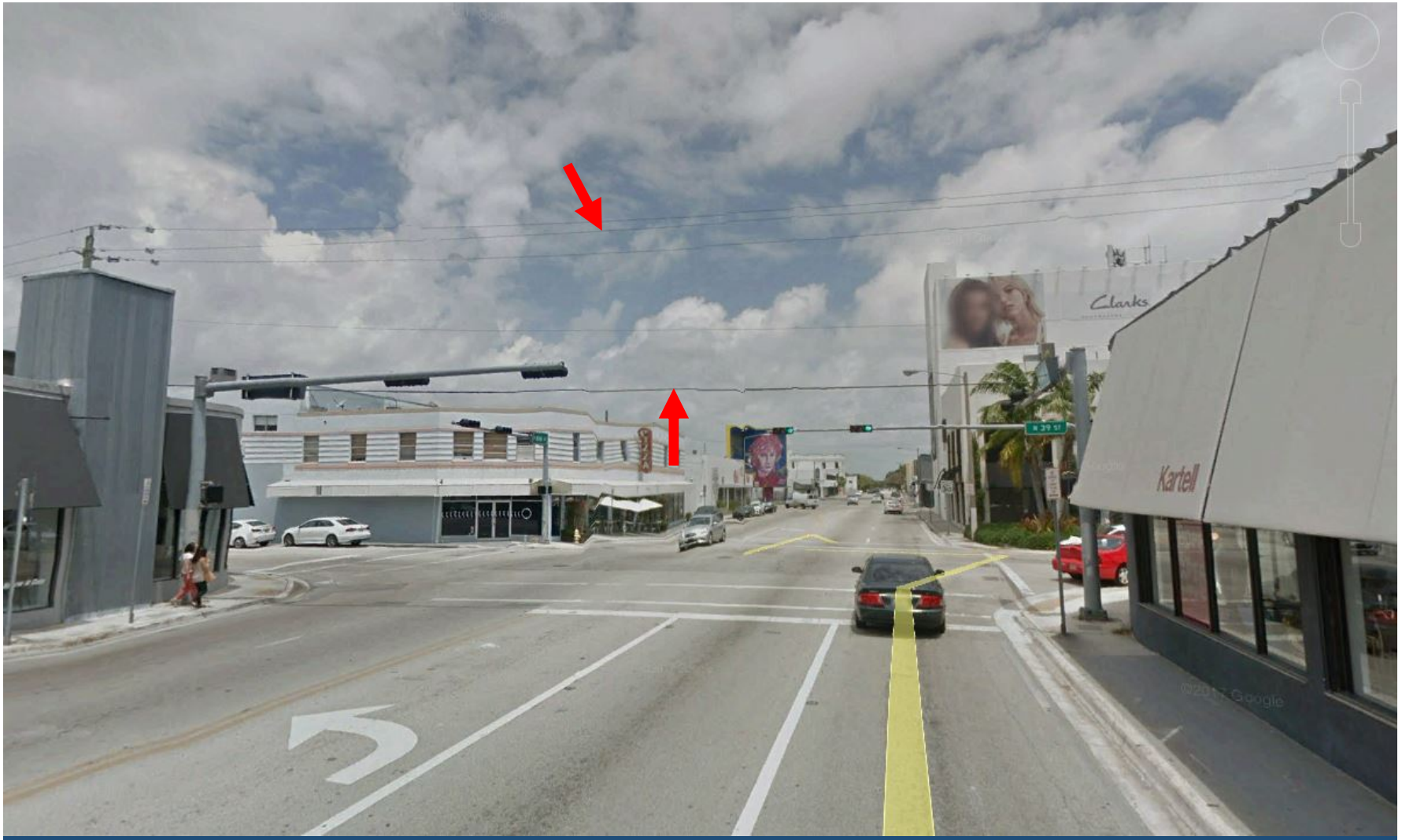
NE 28th Street

Metromover/Monorail – North Miami Avenue



NE 29th Street

Metromover/Monorail – North Miami Avenue



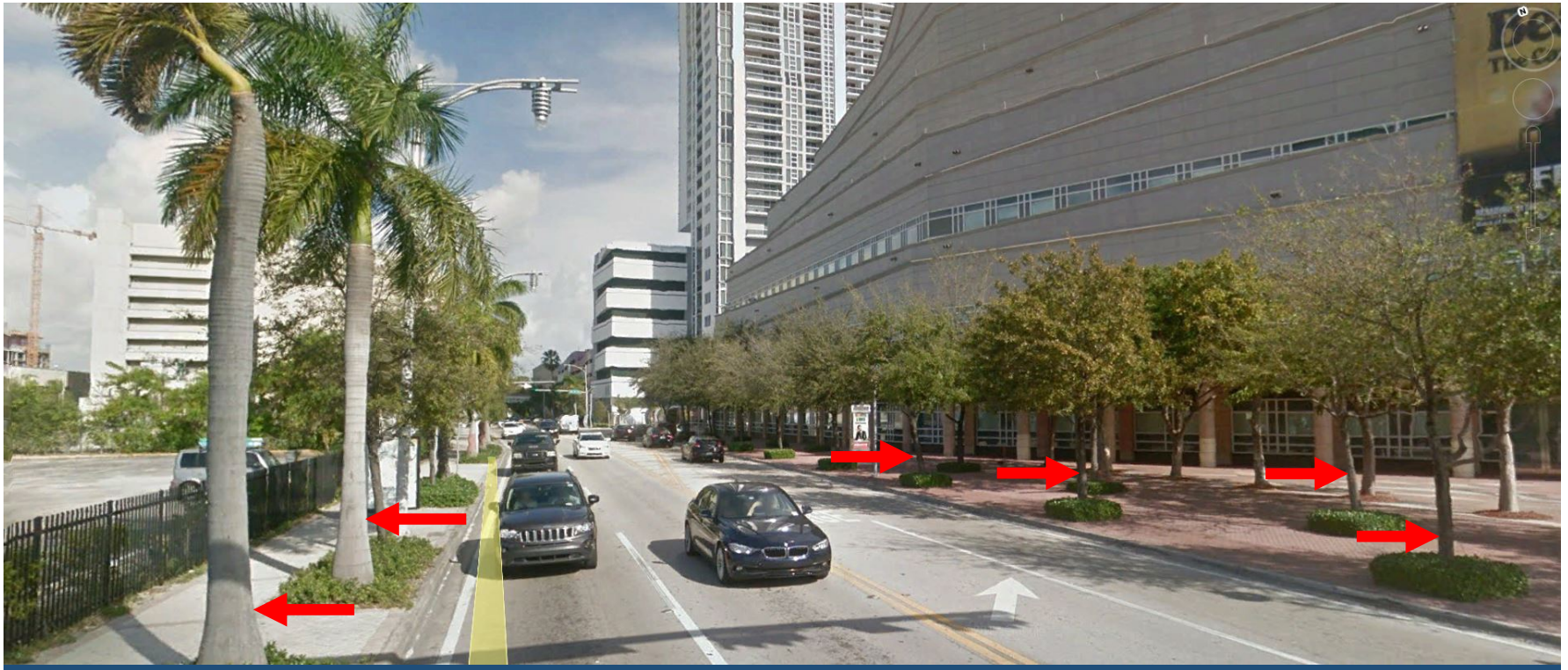
NE 39th Street

Metromover/Monorail – North Miami Avenue

I-195

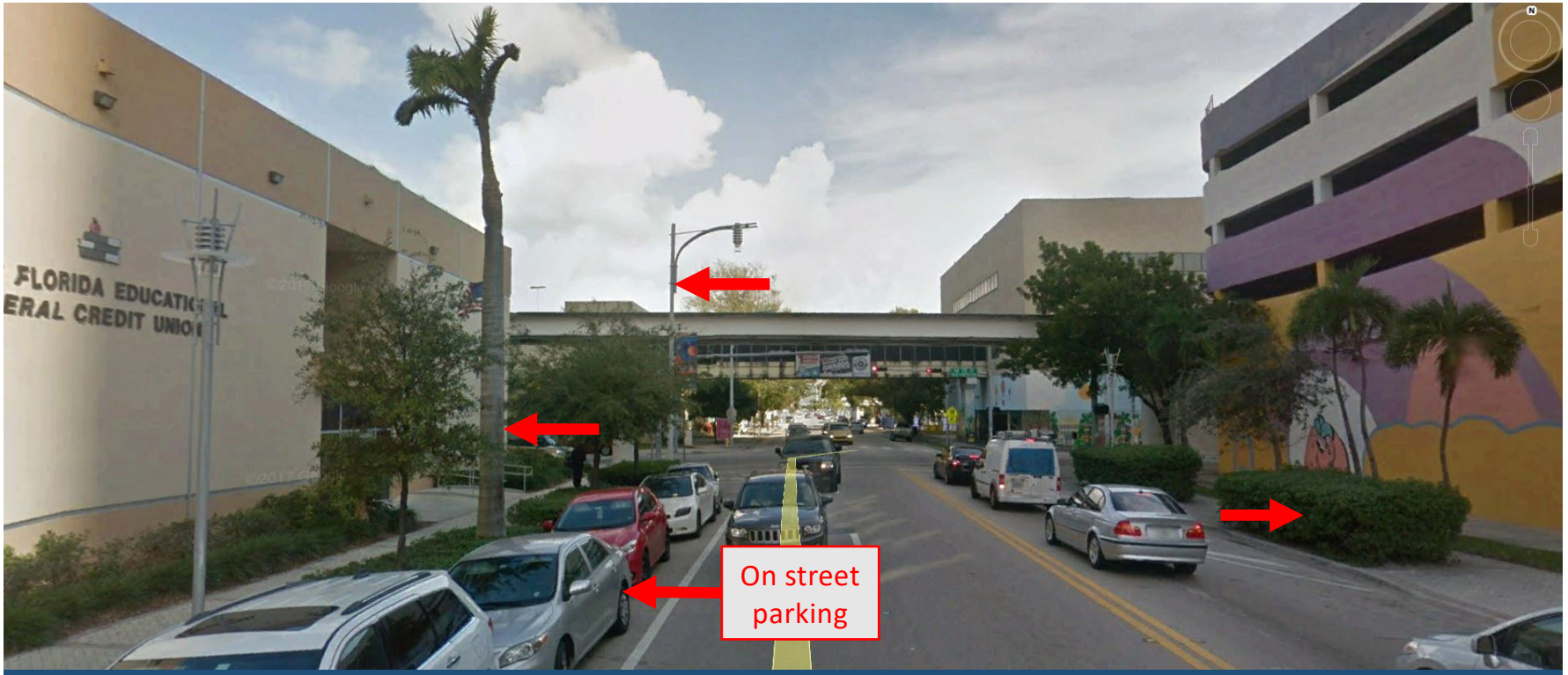
Metromover/Monorail – North Miami Avenue

LRT – NE 2nd Avenue



Between NE 13th Street & NE 14th Street

LRT – NE 2nd Avenue



Between NE 14th Street & NE 17th Street

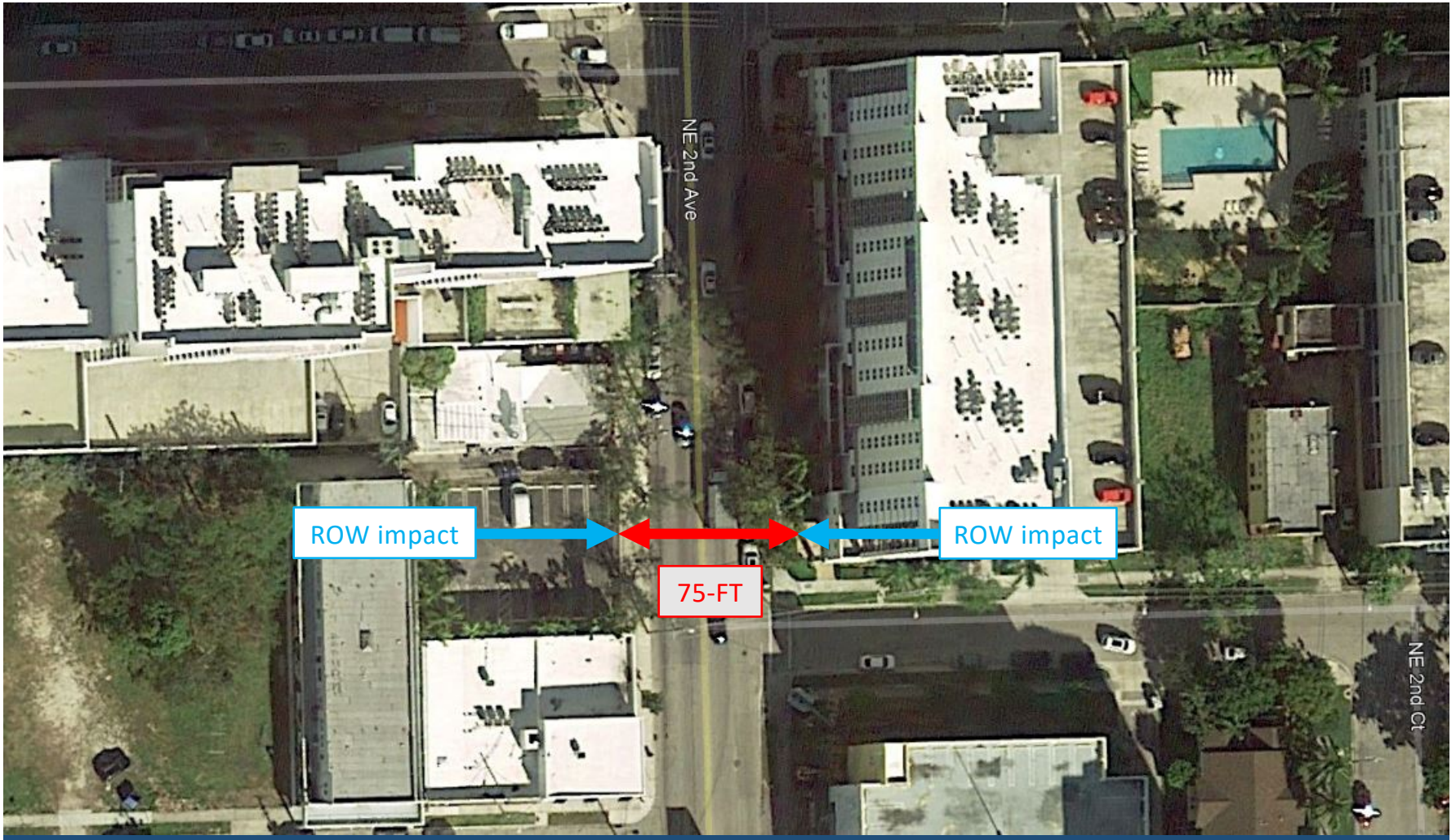
LRT – NE 2nd Avenue

Between NE 16th Street & NE 17th Street

LRT – NE 2nd Avenue

Between NE 17th Terrace & NE 18th Street

LRT – NE 2nd Avenue

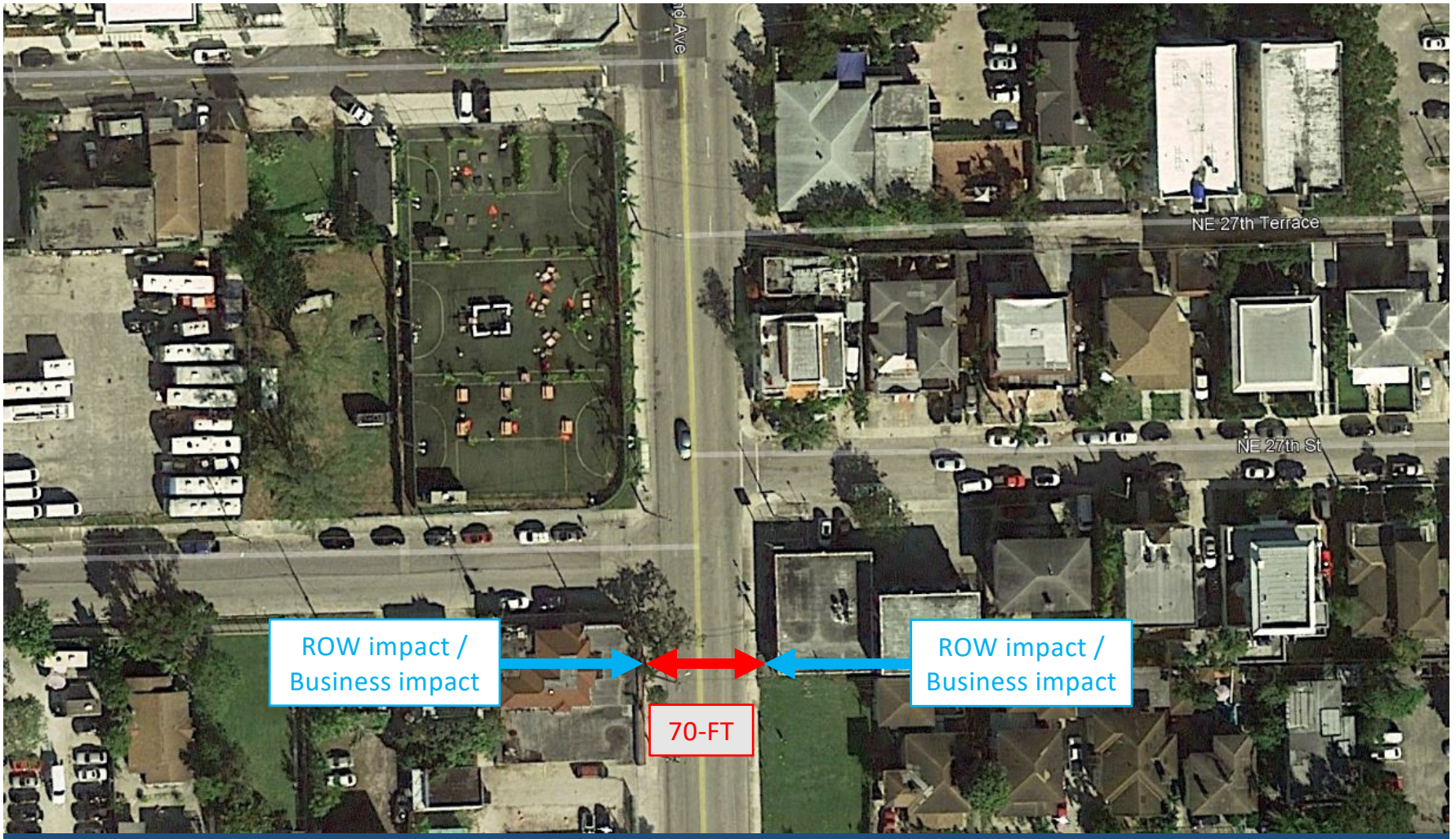


Between NE 24th Street & NE 25th Street

LRT – NE 2nd Avenue

Between NE 24th Street & NE 25th Street

LRT – NE 2nd Avenue



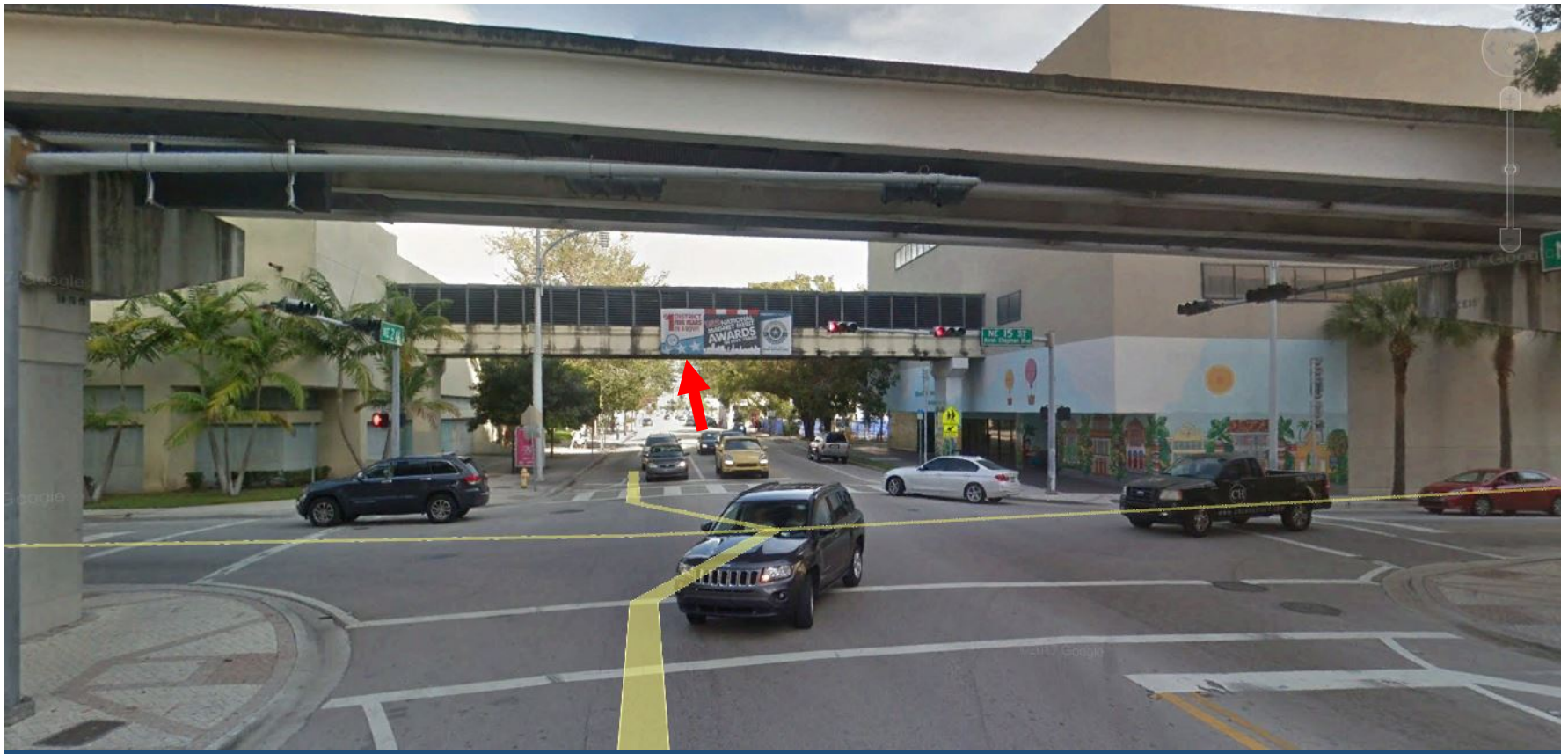
Between NE 26th Terrace & NE 28th Street

LRT – NE 2nd Avenue

Between NE 26th Terrace & NE 27th Street

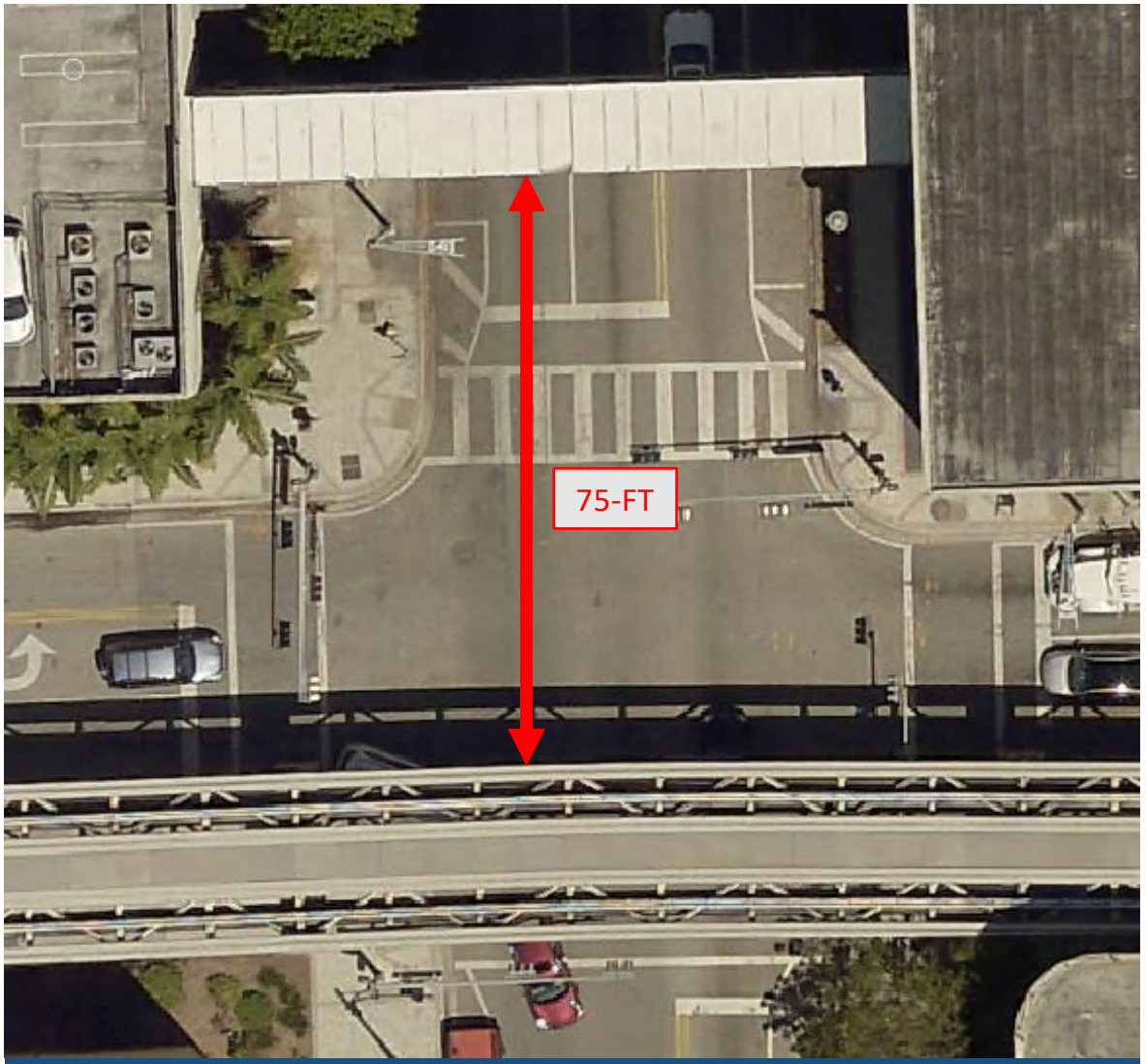
LRT – NE 2nd Avenue

Metromover/Monorail – NE 2nd Avenue



Between NE 15th Street & NE 15th Terrace

Metromover/Monorail – NE 2nd Avenue

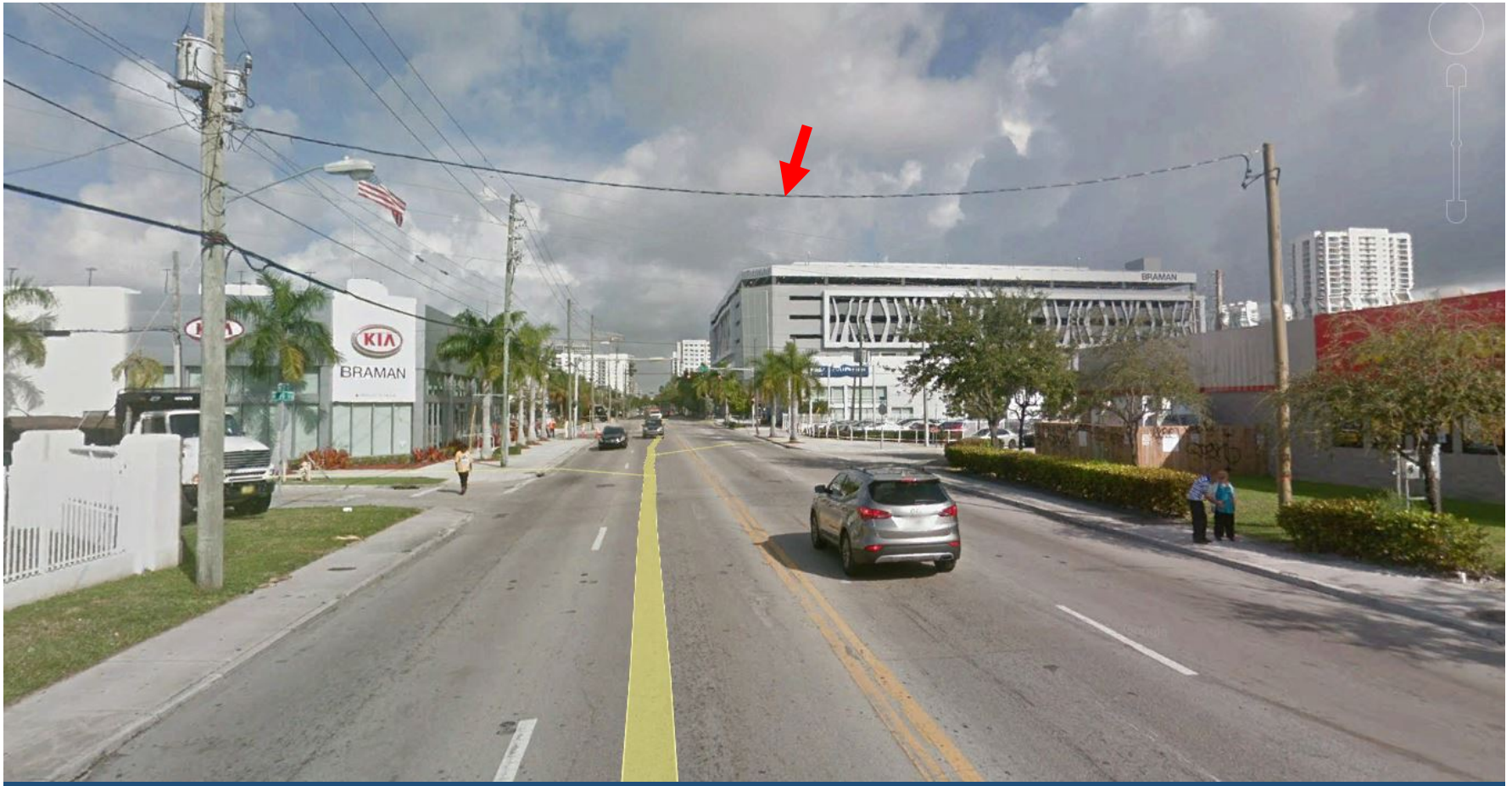


Between NE 15th Street & 15th Terrace

Metromover/Monorail – NE 2nd Avenue

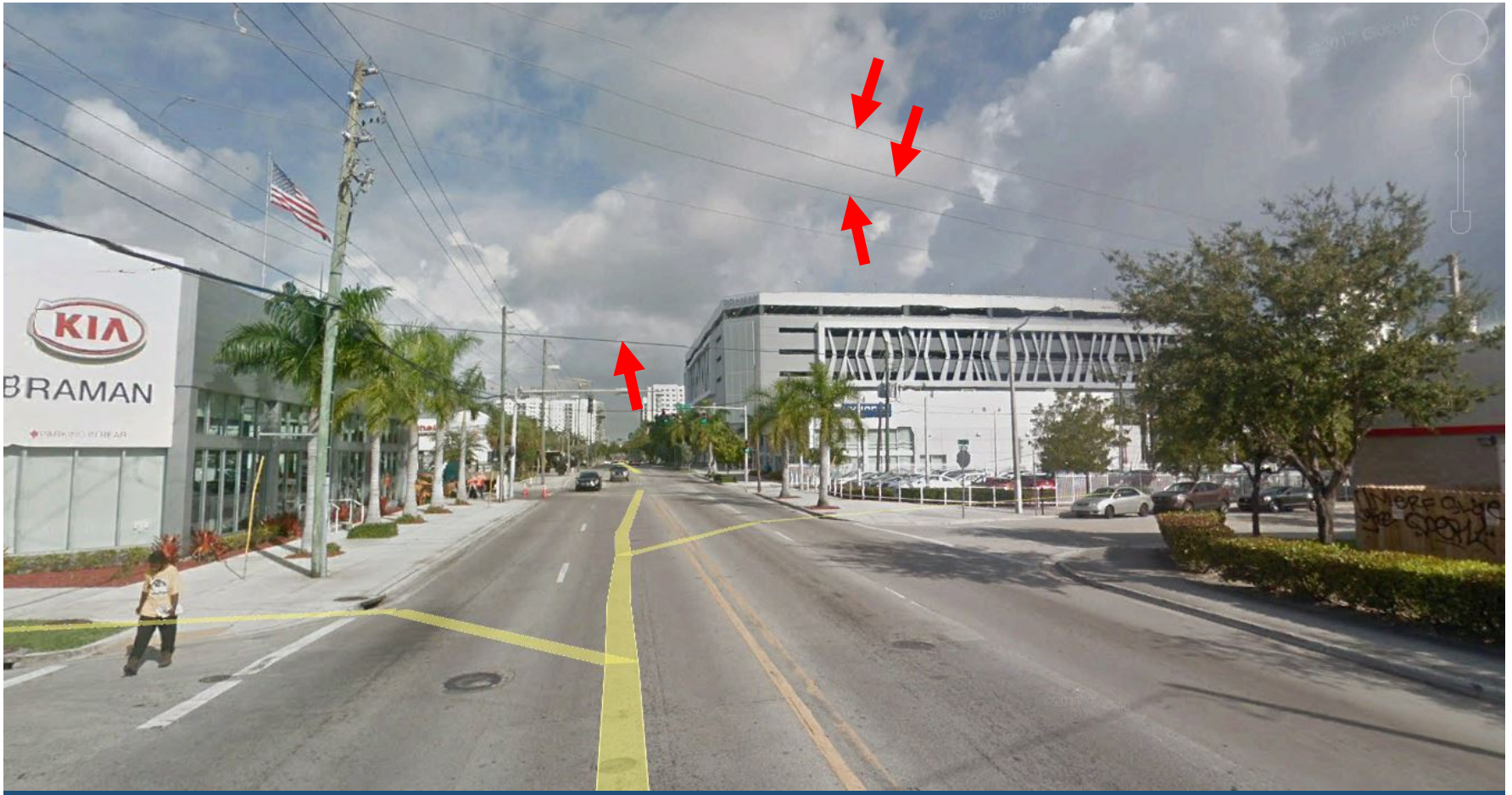
Between NE 16th Street & NE 17th Street

Metromover/Monorail – NE 2nd Avenue



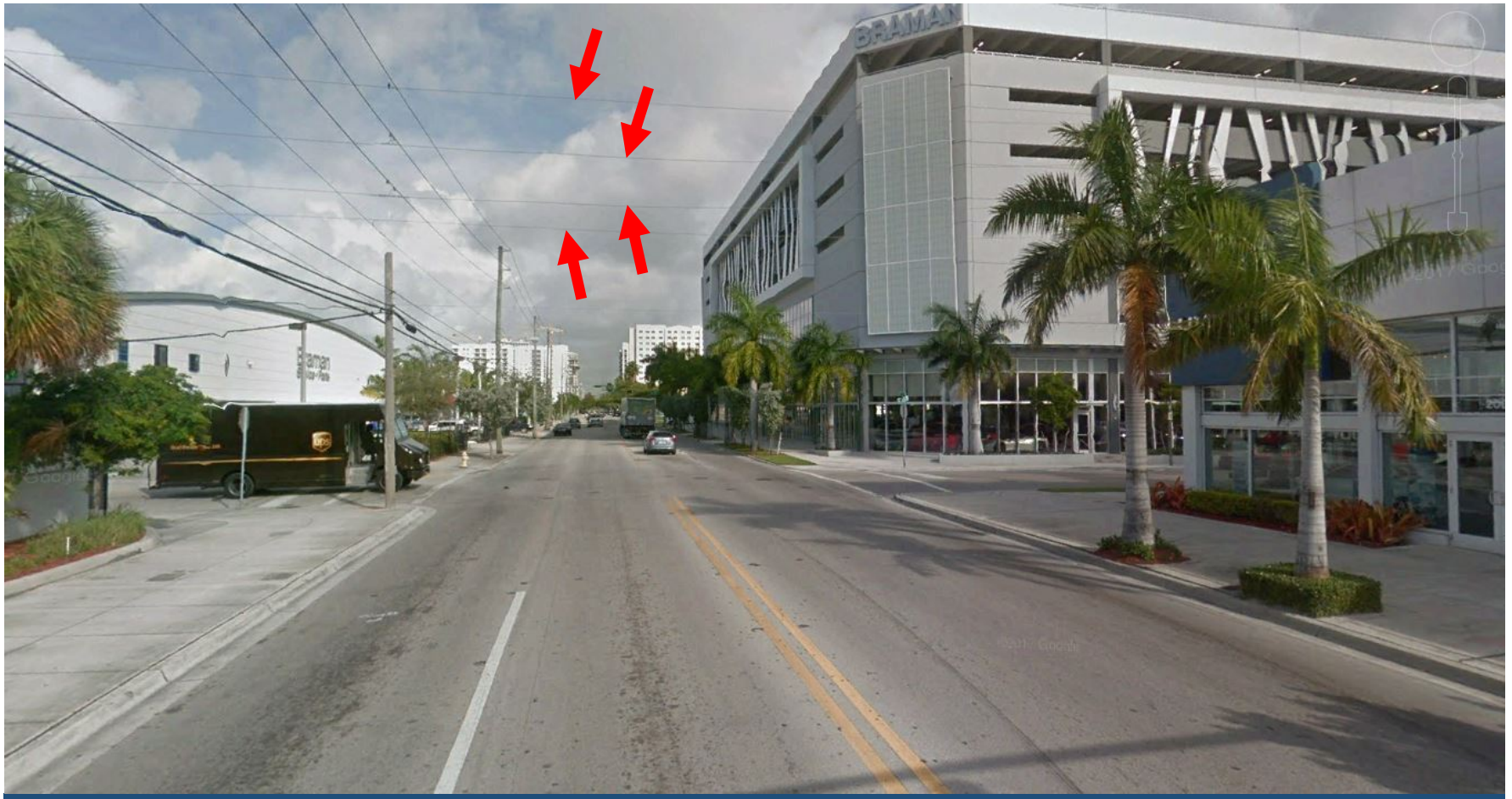
Between NE 19th Street & 19th Terrace

Metromover/Monorail – NE 2nd Avenue



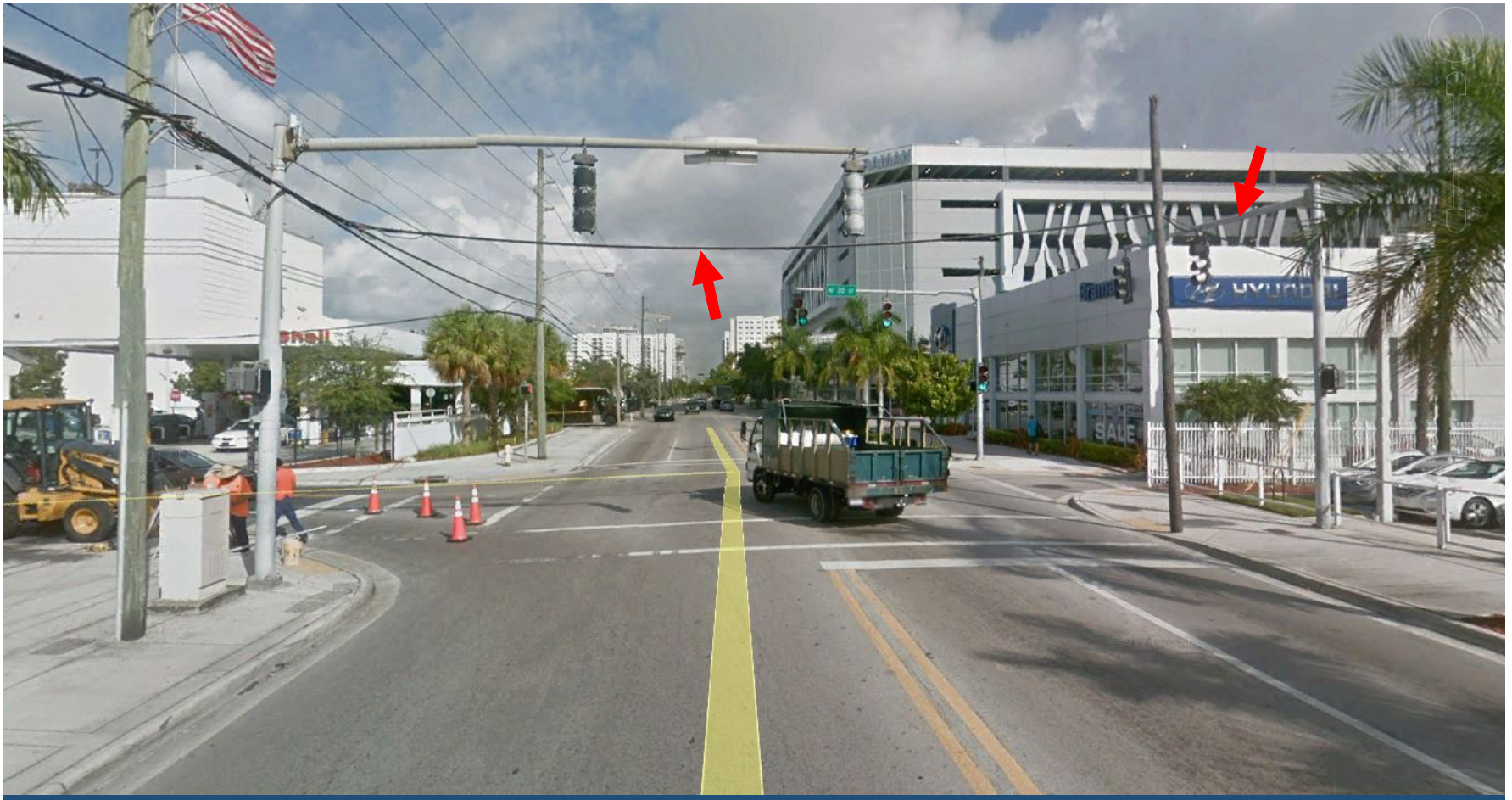
NE 19th Terrace

Metromover/Monorail – NE 2nd Avenue



Between NE 20th Street & 20th Terrace

Metromover/Monorail – NE 2nd Avenue



NE 20th Street

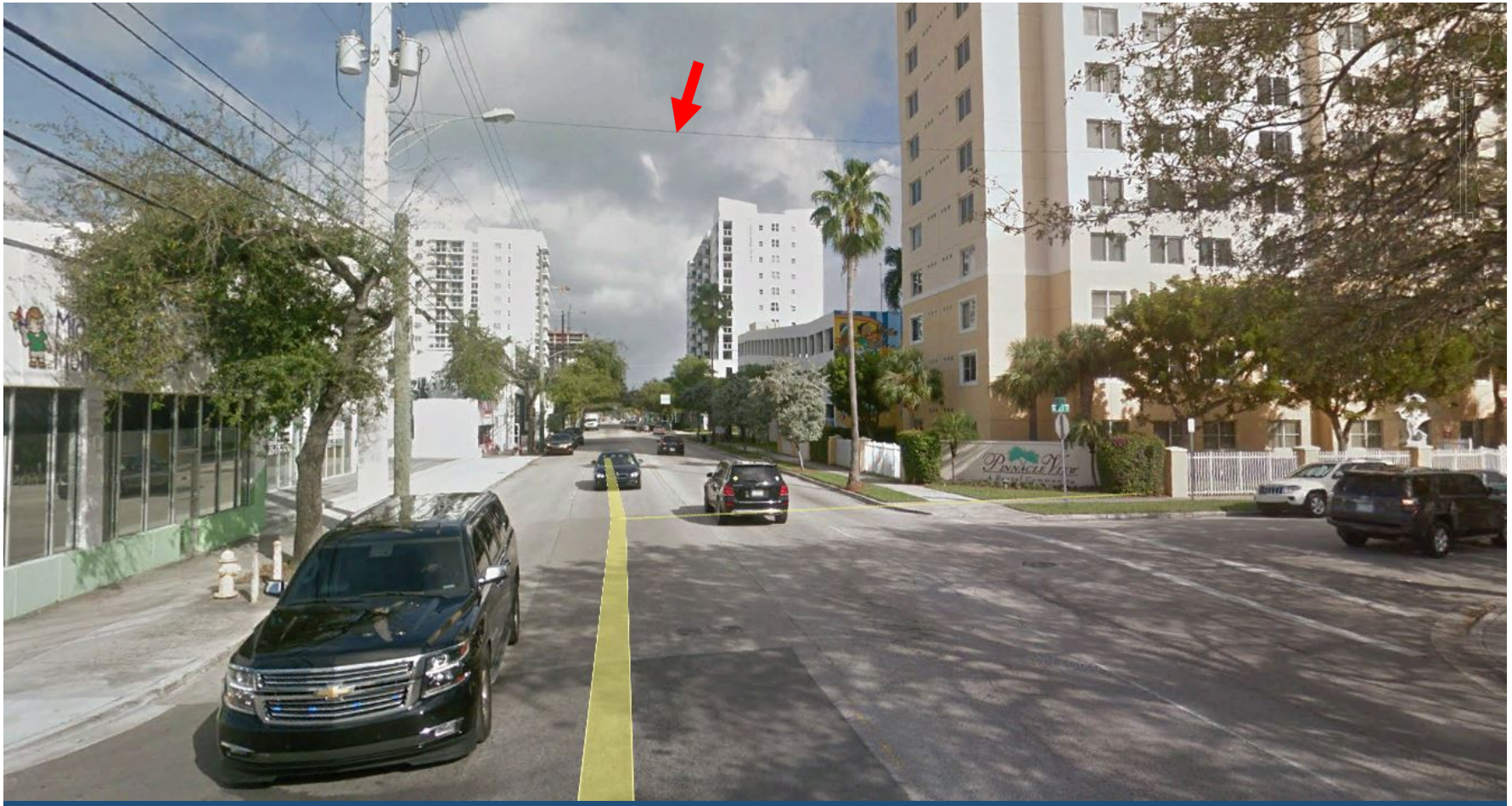
Metromover/Monorail – NE 2nd Avenue

NE 21st Street

Metromover/Monorail – NE 2nd Avenue

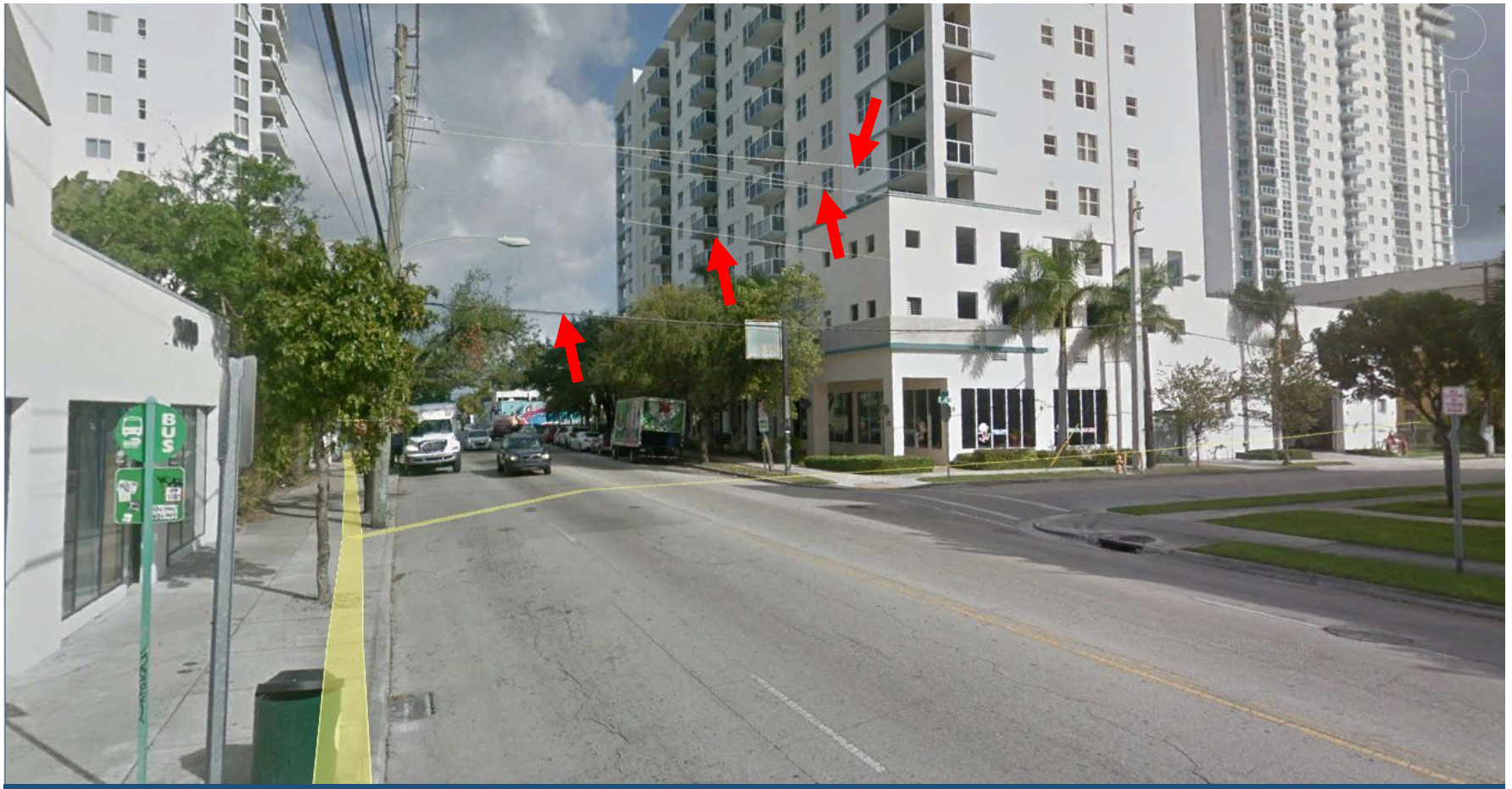
NE 22nd Street

Metromover/Monorail – NE 2nd Avenue



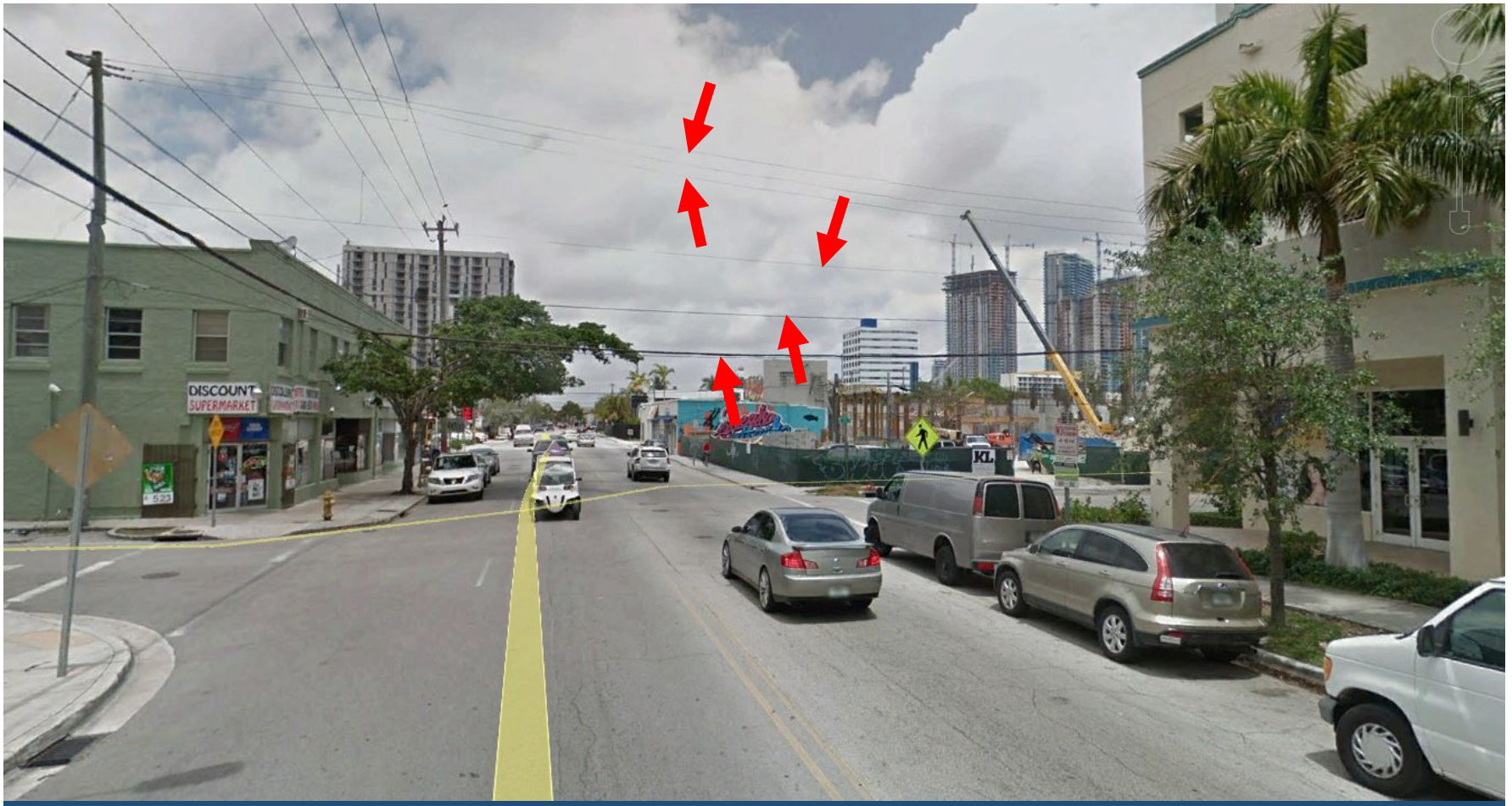
Between NE 23rd Street & 24th Street

Metromover/Monorail – NE 2nd Avenue



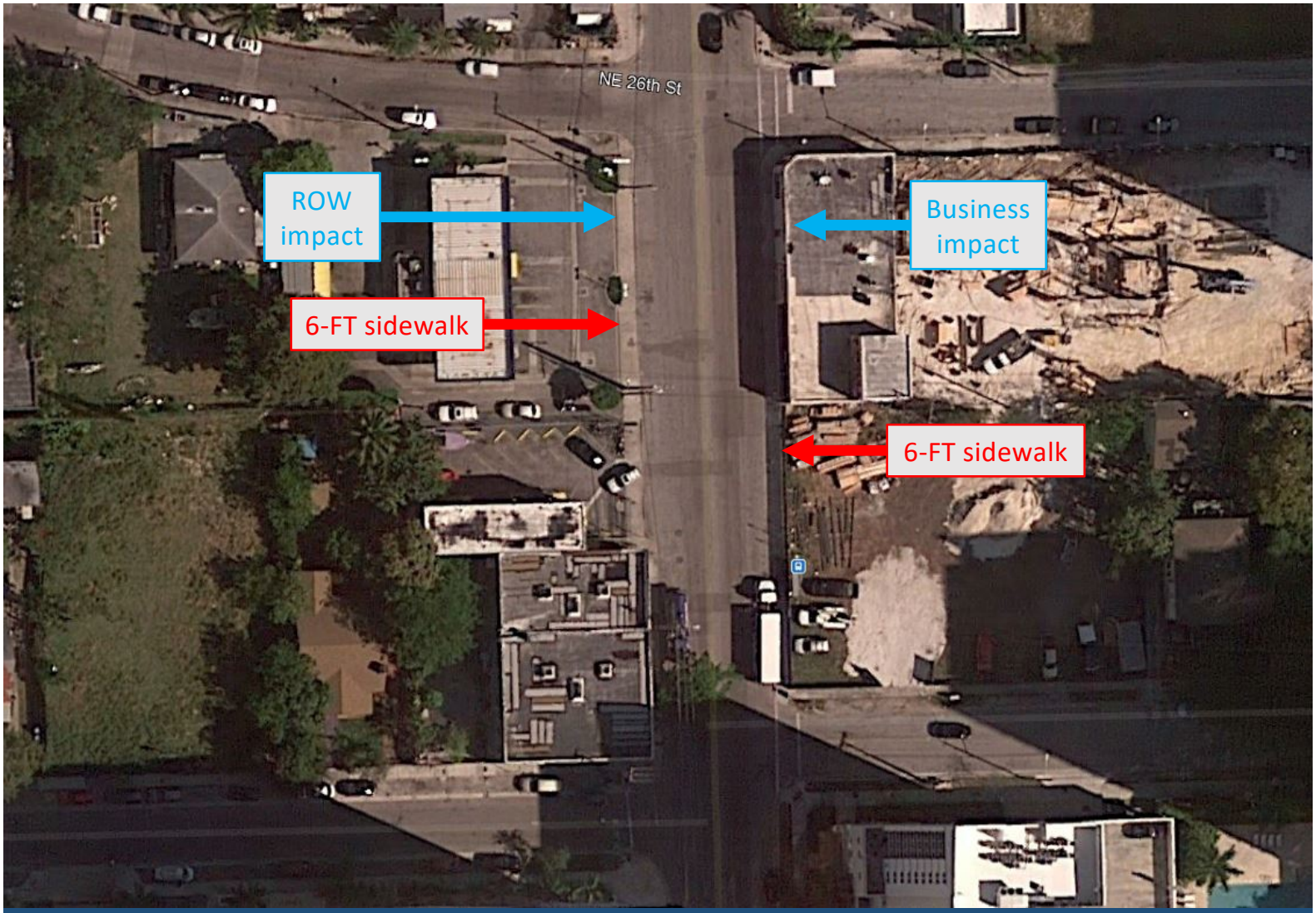
NE 24th Street

Metromover/Monorail – NE 2nd Avenue



NE 25th Street

Metromover/Monorail – NE 2nd Avenue



Between NE 25th Street & NE 26th Street

Metromover/Monorail – NE 2nd Avenue

Between NE 25th Street & NE 26th Street

Metromover/Monorail – NE 2nd Avenue

NE 26th Street

Metromover/Monorail – NE 2nd Avenue

Between NE 26th Street & NE 26th Terrace

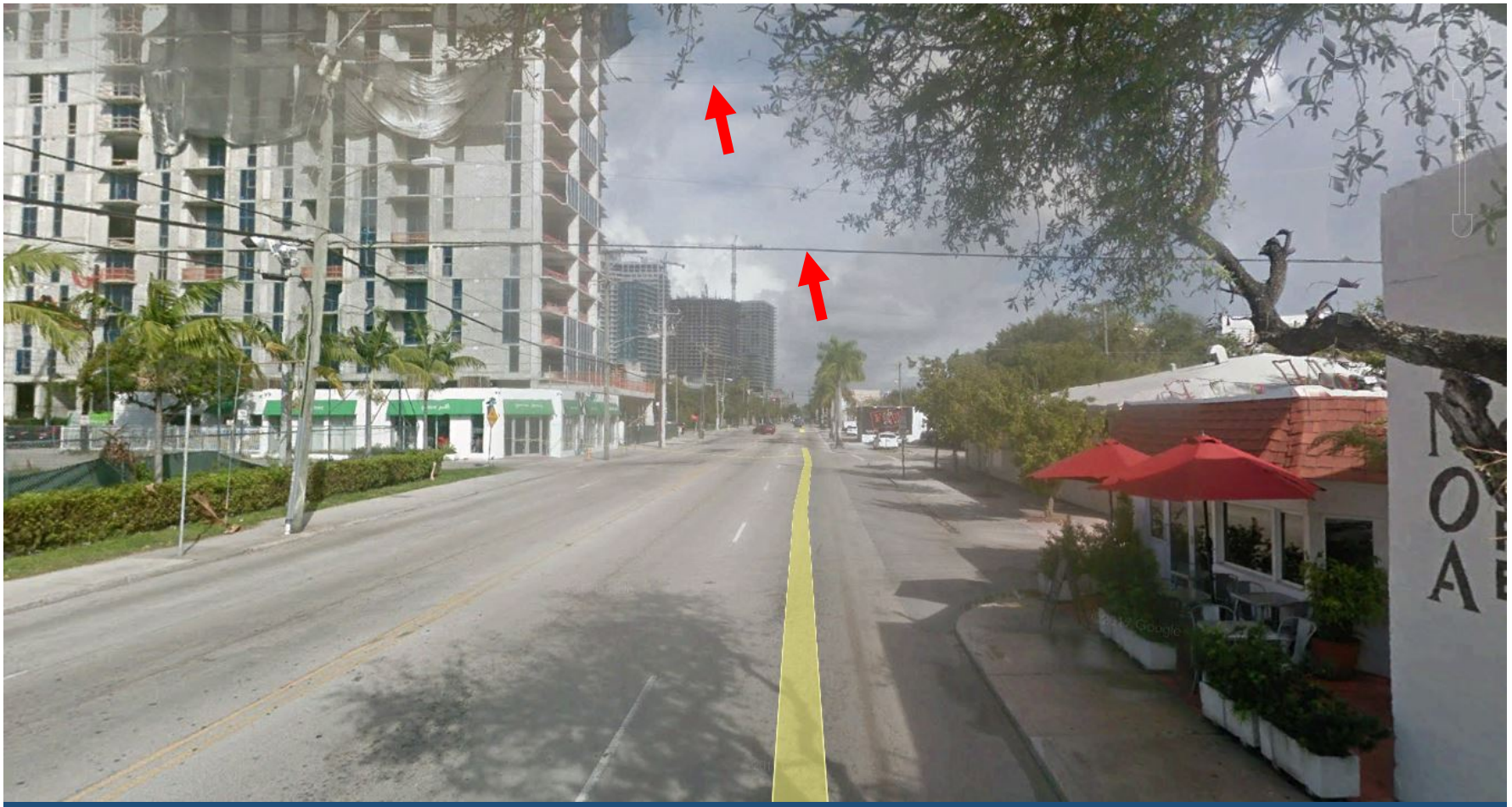
Metromover/Monorail – NE 2nd Avenue

Between NE 26th Street & NE 27th Street

Metromover/Monorail – NE 2nd Avenue

NE 27th Street

Metromover/Monorail – NE 2nd Avenue

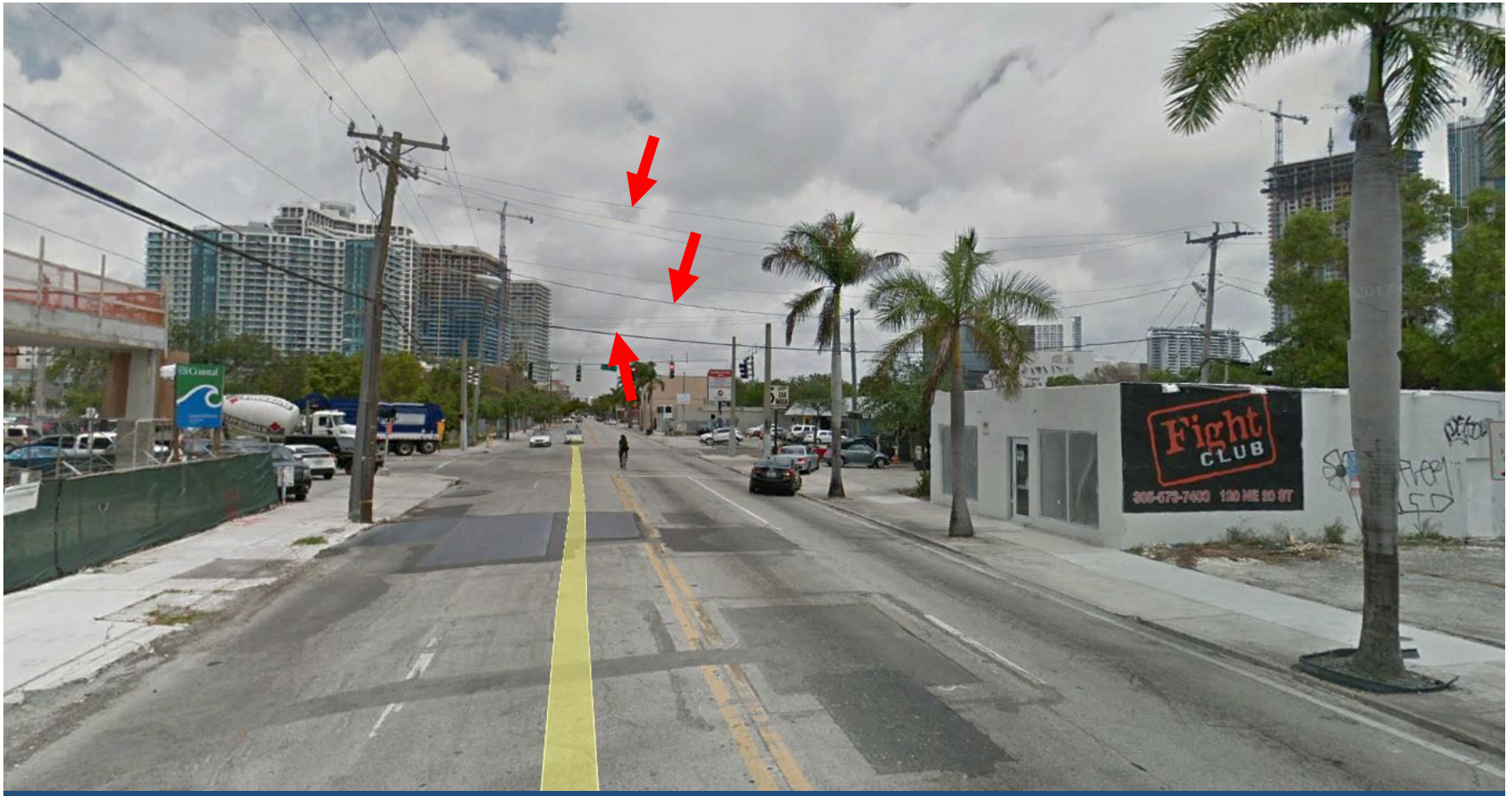


NE 27th Terrace

Metromover/Monorail – NE 2nd Avenue

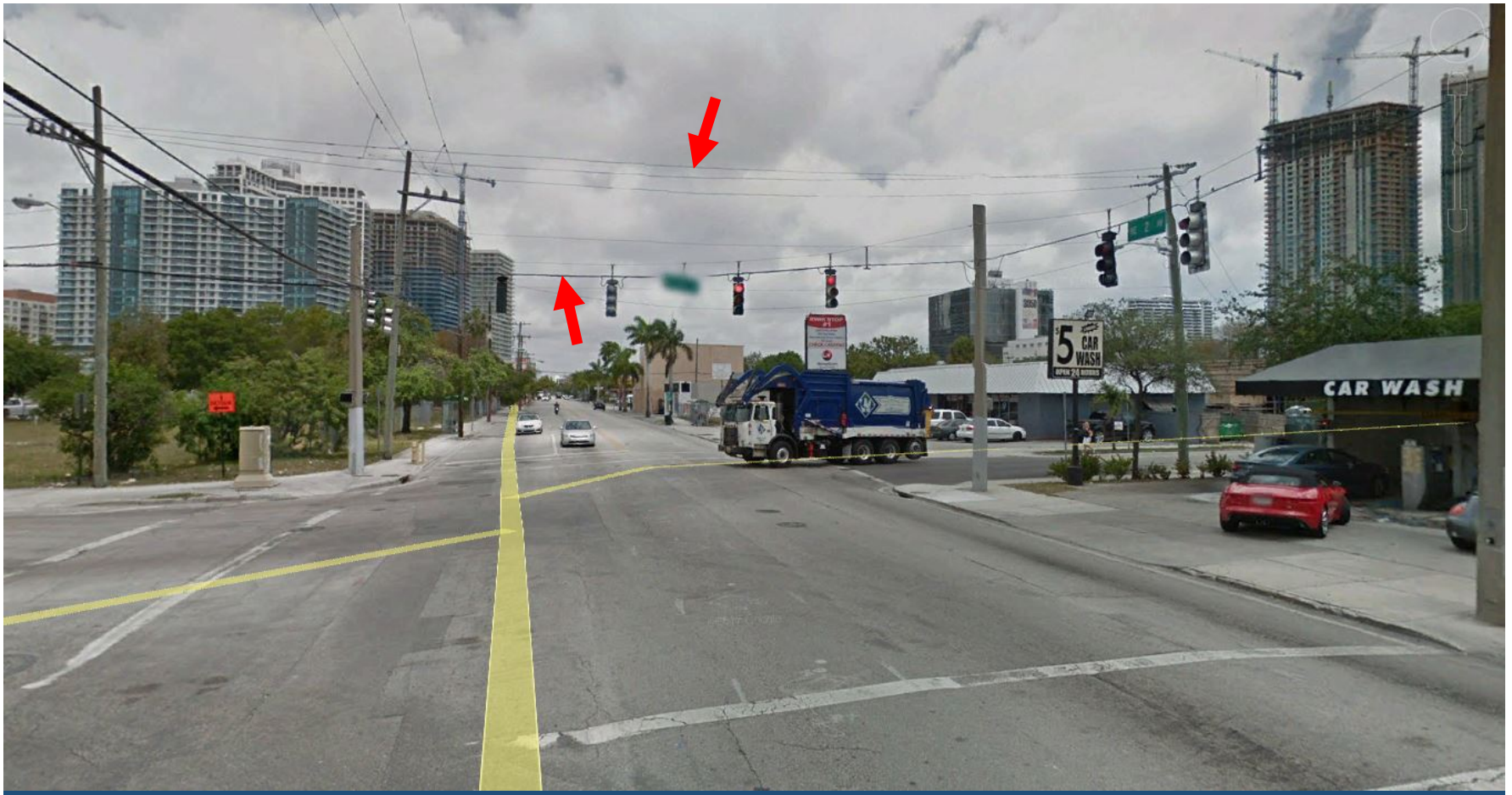
NE 28th Street (looking south along NE 2nd Avenue)

Metromover/Monorail – NE 2nd Avenue



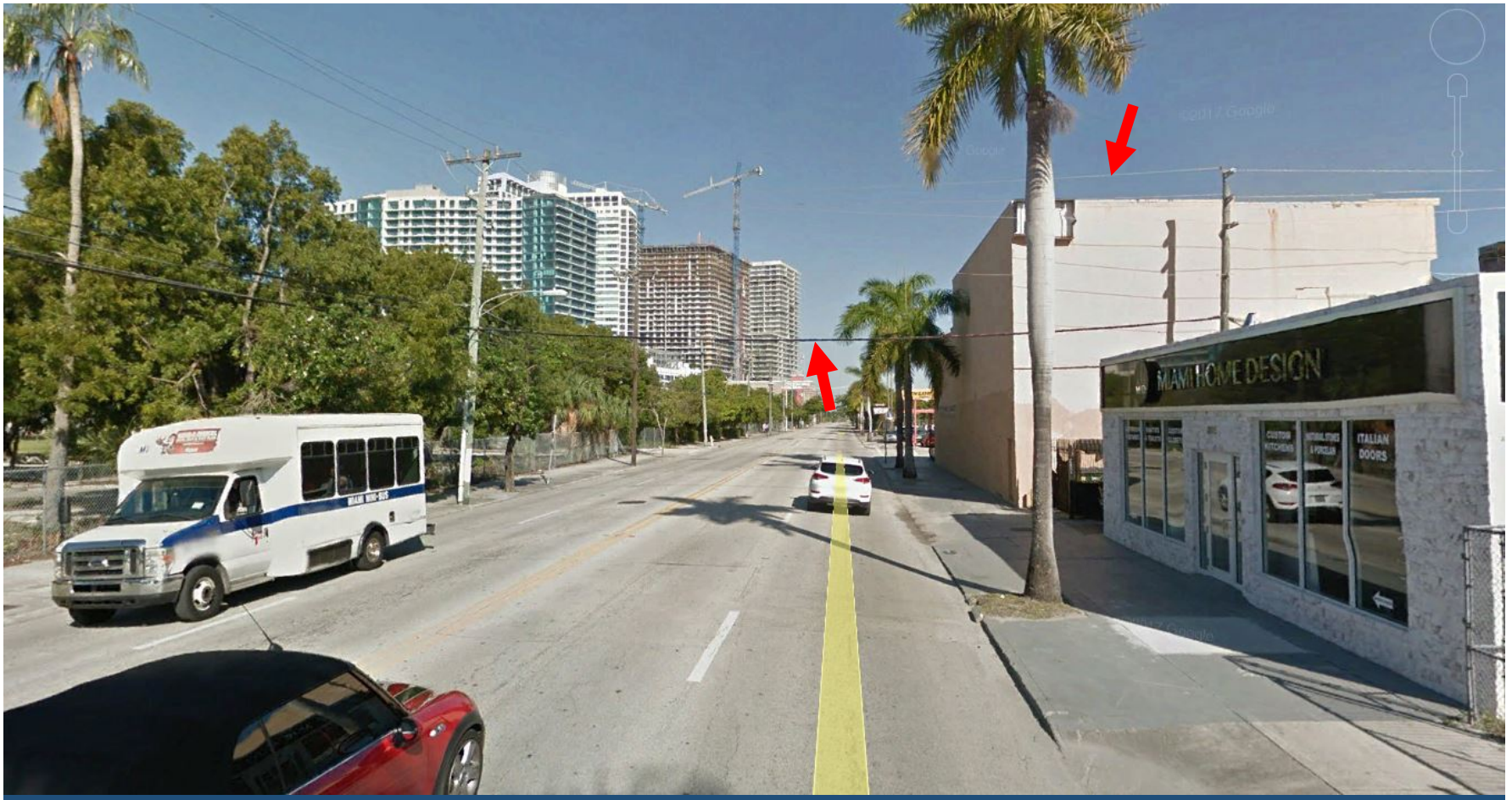
Between NE 28th Street & NE 29th Street

Metromover/Monorail – NE 2nd Avenue



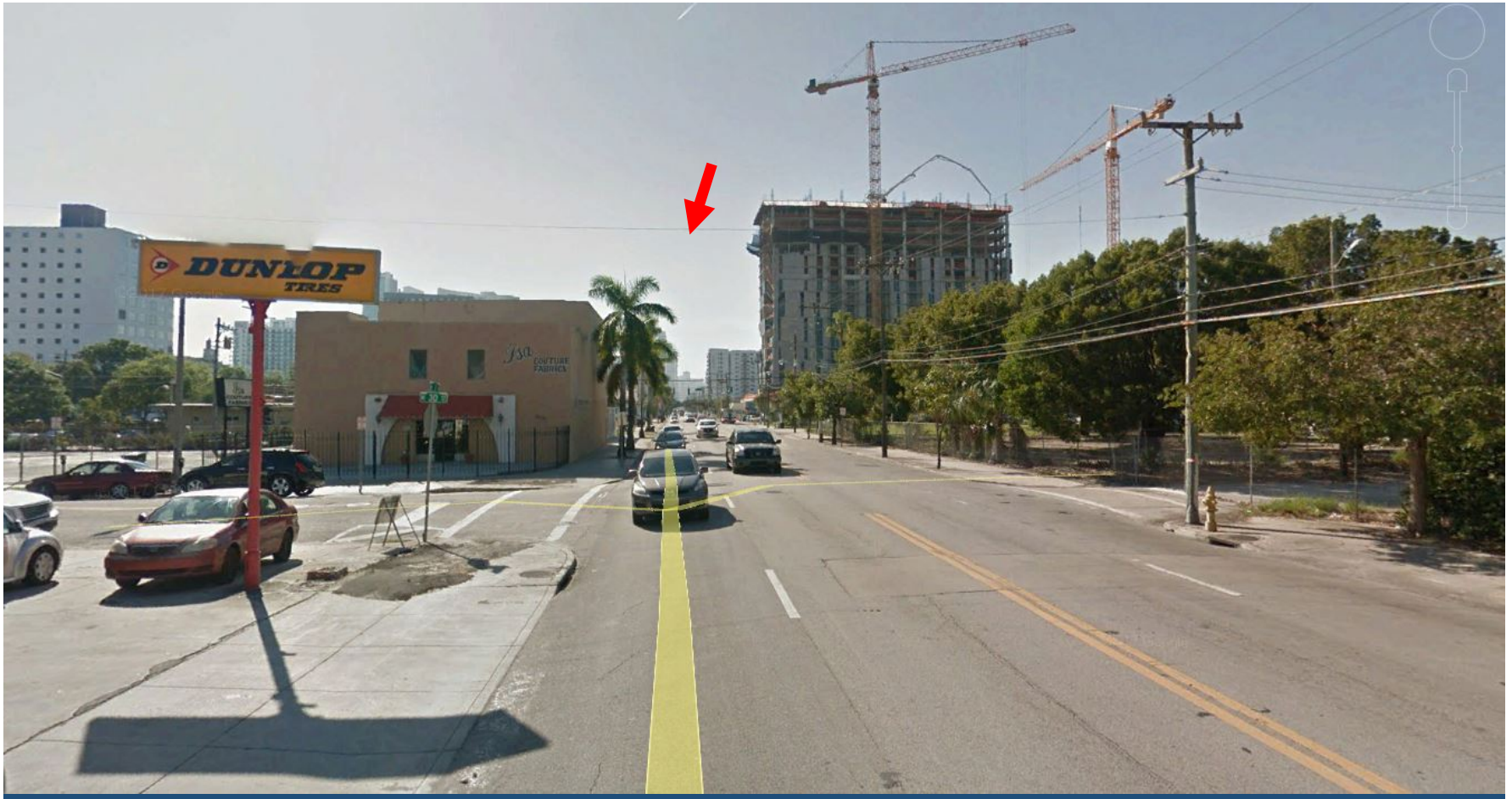
NE 29th Street

Metromover/Monorail – NE 2nd Avenue



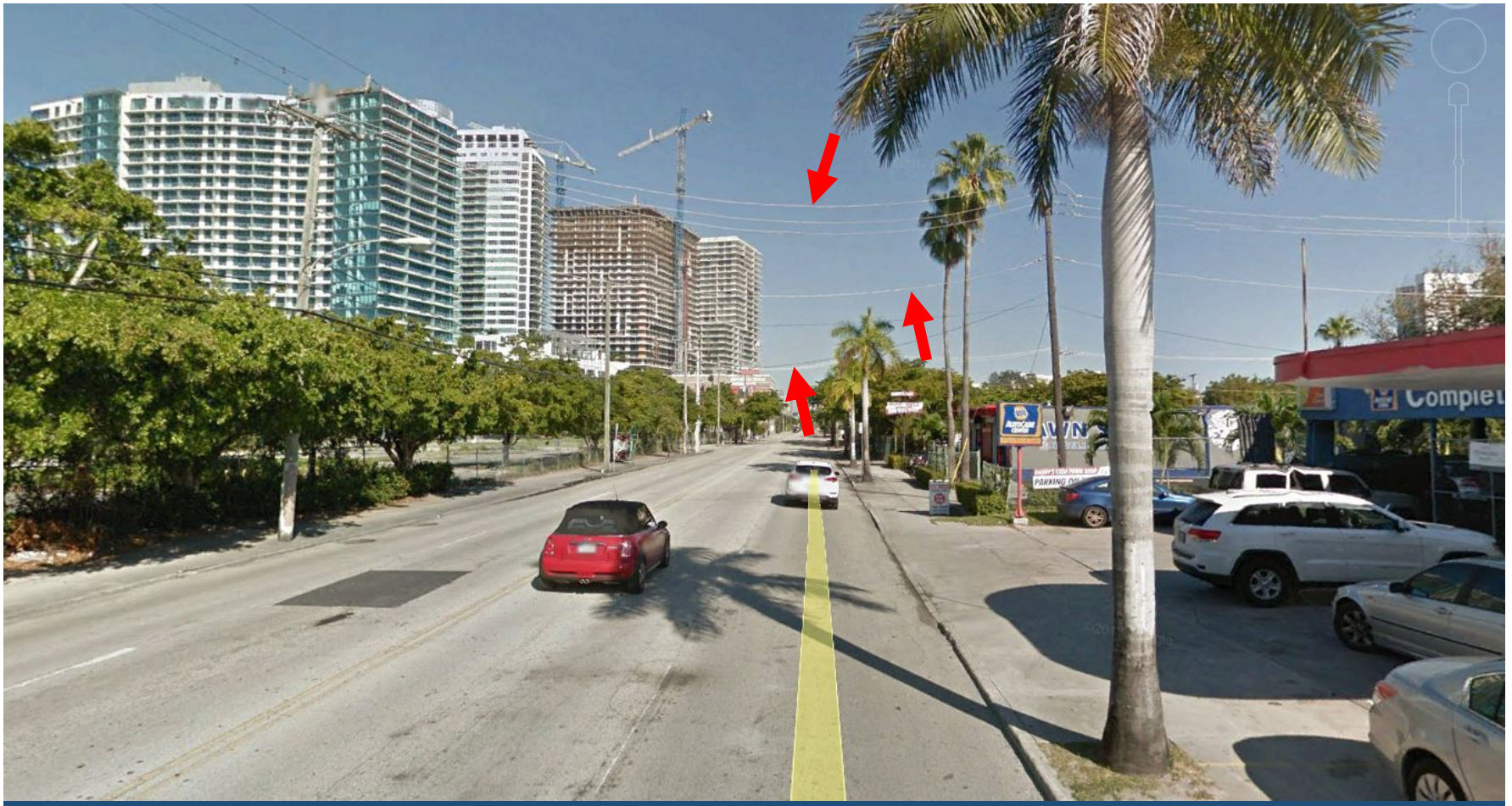
Between NE 29th Street & NE 30th Street

Metromover/Monorail – NE 2nd Avenue



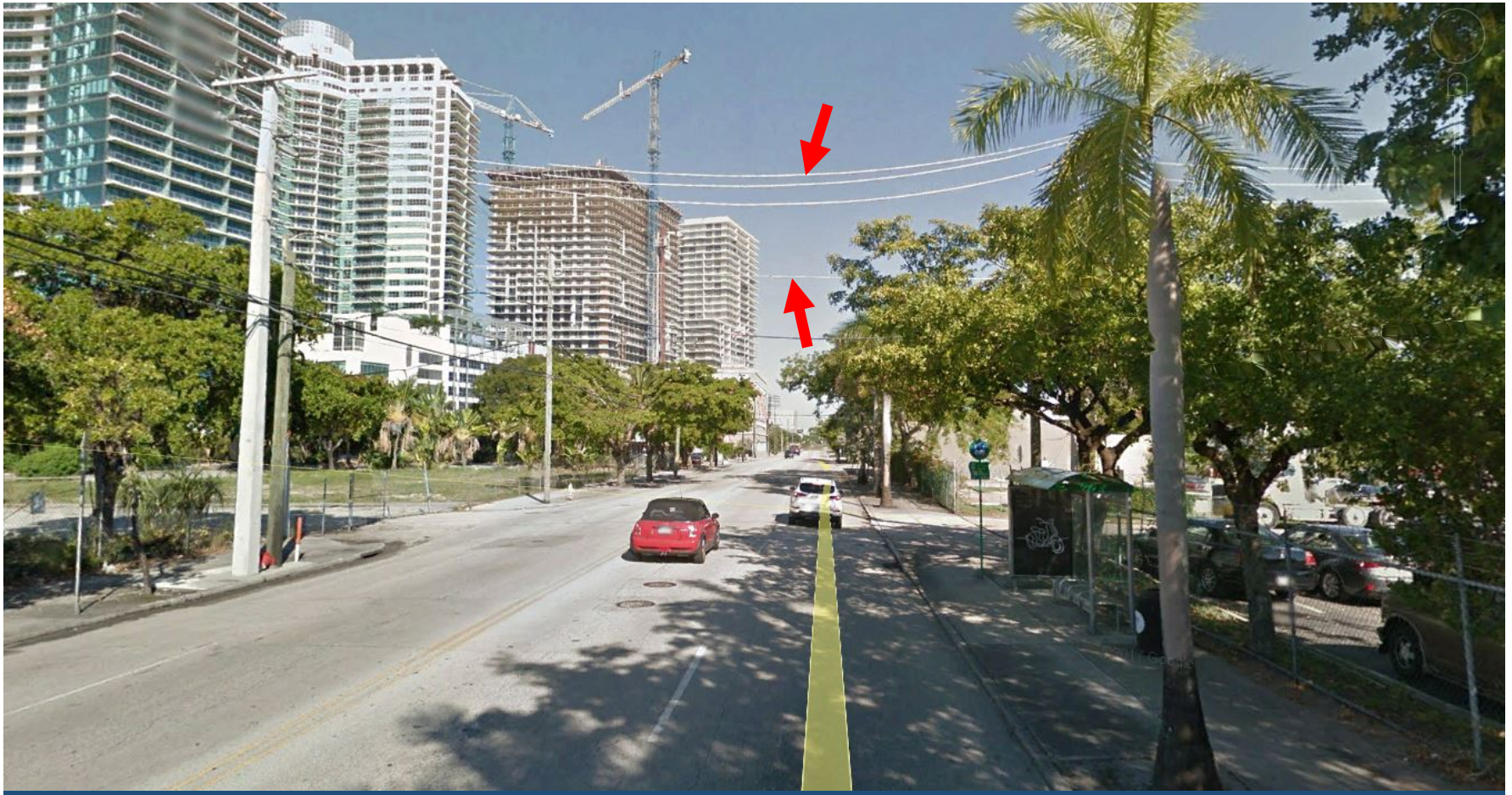
NE 30th Street (looking south along NE 2nd Avenue)

Metromover/Monorail – NE 2nd Avenue



Between NE 30th Street & NE 31st Street

Metromover/Monorail – NE 2nd Avenue

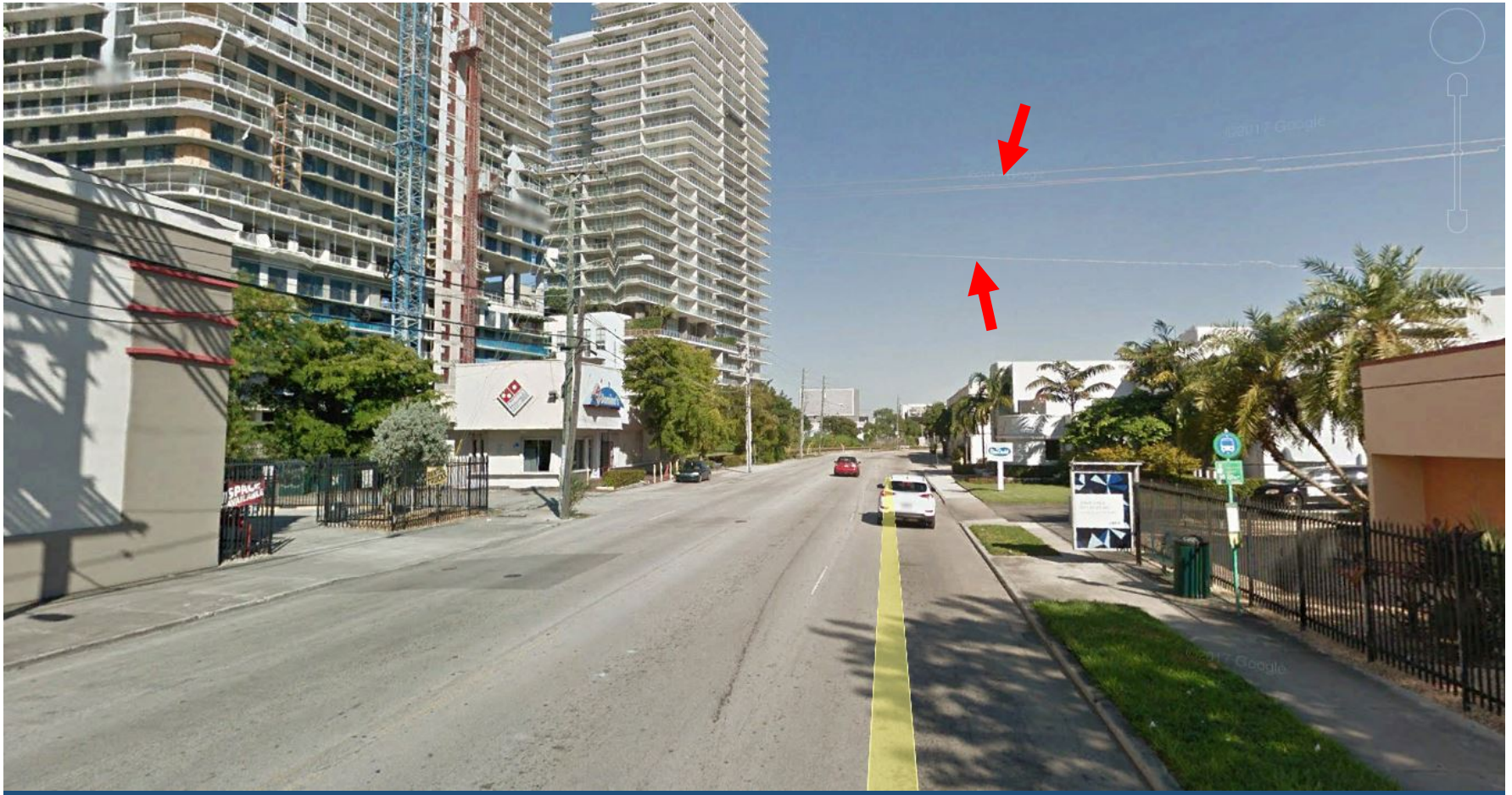


NE 31st Street

Metromover/Monorail – NE 2nd Avenue

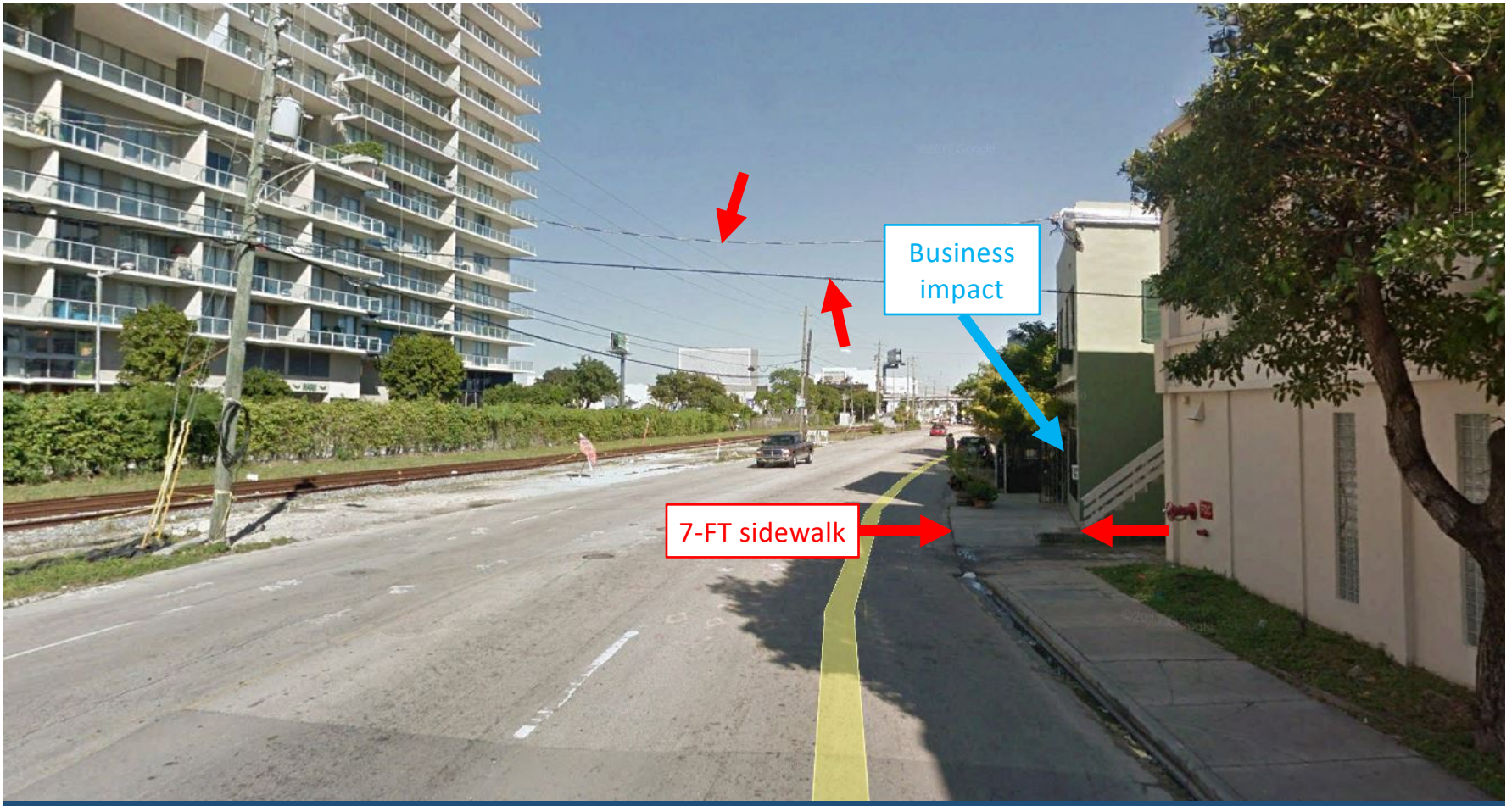
Between NE 31st Street & NE 32nd Street

Metromover/Monorail – NE 2nd Avenue



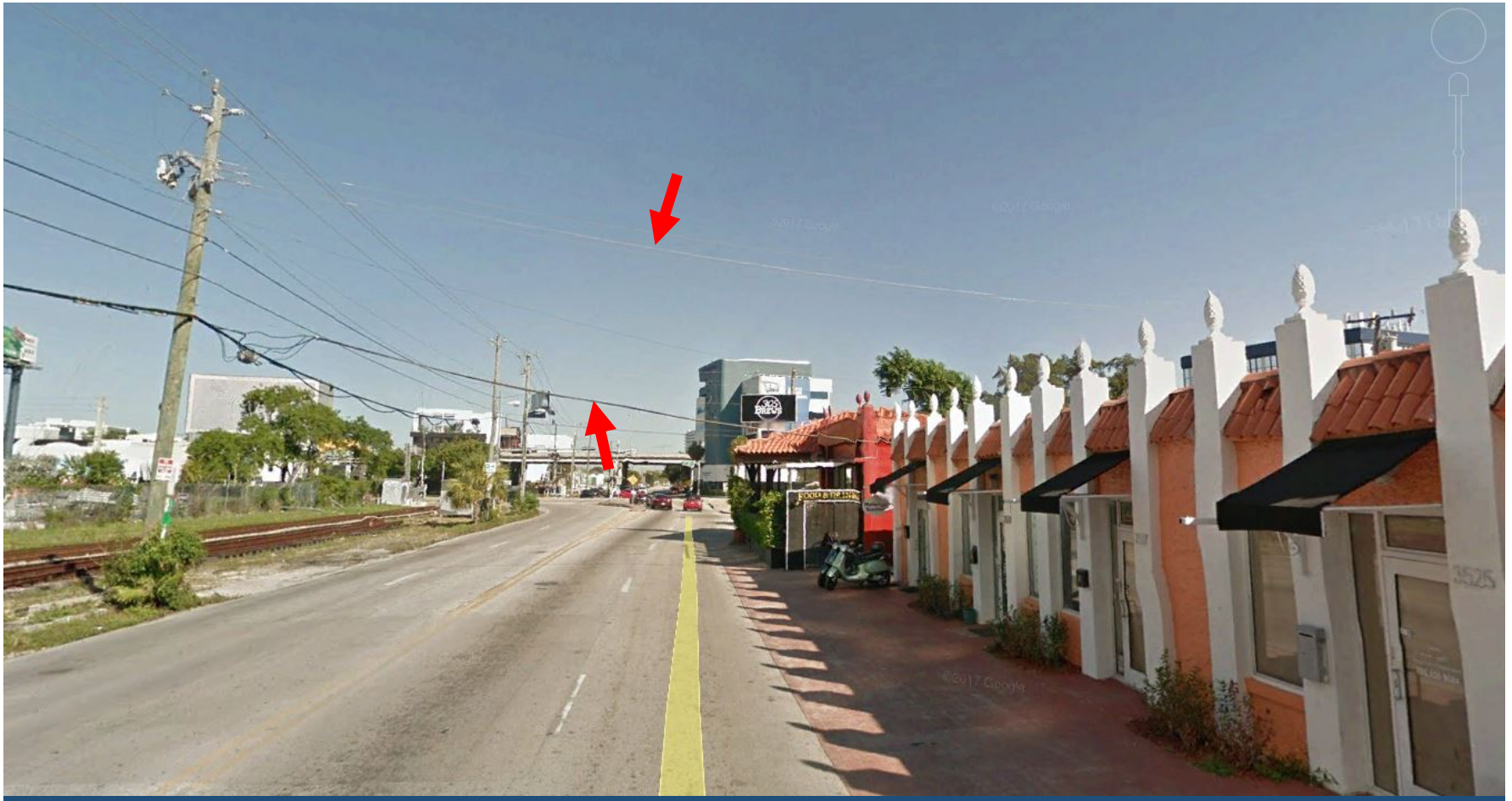
Between NE 33rd Street & NE 34th Street

Metromover/Monorail – NE 2nd Avenue



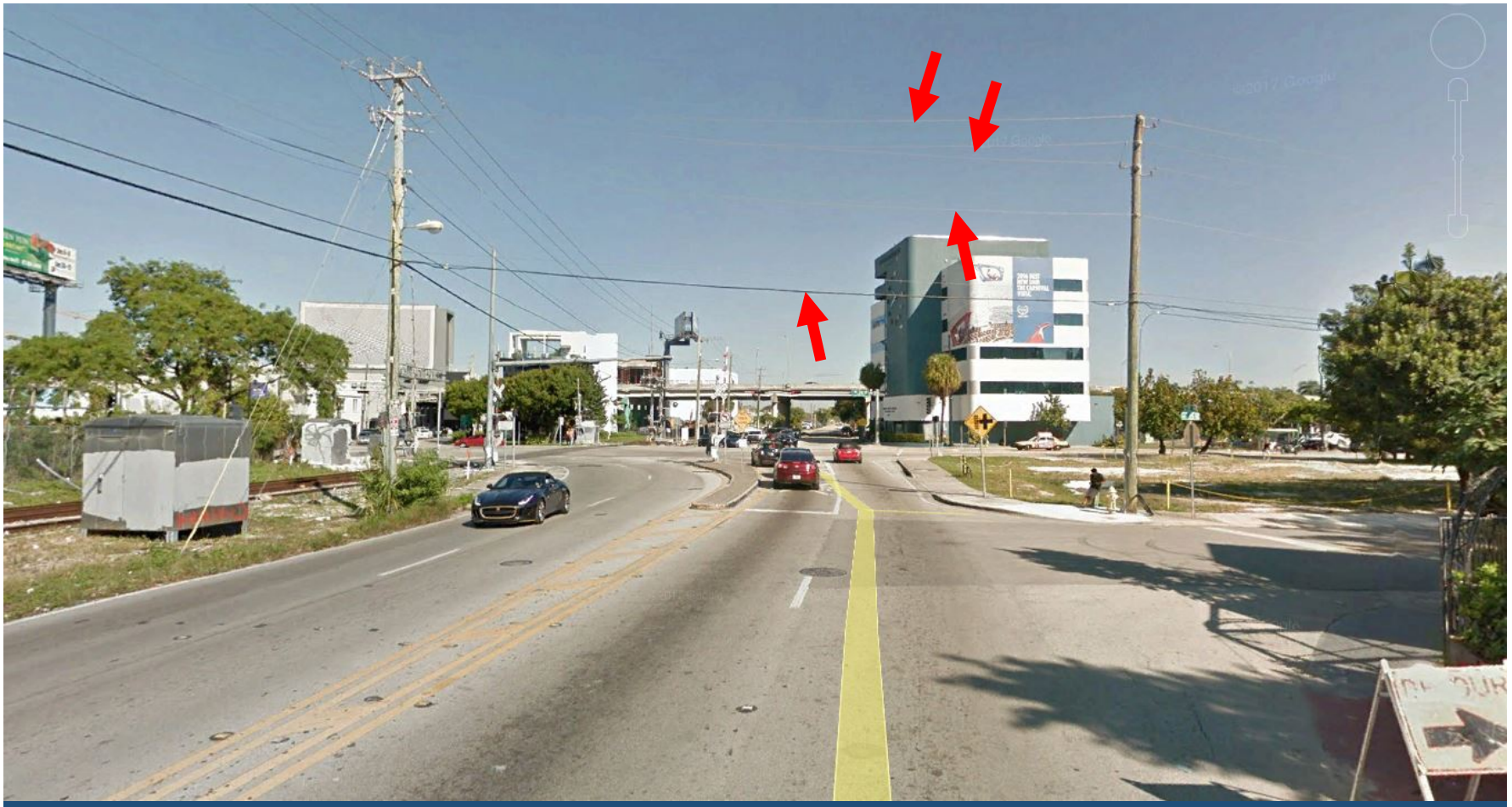
Between NE 34th Street & NE 35th Street

Metromover/Monorail – NE 2nd Avenue



Between NE 35th Street & NE 35th Terrace

Metromover/Monorail – NE 2nd Avenue



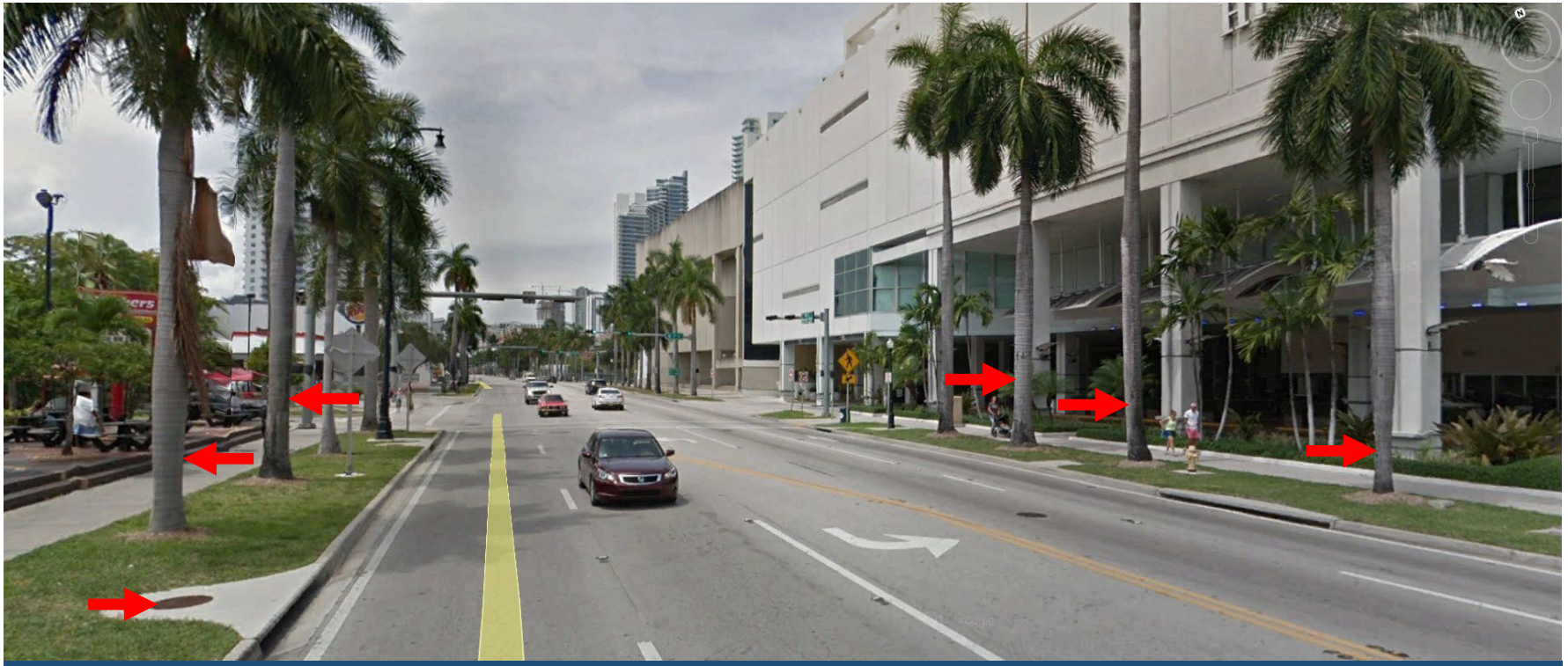
NE 35th Terrace

Metromover/Monorail – NE 2nd Avenue

LRT – Biscayne Boulevard

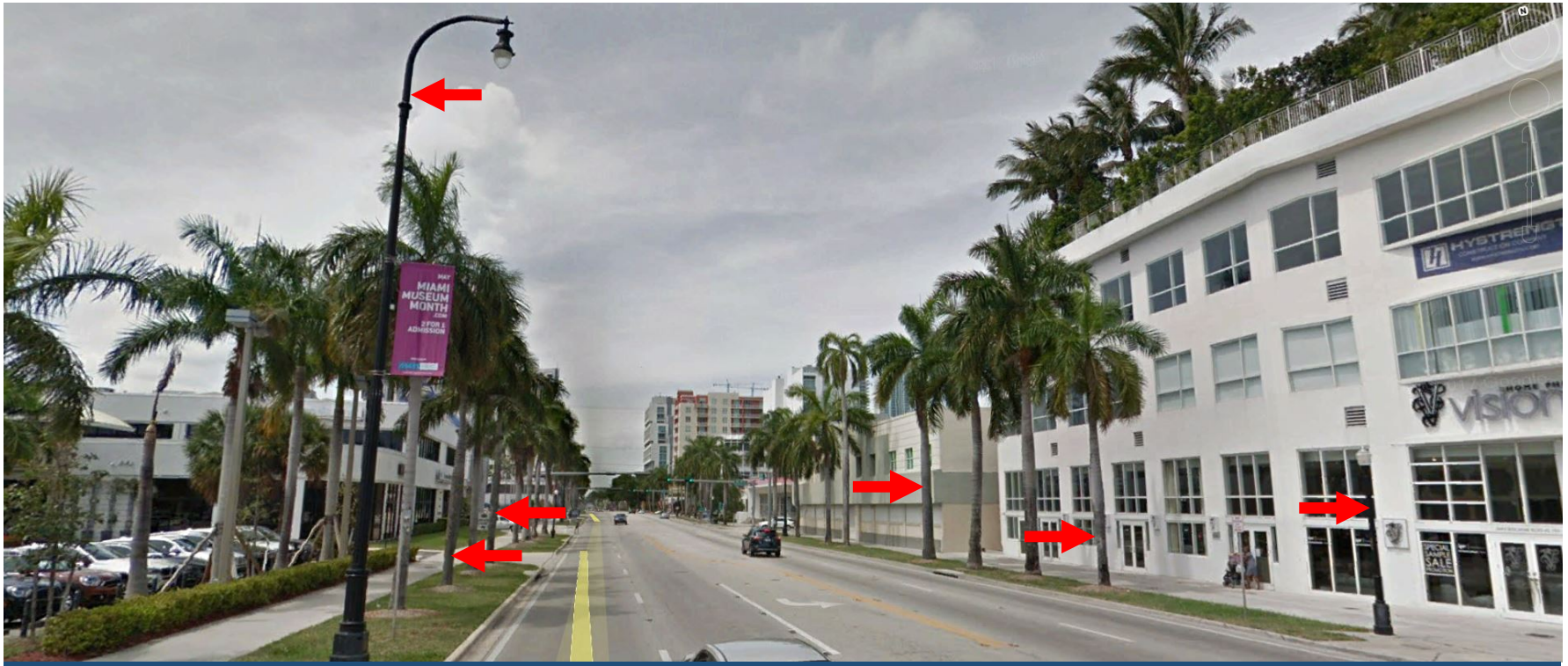
Between NE 13th Street & NE 14th Street

LRT – Biscayne Boulevard



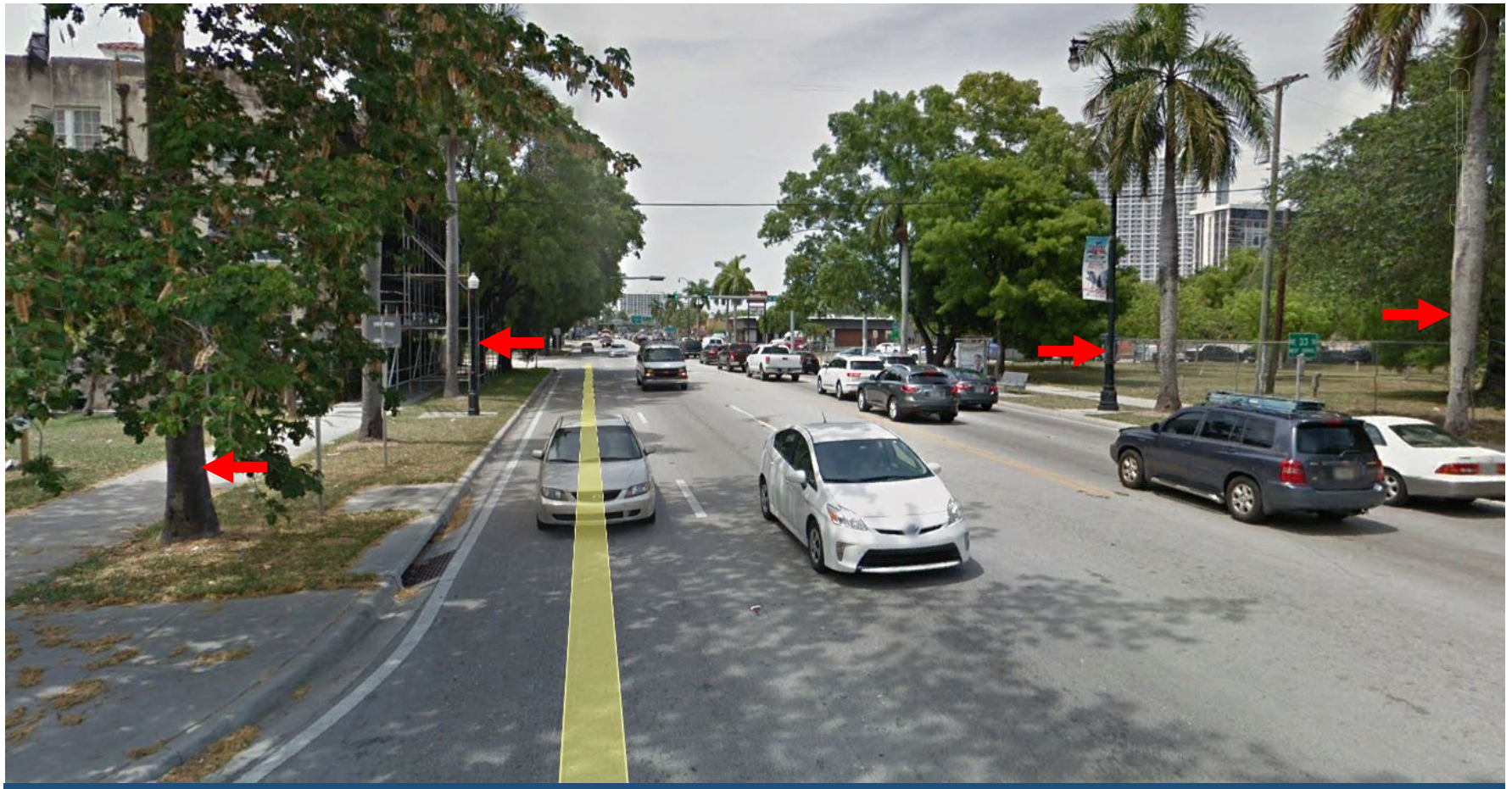
Between NE 16th Street & NE 17th Street

LRT – Biscayne Boulevard



Between NE 20th Terrace to NE 21st Street

LRT – Biscayne Boulevard

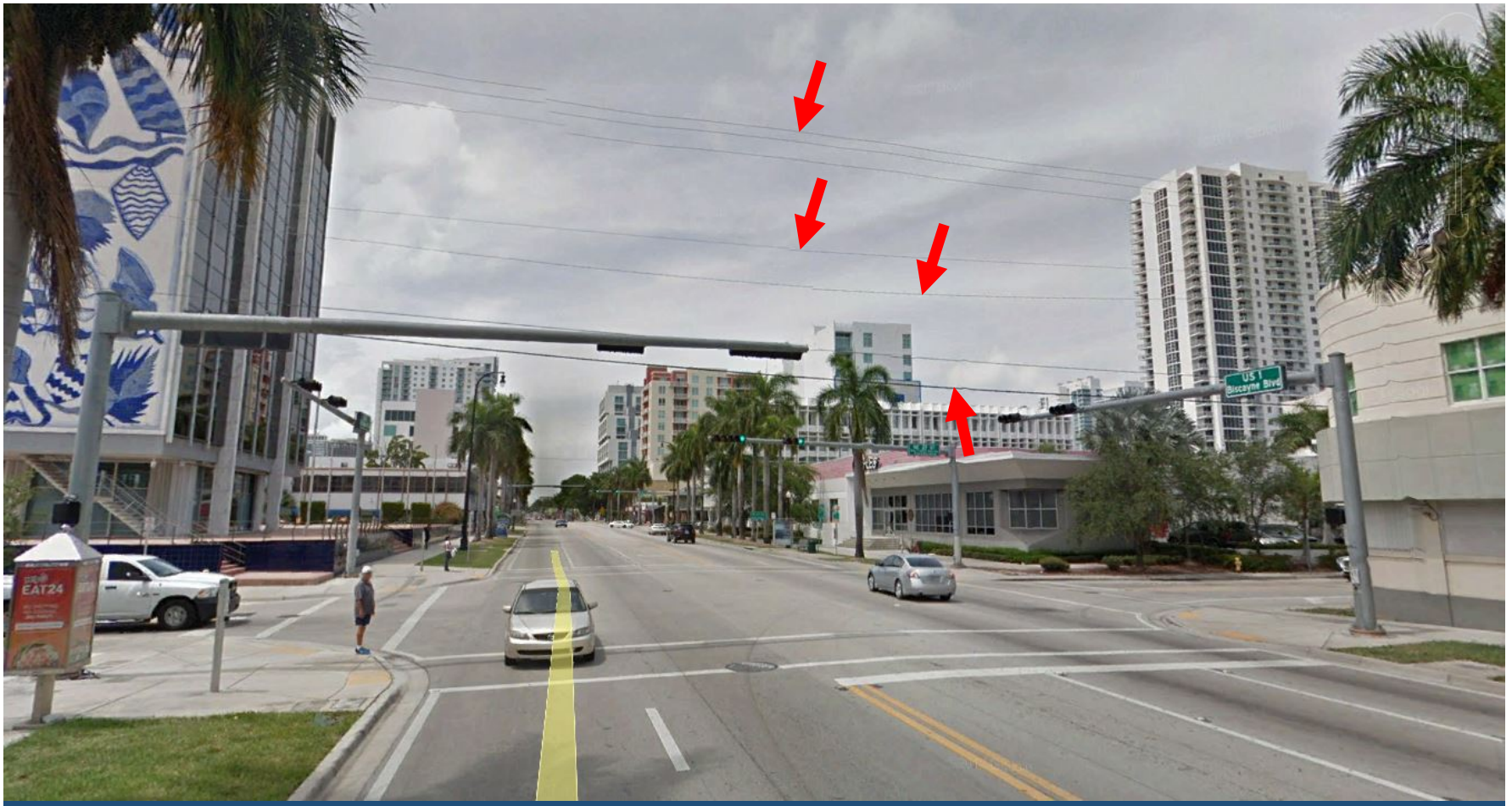


Between NE 32nd Street & 33rd Street

LRT – Biscayne Boulevard

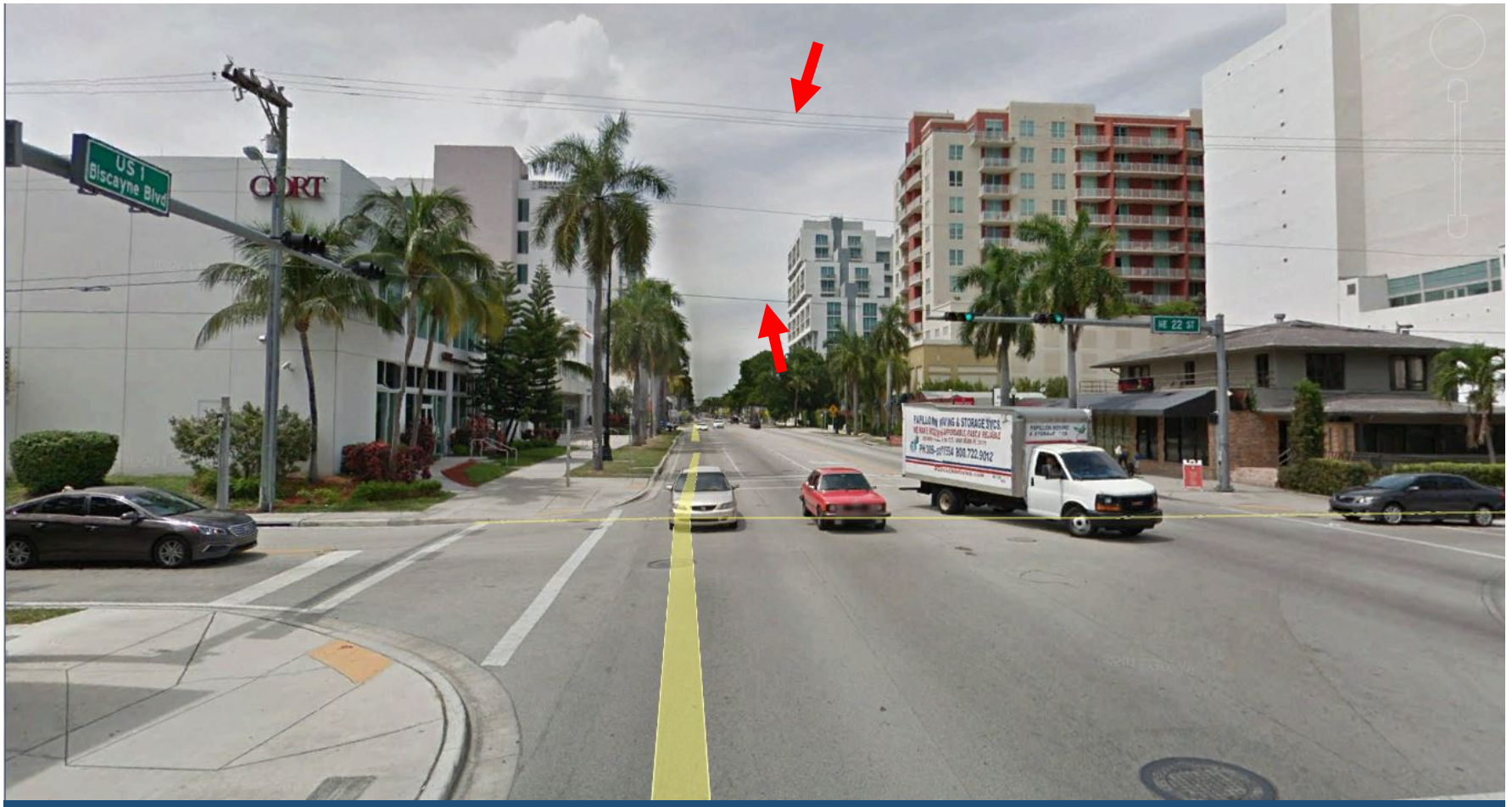
LRT – Biscayne Boulevard

Metromover/Monorail – Biscayne Boulevard



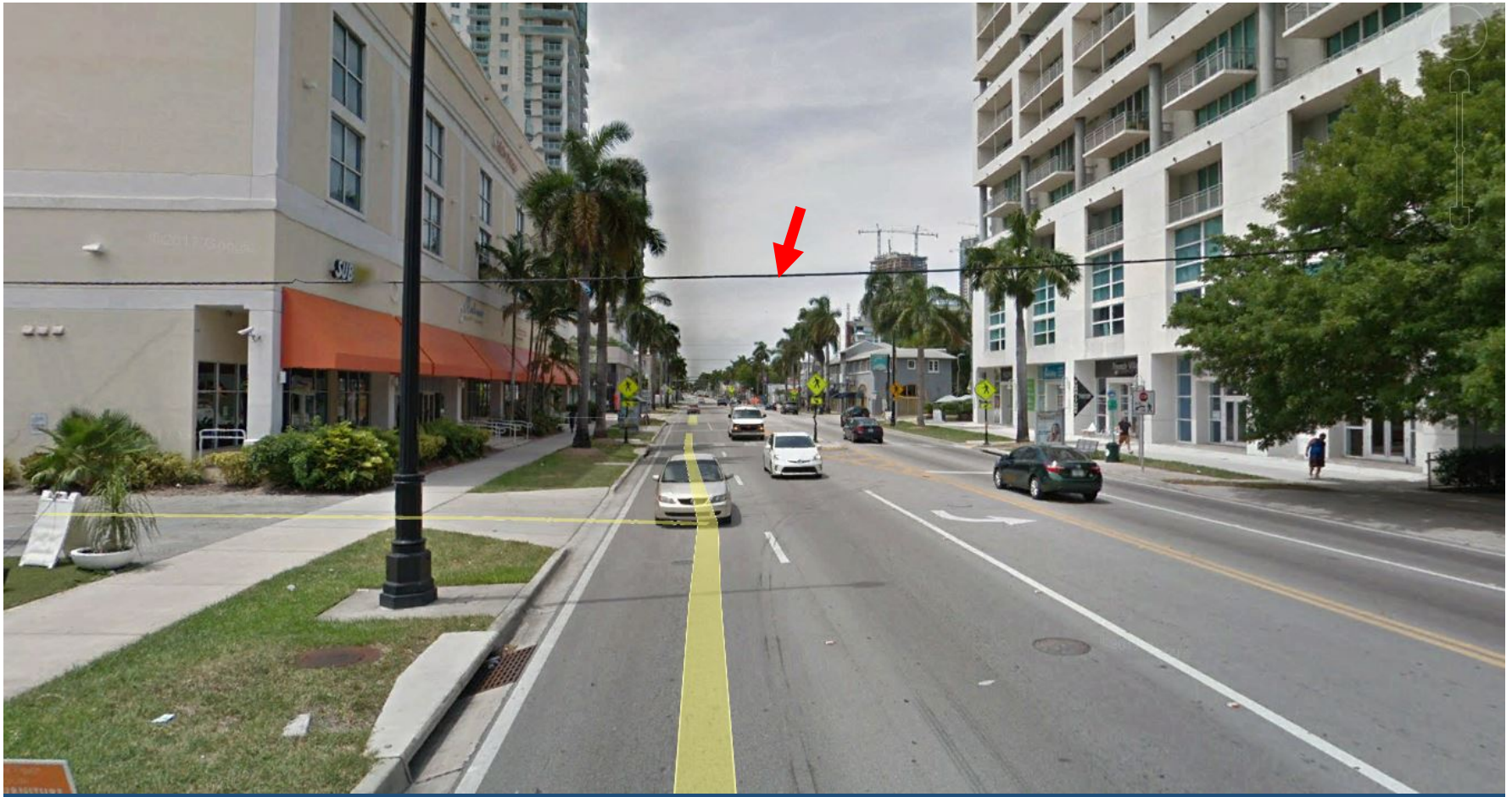
NE 21st Street

Metromover/Monorail – Biscayne Boulevard



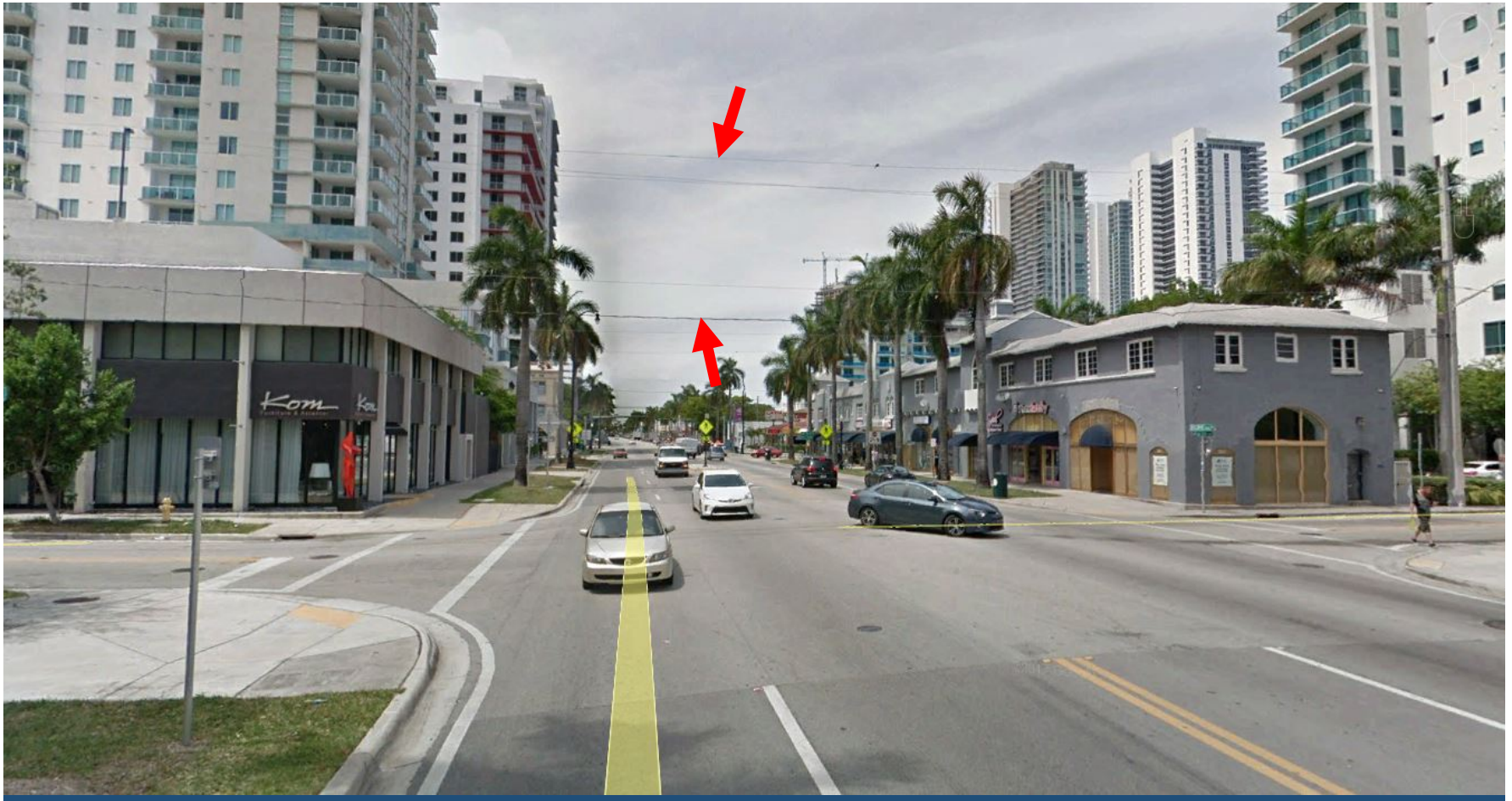
NE 22nd Street

Metromover/Monorail – Biscayne Boulevard

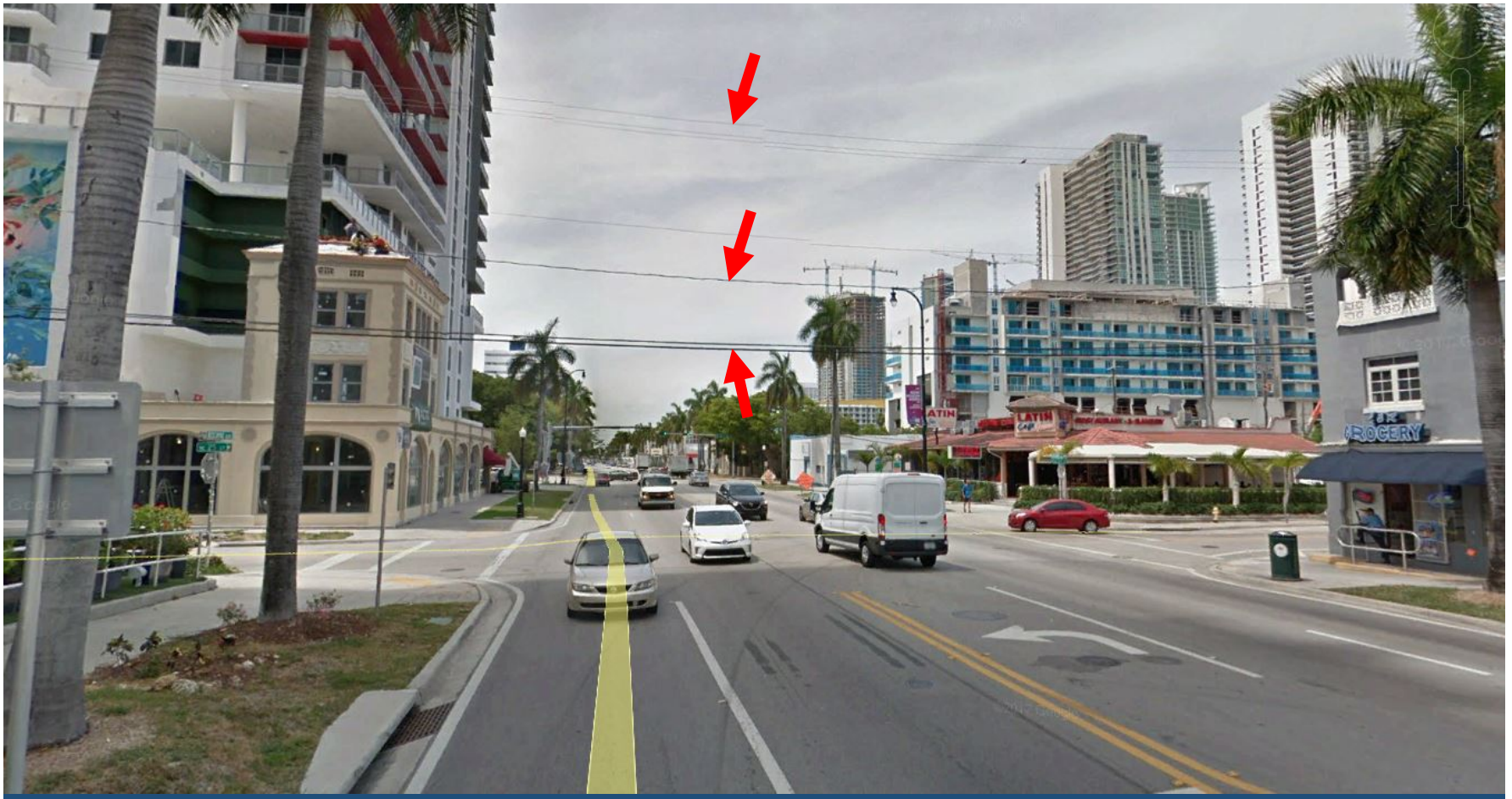


NE 23rd Terrace

Metromover/Monorail – Biscayne Boulevard

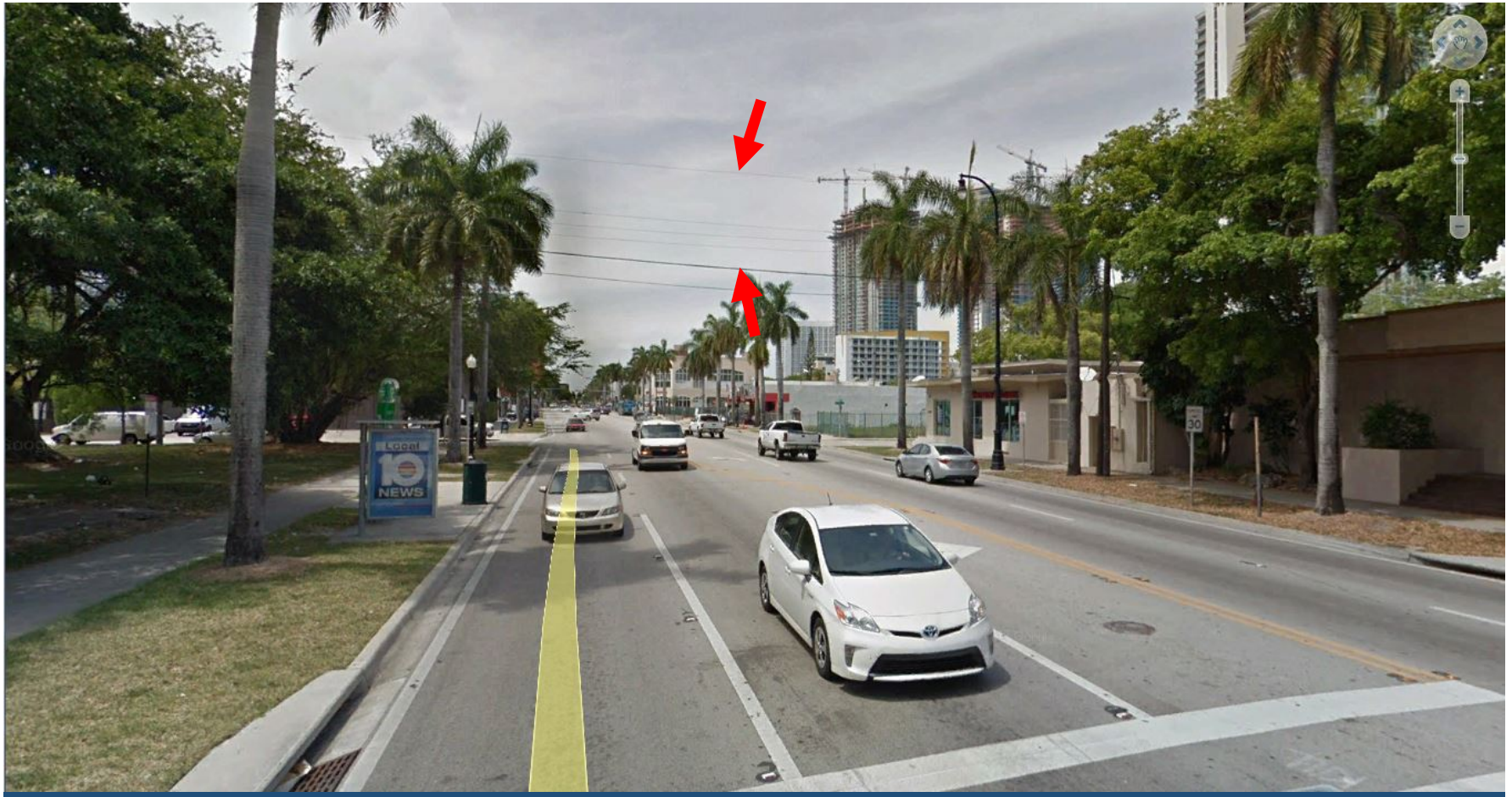


Metromover/Monorail – Biscayne Boulevard



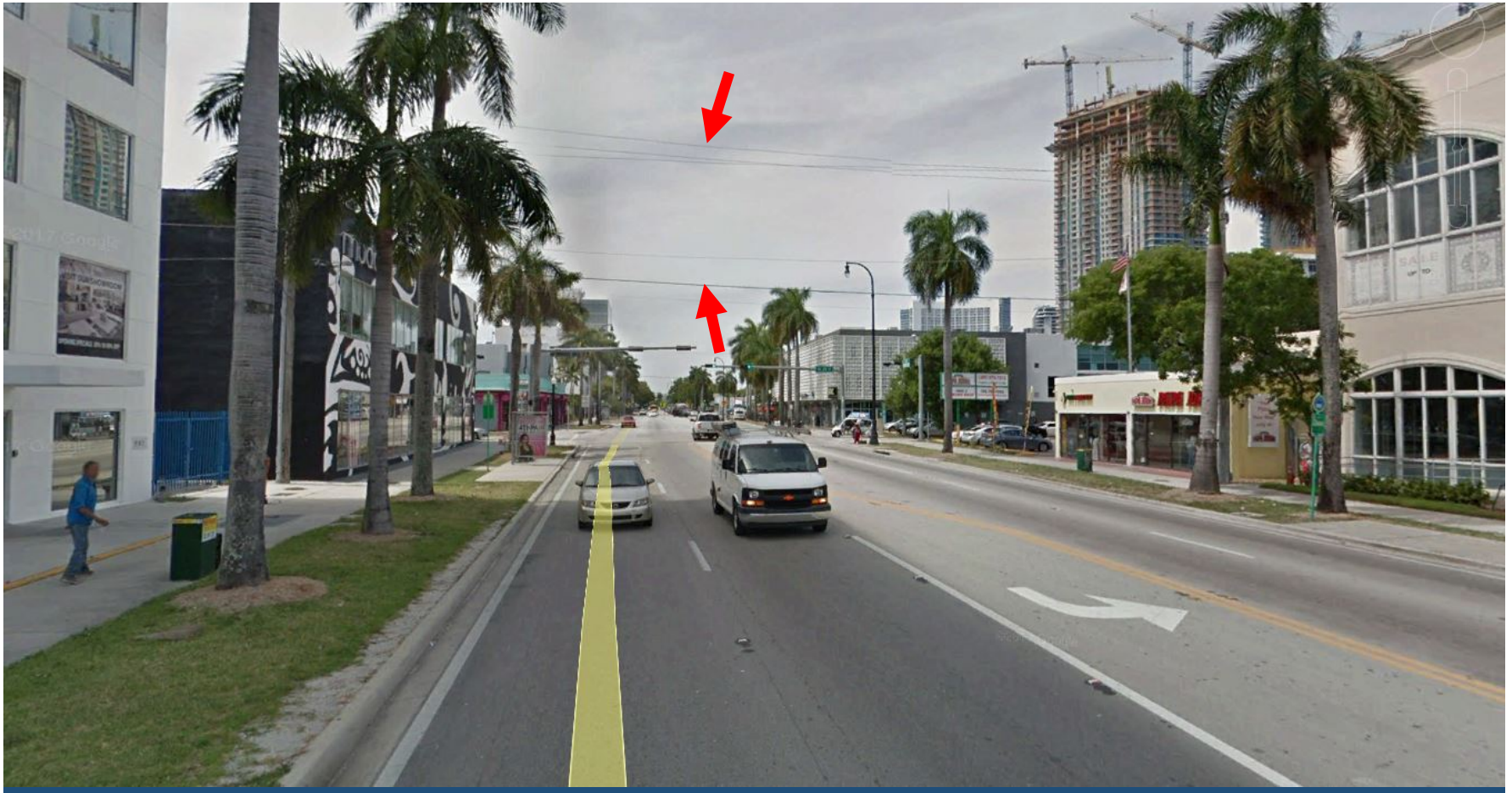
NE 25th Street

Metromover/Monorail – Biscayne Boulevard



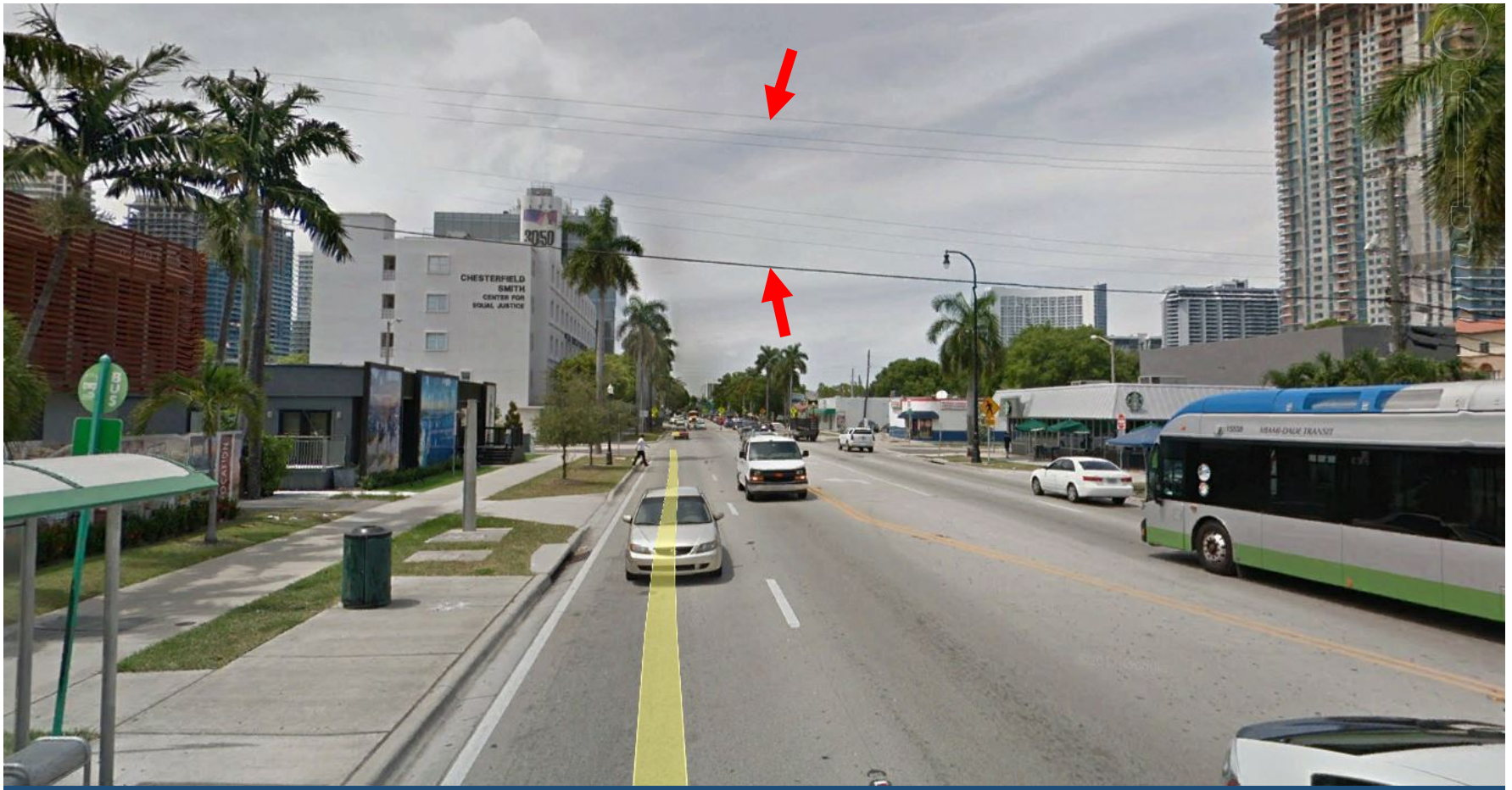
Between NE 26th Street & NE 26th Terrace

Metromover/Monorail – Biscayne Boulevard



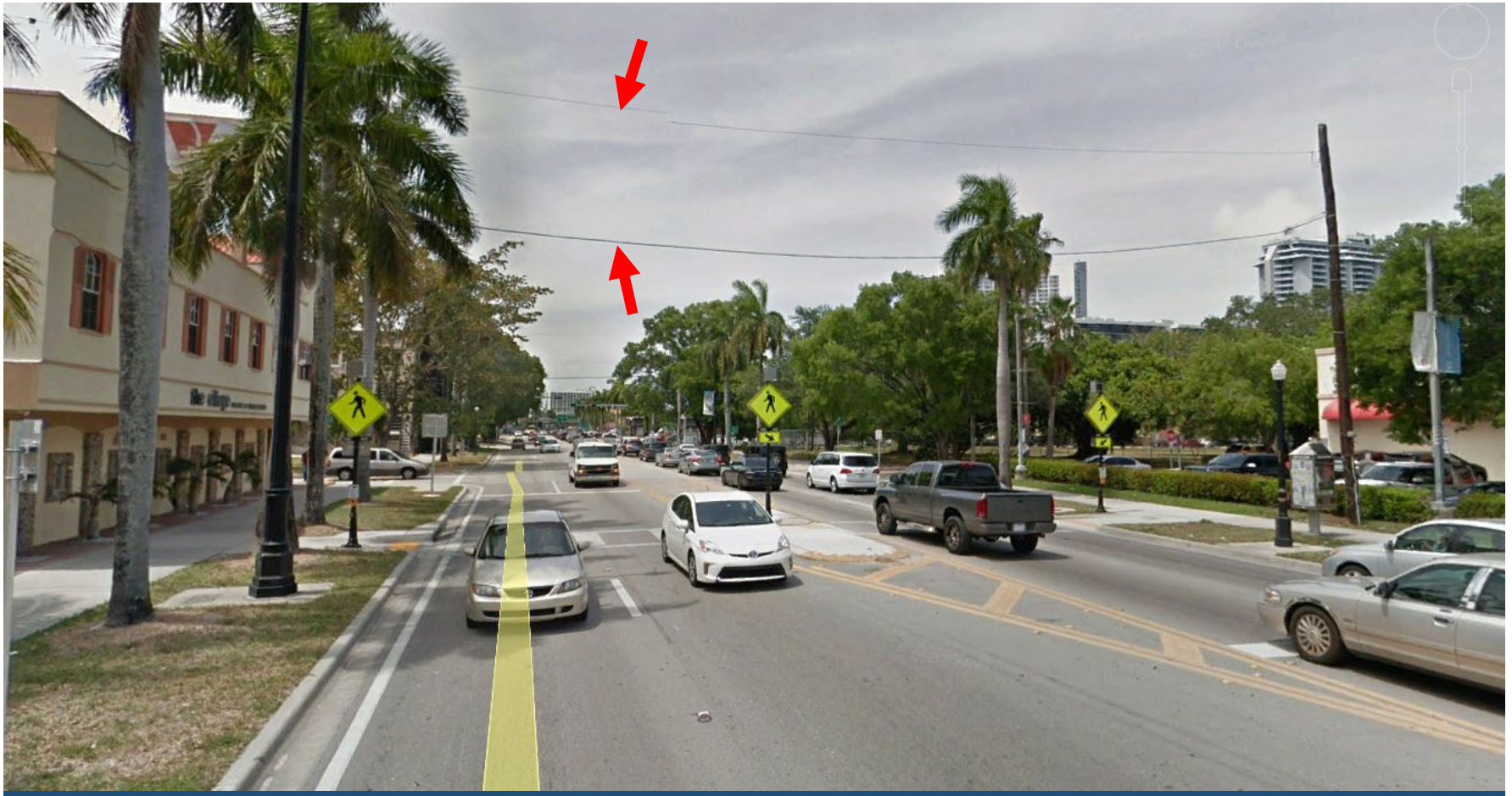
Between NE 28th Street & NE 29th Street

Metromover/Monorail – Biscayne Boulevard



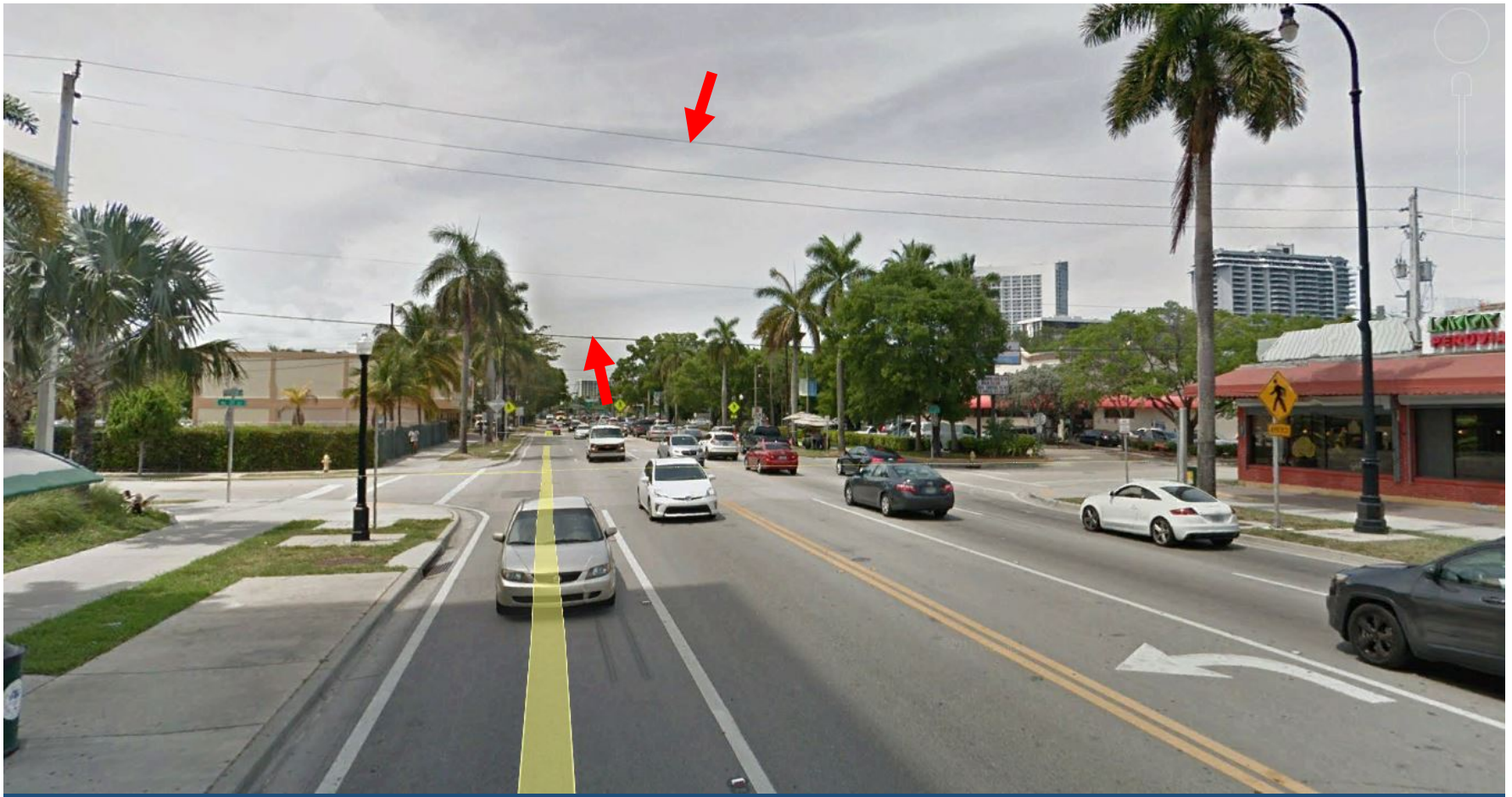
Between NE 29th Street & NE 30th Street

Metromover/Monorail – Biscayne Boulevard



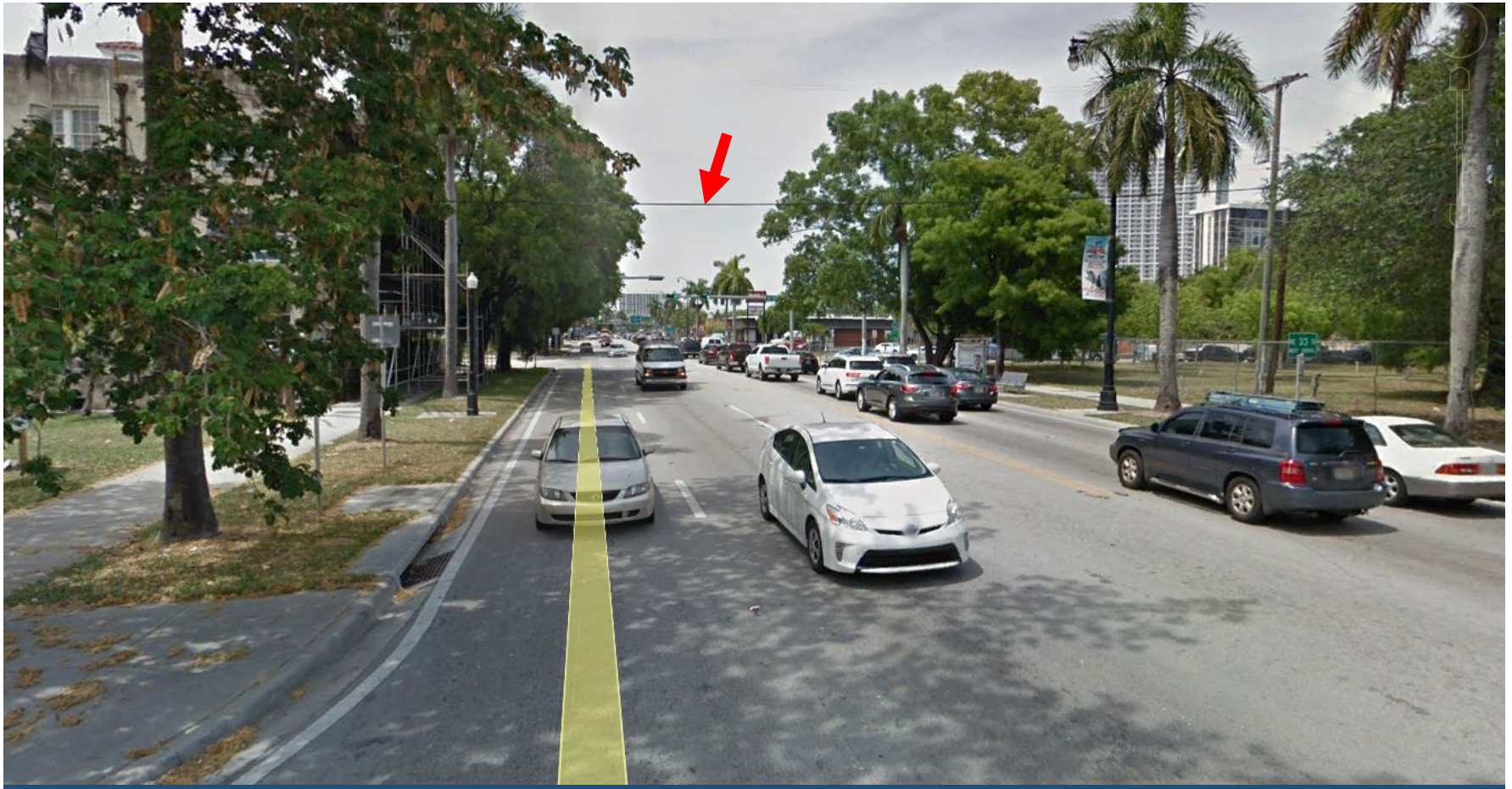
Between NE 31st Street & NE 32st Street

Metromover/Monorail – Biscayne Boulevard



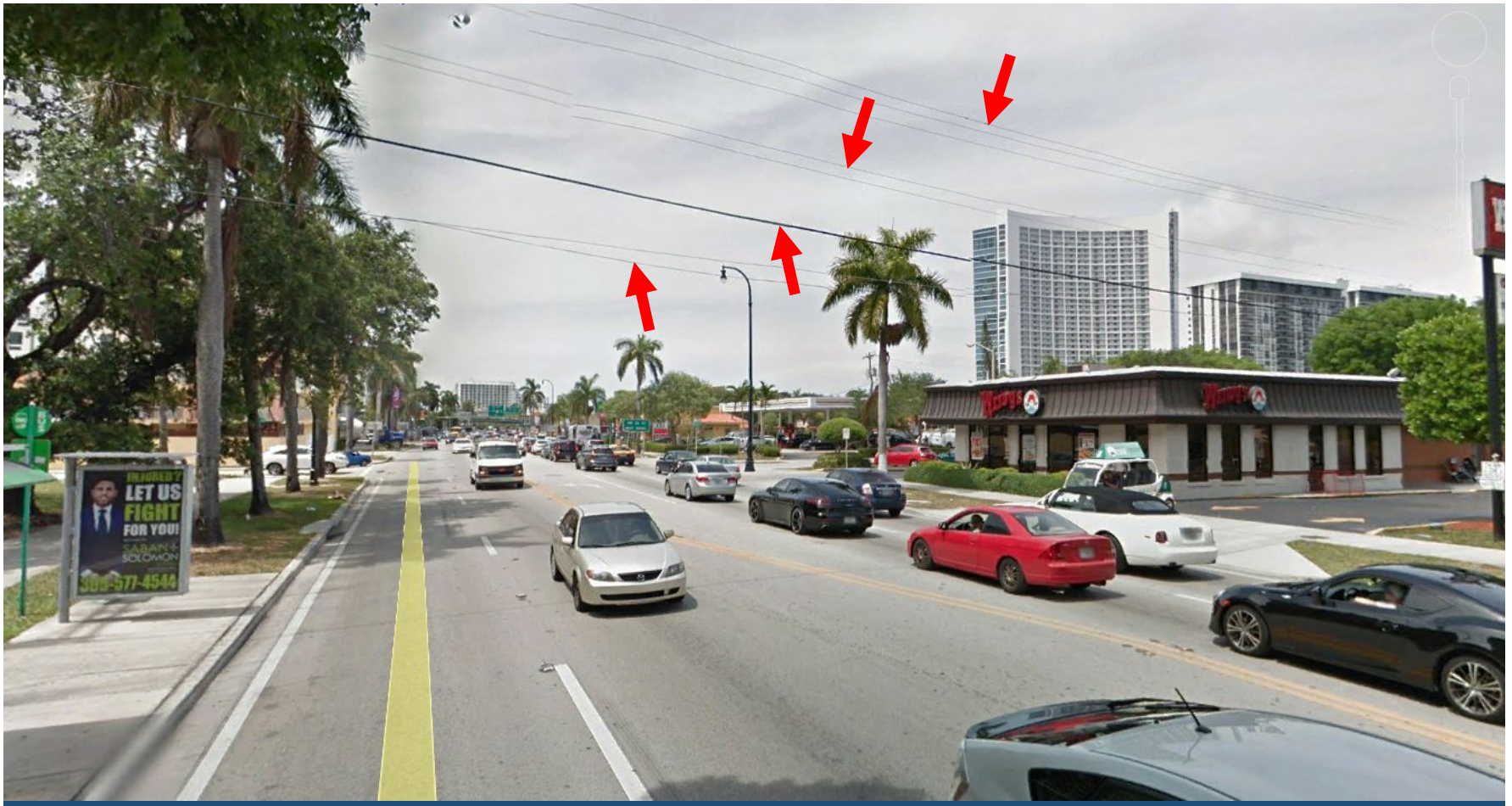
NE 31st Street

Metromover/Monorail – Biscayne Boulevard



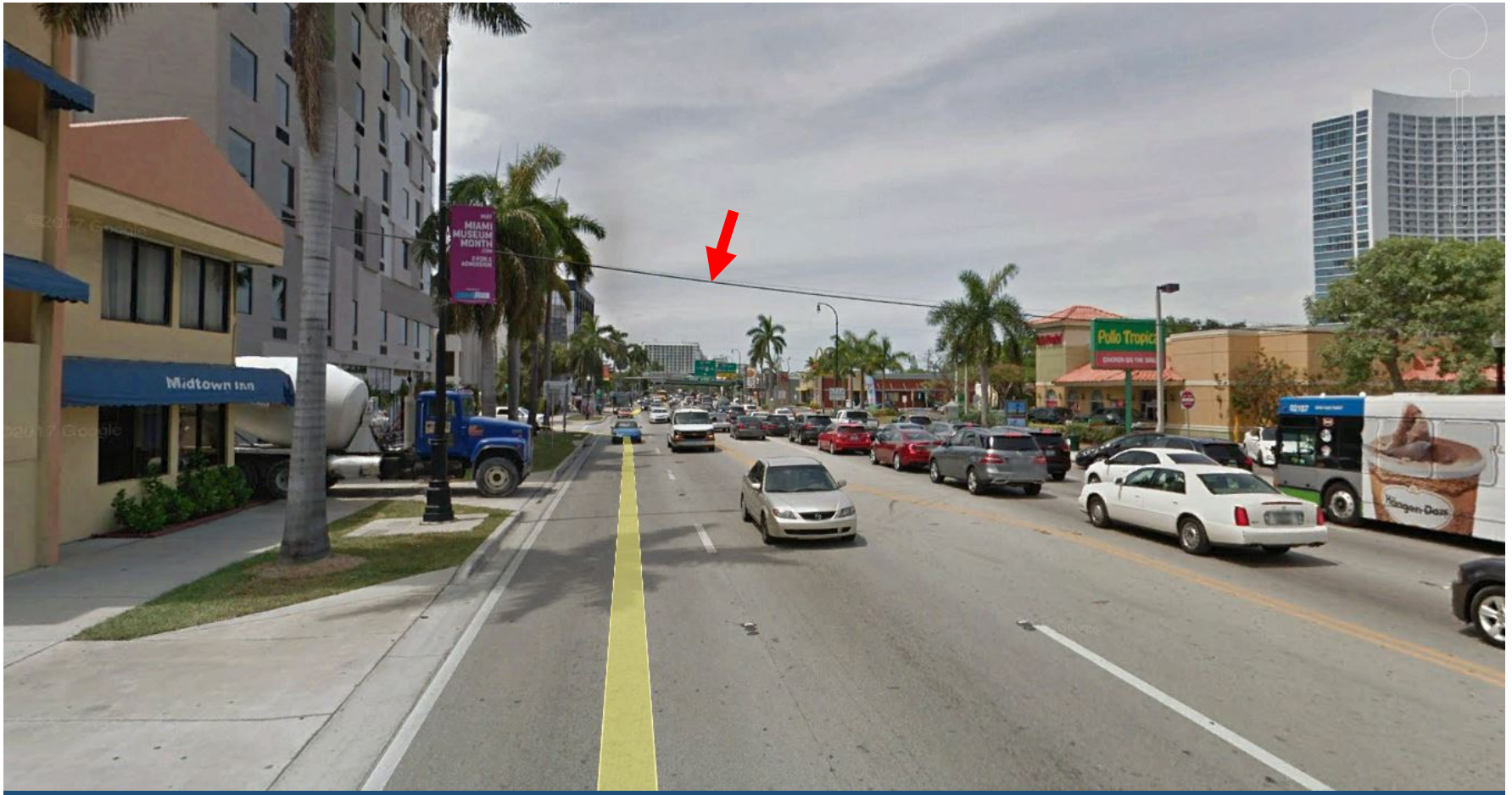
Between NE 32nd Street & 33rd Street

Metromover/Monorail – Biscayne Boulevard



Between NE 33rd Street & 34th Street

Metromover/Monorail – Biscayne Boulevard



Between NE 34th Street & 35th Street

Metromover/Monorail – Biscayne Boulevard

Between NE 35th Street & 35th Terrace

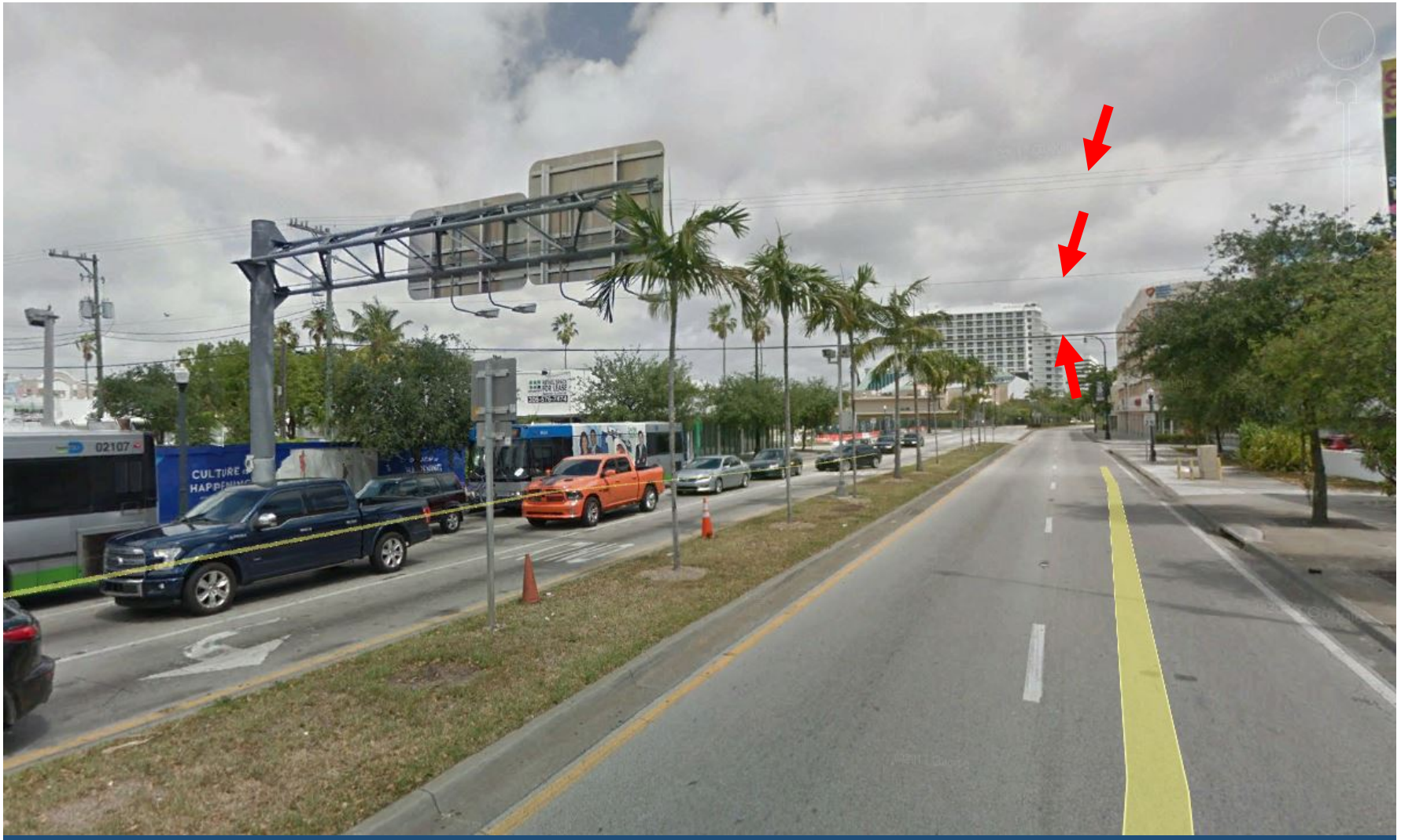
Metromover/Monorail – Biscayne Boulevard

I-195

Metromover/Monorail – Biscayne Boulevard

Between I-195 & NE 38th Street

Metromover/Monorail – Biscayne Boulevard



Between NE 38th Street & NE 39th Street

Metromover/Monorail – Biscayne Boulevard