CITY OF MIAMIBEACH

Intelligent Transportation System (ITS) and Smart Parking System (SPS) Project

Volume 1: Technical Application

Project Name:
City of Miami Beach ITS and SPS

Applicant:
City of Miami Beach

Request:
$4,744,002

Are matching funds restricted to a specific project component?
No

Total Project Cost
(from all sources):
$9,488,003

Technologies Proposed to be deployed:

- Smart Parking System
- Dynamic Message Signs
- CCTV Cameras
- Travel Time System (BT device)
- Vehicle Detection System (Microwave)
- Transportation Management Center

State:
Florida

Project is currently programmed in the:

- Transportation Improvement Program (TIP)
- Statewide Transportation Improvement Program (STIP)
- MPO Long Range Transportation Plan
- State Long Range Transportation Plan

June 2017

US DOT Advanced Transportation and Congestion Management Techologies Deployment Initative

NOFO: 693JJ317NF000I

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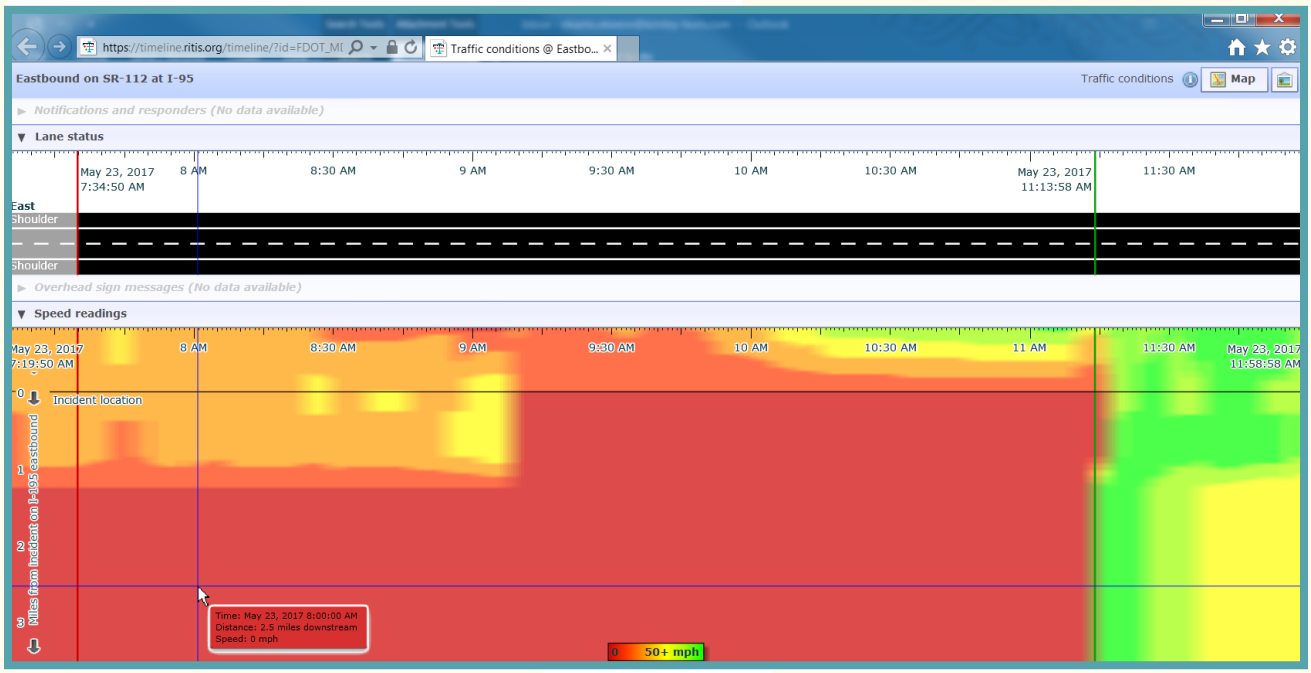
1.1 Project Description

As a premier tourist destination and major economic engine in the state of Florida, the vibrant community of the City of Miami Beach faces significant transportation challenges and relies on a diverse group of transportation partners, such as the Florida Department of Transportation (FDOT) and Miami-Dade County, to provide multi-modal connectivity to the South Florida region. The rapidly increasing population of the city has severely affected mobility and congestion puts a strain on the existing transportation system. Furthermore, because the City of Miami Beach is an island, an incident occurring on one of the few access ways to the city has detrimental effects on traffic congestion, safety, and travel time. This creates a unique environment where Multimodal Integrated Management is essential to the region's transportation network.

For example, on Tuesday May 23, 2017 at 4:30 am, a fatal accident on the Julia Tuttle Causeway (I-195/SR 112) resulted in a seven-hour shutdown that severely affected the morning rush hour. This single failure on the Causeway caused severe congestion throughout the regional roadway network, where travel times in the cities of Miami Beach and Miami as well as throughout the larger Miami-Dade County region tripled. For several hours, the four major access points to the City of Miami Beach were impassable. A screen capture from the Regional Integrated Transportation Information System (RITIS) provided in Figure 1, shows that the travel speed was zero along the corridor for the duration of the incident and only returned to normal after 11:00 am, once the incident was cleared.

Figure 1: Traffic Speeds Along Julia Tuttle During Incident



This incident demonstrates the ever-increasing need for Multimodal Integrated Management programs in the City of Miami Beach. In the case of the May 23rd incident, knowledge of the rapidly changing conditions on I-195 would have given travelers the option to modify their route to avoid extensive delays. Dynamic Message Signs (DMS), installed in conjunction with other technologies of Traveler Information Systems (TIS), and a Traffic Management Center (TMC) will enhance knowledge of the current state of a corridor which can in turn decrease emergency response times, efficiently redirect traffic, decrease clearance times, and increase safety.

The Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) funds from the United States Department of Transportation (US DOT) are being requested to accelerate the deployment of the Intelligent Transportation System (ITS) and Smart Parking System (SPS) project in the City of Miami Beach, Florida. In partnership with FDOT and Miami-Dade County this project will provide integrated management of Miami Beach corridors through the implementation of a TIS consisting of DMS and Smart Parking components. This project will allow for the monitoring of the city's roadway network by installing cameras on high traffic demand/high incident zones and travel time devices to create a comprehensive system capable of providing performance information, providing a means of effectively and proactively managing traffic throughout the city, consistent with US DOT goals.

The long-term goals and vision of US DOT as specified in the ATCMTD selection criteria are presented in the following table along with the societal benefits expected from the implementation of the project.

Table 1: USDOT Benefits and Description by Evaluation Criteria

CRITERIA	TYPES OF SOCIETAL BENEFITS
Reduction in the number and severity of traffic crashes and an increase in driver, passenger, and pedestrian safety	Improve traveler information with DMS, diversion routes based on real-time monitoring of traffic conditions, and overall enhanced traveler information resulting in fewer conflicts between major and minor streets and improved safety.
Measurement and improvement of the operational performance of the applicable transportation networks	Increase capacity of the existing roadway network and improve reliability of mass transit service. Reduction of vehicles "wandering" in search of parking within the network because of improved guidance on parking availability.
Delivery of environmental benefits that alleviate congestion and streamline traffic flow	Enhanced traveler information and diversion routes can reduce vehicle delays and thus reduce emissions. Reducing in search time for parking spaces with improved guidance on parking availability reduces trip time with corresponding congestion and environmental benefits.
Optimized multimodal system performance	Implementation of ITS and SPS will contribute to the county's effort of providing a reliable and efficient rapid transit infrastructure within the region by increasing person through-put capacity.
Improved access to transportation alternatives, including for underserved populations	Improve local and regional transit service efficiency through enhanced traveler information and DMS, thus improving travel time reliability for a variety of transportation modes.
Public access to real time integrated traffic, transit, and multimodal transportation information to make informed travel decisions	Increased accessibility through better vehicle routing with the implementation of DMS and coordination with existing smartphone applications.
Cost savings to transportation agencies, businesses, and the traveling public	Travel time savings. Vehicle operation savings. Reduce need of hiring law enforcement during special events.

The mission of this project is to create a transportation management system that improves and enhances the safety, efficiency, and reliability of moving people and goods throughout Miami Beach, all while reducing transportation-related emissions and creating pathways to jobs and economic opportunity. **Table 2** summarizes the expected changes and their benefits to the project areas after implementation.

TABLE 2: Summary of Project Components and Impacts

Current Baseline & Problem to be Addressed	Heavy vehicular volumes on the city's arterial and collector network during regular travel days and during special event days are currently managed only by insufficient, standard traffic control infrastructure.
Changes to Baseline	Travel estimating sensors; Travel time data collectors; DMS; SPS; Website and smartphone applications
Types of Impacts	Decreased vehicle travel times; Decreased delay; Reduced vehicle operation; Decreased crash frequency
Populations Affected by Impacts	City residents, commuters, visitors/tourists
Economic Benefits	Monetized value of reduced travel times; Reduced fuel consumption and costs; Monetary costs saved by reduced crash frequency; Reduced costs of law enforcement directing traffic during special events; Growth in tourism industry; Improved access to jobs
Environmental Benefits	Reduced emissions, both greenhouse and non-greenhouse gases

1.2 Description of Entity

The Federal Highway Administration (FHWA) will be entering into the agreement with The City of Miami Beach, which will serve as the Project Sponsor for the ITS and SPS project. A summary of the roles and responsibilities of deployment for the project are summarized below.

PARTNERSHIPS

As a Multimodal Integrated Management project, partnership is critical to the project's success and the city has already engaged the key partners required to ensure the success of the project. The Miami Beach Transportation Department will be the lead agency and partnerships with the following internal and external agencies will be leveraged to successfully implement this project. Partnerships with these agencies are further defined in **Section 1.11.**

INTERNAL

- City of Miami Beach Transportation Department – Traffic Operations
- City of Miami Beach Police Department
- City of Miami Beach Information Technology (IT) Department
- City of Miami Beach Parking Department
- City of Miami Beach Procurement Department
- City of Miami Beach Emergency Management Department

EXTERNAL

- Miami-Dade County Department of Transportation
- Florida Department of Transportation (FDOT), District Six
- Miami-Dade Expressway Authority (MDX)
- Florida Atlantic University (FAU)
- Florida International University (FIU)

PROGRAM MANAGEMENT

The roles and responsibilities of deployment for the ITS and SPS project are outlined as follows:

- **Project Sponsors.** The Project Sponsor is the City of Miami Beach, whose responsibilities include funding and deployment of the system and defining the system goals, objectives, and requirements.

- **User Agencies.** User Agencies will utilize the devices and infrastructure installed as part of this project and will be responsible for traffic monitoring, congestion management, traffic incident management, performance measures, and data collection. The User Agencies are:
  - City of Miami Beach Transportation Department – Traffic Operations
  - City of Miami Beach Parking Department
  - City of Miami Beach Police Department
- **Maintenance and Support Agencies.** This project will be implemented as a Design, Build, Operate, and Maintain (DBOM) project. The City of Miami Beach will fund the operations and maintenance and support through the DBOM contract. Other maintenance and support agencies that may have maintenance/support requirements based on existing agreements include:
  - City of Miami Beach Transportation Department – Traffic Operations
  - City of Miami Beach IT Department
  - City of Miami Beach Parking Department
  - Miami-Dade County
  - FDOT District Six
- **Operating Centers.** Operating Centers are facilities that will perform central command operations by utilizing central software, local software, and hardware to control the ITS and SPS devices implemented as part of this project. A TMC will be established at the FDOT District Six SunGuide TMC, clearly demonstrating the strong partnership already established between the city and the District. A draft of the Memorandum of Agreement (MOA) for this co-location is provided in Appendix A. The TMC will be responsible for the collection, dissemination, and use of real-time transportation related information that will in turn be used to improve mobility, reduce congestion, and provide for more efficient and accessible transportation.

1.3 Description of Geographic Area

The City of Miami Beach, incorporated in 1915, is located in a series of both natural and man-made barrier islands between Biscayne Bay and the Atlantic Ocean. The city's total land area is approximately 7.7 square miles and it is divided into three segments that have different characteristics, land uses, and mobility behaviors: South Beach, Middle Beach, and North Beach. Miami Beach is considered to be one of the primary economic drivers in the state of Florida.

The Miami Beach roadway network is an orthogonal grid connected to the rest of Miami-Dade County by four east-west causeways that provide access to and from the city: MacArthur Causeway, Venetian Causeway, Julia Tuttle Causeway, and John F. Kennedy Causeway. The causeways serve as links between the beach and Downtown Miami, Miami International Airport, Government Center, and other attractions within Miami-Dade County. Grids are effective in dense urban settings because of the robust functionality of multiple paths to provide a release valve when certain links fail due to high demand, construction, temporary closures, or emergencies. The internal grid in Miami Beach is essential to mobility by providing the public multiple paths for moving throughout the city.

According to the Visitor Profile and Economic Impact Study conducted for the Greater Miami Convention & Visitors Bureau in 2014, nearly 48 percent of overnight visitors to the Miami-Dade County area stay in Miami Beach. Approximately 76 percent of those visitors are in the area for leisure and vacation purposes, while nearly 13 percent were in the area for business or conventions. The top three most popular attractions of the Greater Miami area as a whole are located in Miami Beach: the Art Deco District in the South Beach, the beaches, and Lincoln Road Mall. Overnight visitors spent an estimated $23.8 billion dollars while visiting the Miami area in 2014. This study also showed that visitor satisfaction, as well as visitors' intent to return,

48% of overnight visitors to the Miami area stay in Miami Beach

Why are they in the area?

76% leisure and vacation purposes

13% business or conventions

2014 Visitor Profile and Economic Impact Study conducted for the Greater Miami Convention & Visitors Bureau

significantly declined in 2014, with many visitors citing traffic congestion was as the most negative aspect of trips to Miami Beach.

As of 2016, the City of Miami Beach has a population of 91,917. This population figure represents a 4.8 percent growth in population from 2010, demonstrating the need for improved mobility and network capability. Given the city's natural characteristics and an ambitious events calendar, the average daily population often exceeds 200,000, resulting in mobility challenges and congestion throughout the existing transportation network. The North Beach and South Beach areas have been found to contain the highest population density, highest youth population (15 years old to 25 years old), highest elderly population (65 years old and older), and highest area of zero-car households. These local characteristics reinforce the need to improve and enhance local and regional mobility efficiency; especially to promote economic growth, to improve livability for citizens and business, and to increase the attractiveness and competitiveness of Miami Beach.

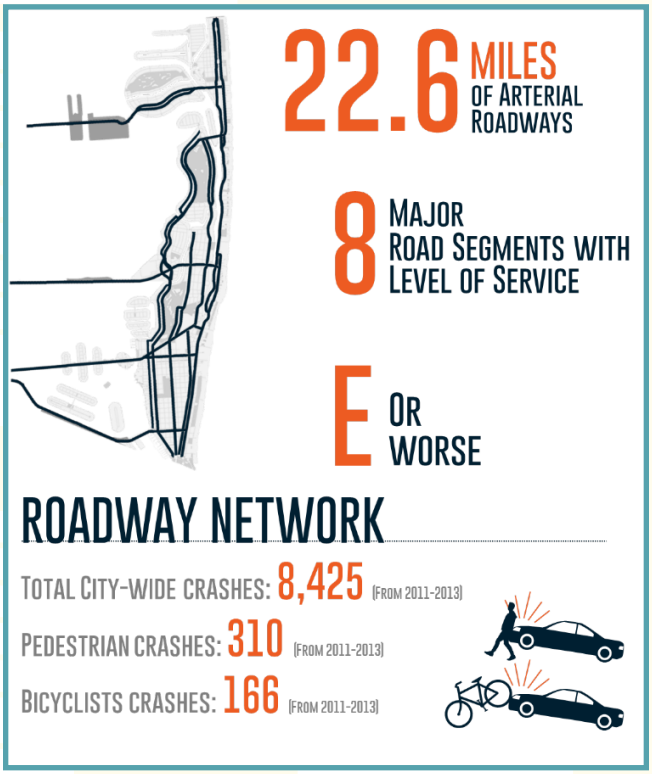
In 2015, the City of Miami Beach broke ground on a $600M expansion of its Convention Center. It is worth noting that this is the only major Convention Center in Miami-Dade County. The City is investing significantly in the Convention Center to increase the number of conventions in Miami Beach and increase the economic solvency of the area and its work force. In the future, it is anticipated that major events will be held at this state of the art facility. Increasing the effectiveness of the transportation network is key to manage the anticipated growth in demand to be generated by the new Miami Beach Convention Center. The project is anticipated to be completed by August 2018.

1.4 Challenges Addressed

The ITS and SPS project will provide multimodal integrated management of the Miami Beach roadway network, addressing congestion problems throughout the city while also enhancing the safety, efficiency, and reliability of moving people and goods throughout the city. Addressing congestion problems in the city will also increase connectivity to employment, support workforce development, and contribute to community development to the more disadvantage groups in the city. The real-world issues and challenges that will be addressed by the deployment of the ITS and SPS project are summarized below.

CAUSEWAYS

The four causeways are the only access routes for tourists, residents, and commercial motorists, making mobility on these facilities essential to the economic vitality of the city. The two main transportation challenges facing Miami Beach are: 1) not all the causeways are uninterrupted flow corridors, making accessing and egressing the city more difficult; and 2) Mac Arthur Causeway and Julia Tuttle Causeway carry more than 70 percent of the traffic entering and leaving the city. The implementation of an effective ITS system is critical to addressing the need to improve flow along the interrupted-flow causeways and the need to more evenly distribute traffic along all four causeways, which will improve travel times and travel time reliability and will decrease delay and costs associated with delay, while accessing and egressing the city.



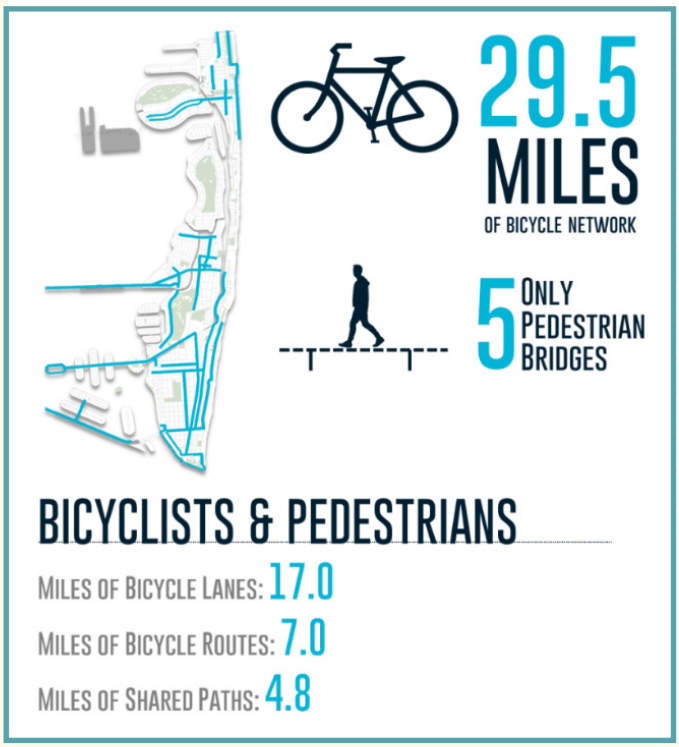
Source: City of Miami Beach Transportation Master Plan

ARTERIALS AND MAJOR COLLECTORS

There are currently 22.6 miles of arterial roadways throughout the City of Miami Beach. Miami Beach is narrow, elongated, and coastal in community characteristics. The east-west arterials 5th Street, Dade Boulevard, 41st Street, and 71st Street are extensions of the four causeways and are generally responsible for accommodating heavy volumes that connect to the main north-south corridors and to the beaches. During peak hours, the east-west arterials also carry the most commuter traffic in and out of the city. The north-south arterials connect Miami Beach to other communities to the north and are also integral to mobility within the city. In addition to the arterial system, several east-west and north-south collectors are vital to mobility. East-west collectors 16th Street and 17th Street attract high traffic demand despite limited capacity due to their proximity to principal destinations in South Beach, including Lincoln Road, City Hall, and Miami Beach Convention Center. North-south collectors Alton Road, Collins Avenue, Washington Avenue, West Avenue, and Indian Creek Drive provide connection to the causeways and Interstate highway system. Limited capacity on these roadways as well as geometric constraints throughout the city make it difficult to address congestion concerns and improve mobility. Advanced transportation technologies are key to tackling transportation problems along these corridors.

SPECIAL EVENTS

Various factors, including climate, natural resources, and an active nightlife, have made the City of Miami Beach a desirable location to host special events year-round. The city hosts 14 special events throughout the year that are officially recognized in Section 46-92(g)(1)(b) of the Miami Beach City Code as "High Impact Periods;" however, hundreds of lower-impact events occur throughout the year as well, putting a strain on the existing transportation network. Events included in the "High Impact Period" section of the code are typically intense and generate heavy vehicular volumes in the city. Given the heavy volumes generated and the limited capacity accessing and traversing the city, each of these events presents a number of challenges for engineers and law-enforcement when addressing congestion and incident response. The ITS and SPS project will provide advanced traveler information as well as real-time travel and parking information that will more effectively direct visitors in and out of the city and will also more efficiently match vehicles looking for parking to available parking spaces. Efficiently moving traffic in-and-out and throughout the city during special events will allow Miami Beach to remain a premier tourist destination and location for special events, which is essential to economic vitality in the region.



Source: City of Miami Beach Transportation Master Plan

PEDESTRIANS AND BICYCLISTS

High pedestrian and bicycle activity is one of the distinguishing characteristics of Miami Beach's transportation network. Due to the orthogonal grid and the presence of many pedestrian generators and attractors, Miami Beach is one of the great "walking cities" of Florida. The 2012 City of Miami Beach Community Satisfaction Survey indicated that 26 percent of the residents of the City utilize walking and/or cycling as their primary method of transportation. The implementation of the ITS and SPS project would improve pedestrian safety as a by-product of reducing travel times. When congestion is lighter, drivers are less stressed and more courteous, which leads to a reduction in crashes between motor vehicles and bicyclists and pedes-

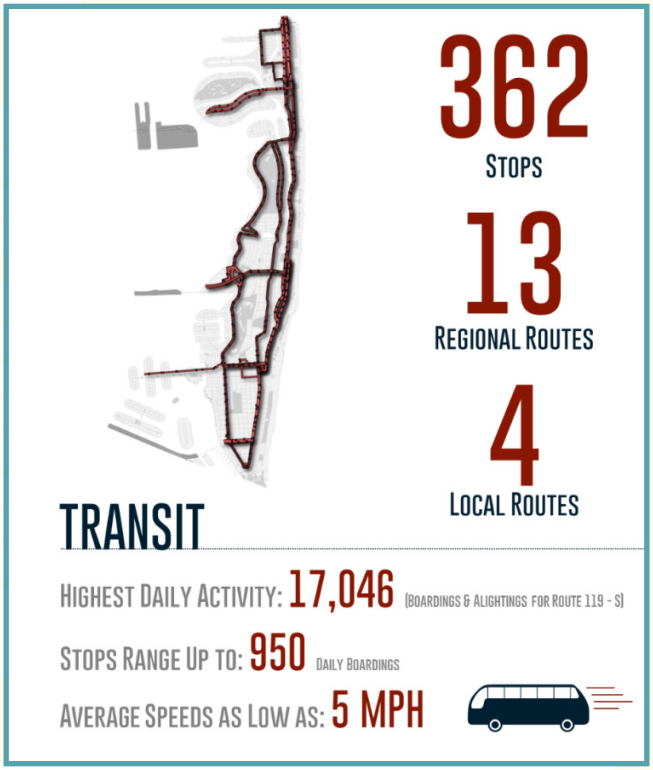
trians. In addition to this, the SPS will reduce the number of vehicles on roadways and in parking lots looking for parking spaces, thus decreasing the potential of vehicle-on-pedestrian conflicts. Pedestrian activity is vital to the economic growth of Miami Beach and the safety benefits associated with the ITS and SPS project are important positive impacts to economic growth.

PARKING

Due to heavy vehicle usage in the city, Miami Beach has continuously struggled with parking supply versus parking demand. A lack of parking facilities affects traffic because drivers searching for parking continuously drive within the vicinity of their ultimate destination until a parking space has been identified, adding to the burden of roadway facilities. The 2014 Walker Parking Study prepared for the City of Miami Beach revealed that during the peak hour, parking demand exceeds capacity by approximately 877 parking spaces. Given the growth of various economic centers throughout Miami-Dade County, parking deficiencies and antiquated parking planning methods adversely impact businesses in the City by affecting the way that patrons make choices. Patrons will choose to go to less-congested areas with more adequate parking instead of visiting Miami Beach, adversely affecting the city's economy and reducing the ladders of opportunity for the local work force. The SPS phase of this project will improve the way drivers receive parking information. The SPS component of this project would enhance the reach of the current application by providing parking information on an additional 35 surface parking lots.

TRANSIT

Since its inception, the City of Miami Beach has been a transit-oriented community. There are currently 14 bus routes in operation in Miami Beach with service provided by Miami-Dade Transit. In addition to the county-operated routes, the City of Miami Beach operates the North Beach Trolley route. In an effort to reduce car trips through the roadways system, the City has continued to prioritize transit projects and several projects are in the planning phase, including a water taxi/ferry service, two new trolley services, light-rail connection between Miami Beach and Miami, and an intermodal facility. Travel time benefits associated with the implementation of the ITS and SPS project will directly affect local and regional transit, resulting in improved on-time performance and reliability. Improved transit service will result in higher customer satisfaction and increased choice ridership. Increased choice transit ridership results in less car trips on the city's roadway network, which both lessens the burdens of congestion and has positive effects on the environment by reducing vehicular emissions. In addition to improving choice ridership, improved transit performance will better connect transit-dependent riders to essential services such as employment centers, health care, schools and education facilities, food, and recreation.



Source: City of Miami Beach Transportation Master Plan

TRAFFIC SIGNALS

In addition to limited right-of-way and geometric constraints, traffic signal spacing is another contributing factor to Miami Beach's capacity shortage. According to FHWA, roadways with an approximate signal spacing of eight signals per mile were reported to have travel times that were adversely affected by 39 percent in comparison to similar facilities. SR 948 (36th Street) and SR 25 (US 27/Okeechobee Road) in Miami-Dade County have an average signal spacing of 0.3 miles and 0.48 miles, respectively. In comparison, SR A1A (5th Street), SR 907 (Alton Road), and SR A1A (Collins Avenue) in Miami Beach have an average signal spacing of 0.078 miles, 0.184 miles, and 0.093 miles, respectively.

In Miami-Dade County, traffic signal operation is under the jurisdiction of the Miami-Dade Transportation and Public Works Department's Traffic Signals and Signs Division. City of Miami Beach staff timing has reached an agreement with Miami-Dade County and hired a traffic signal engineer to address signals within the City in matters of timing, progression, and phasing issues to the County. The funding of a City position to manage traffic signal operations has resulted in improvements to the transportation network. The traffic signal engineer communicates daily with the active arterial management program managers to quickly respond to special events, incidents, and construction causing congestion. The TMC proposed in this project will allow city staff to directly manage traffic signals in Miami Beach, in an effort to improve optimization and responsiveness. The systems components of this project will also serve as the foundation for future technology deployment under future city or county initiatives, including Adaptive Traffic Signal Controller (ATSC) systems. The City and County are going to be partnering to test and install other controllers within the City limits.

INCIDENT RESPONSE

Continuing ITS and SPS development will be used to benefit the Miami Beach Police Department and other first responders by aiding in their allocation of resources. ITS and SPS technologies will allow first responders to more accurately identify the severity and location of incidents along the roadways or parking areas, allowing for more rapid response times and ensuring that the appropriate resources necessary to address the situation are present. In addition, proper notice to drivers via DMS and GPS applications can help reduce secondary crashes. Proper and efficient allocation of first responder resources will reduce Miami Beach spending on these issues, thereby saving tax payer money. The use of these technologies will increase the speed in which roadway incidents can be addressed to bring the traffic flow to normal levels. Understanding the criticality of the relationship with the Police Department and their impact on incident response, police representatives were intimately involved in identifying the device locations for the project and the priority of the corridors.

LADDERS OF OPPORTUNITY

Access and traffic flow improvements that result from implementation of the ITS and SPS program are also intended to meet the primary goal of the US DOT's Ladders of Opportunity Initiative by connecting more Americans to jobs. Increased efficiency in the Miami Beach transportation network will improve the interconnectivity between Miami communities and job opportunities within the city, especially for underserved populations. In addition to creating jobs with the implementation and management of this system, improved traffic flow may improve existing employment markets throughout Miami Beach by expanding access and improving user satisfaction.

1.5 Transportation Systems and Services

A series of phases have been developed that will allow the City to deploy, operate, and maintain the ITS and SPS incrementally. In order to maintain a functional and cost-effective deployment, the system was planned for implementation in three construction phases. Each phase includes the installation of the ITS and SPS infrastructure and sub-systems. The specific ITS infrastructure and sub-systems include:

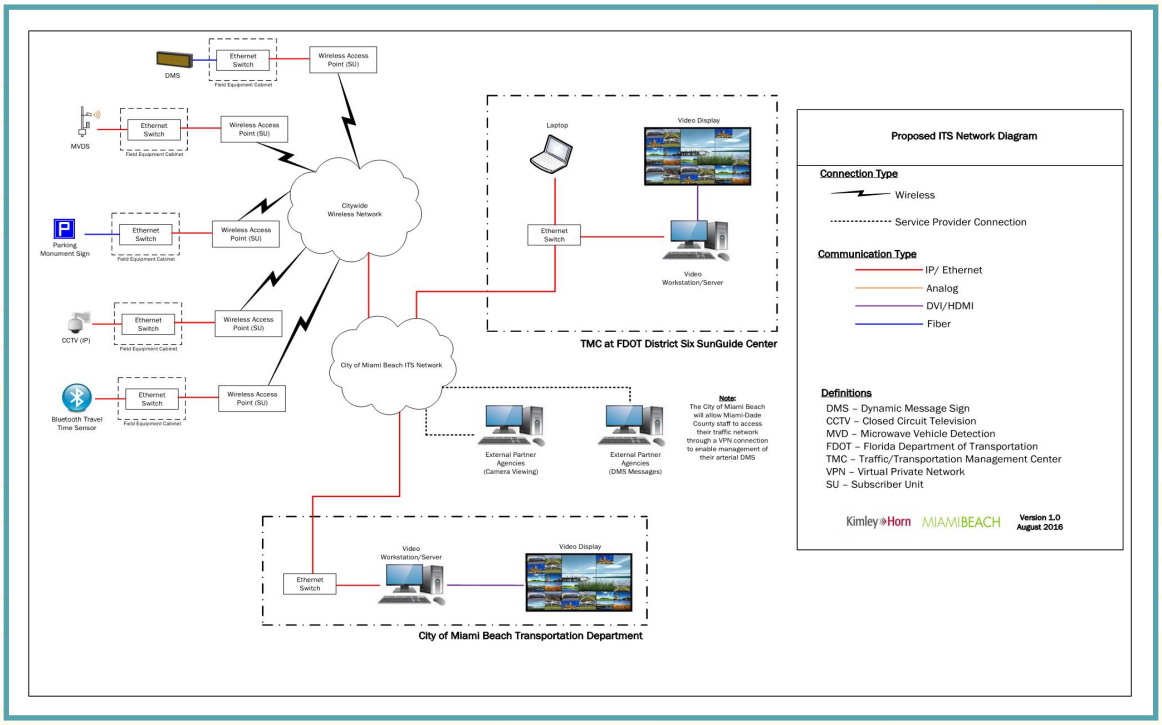
- A communications system consisting of wireless communications segments
- A CCTV camera system
- A vehicle detection system such as microwave detection, video detection, and wireless magnetometer detection
- A travel-time data collection system with Bluetooth and Wi-Fi
- A Dynamic Message Sign (DMS) system

This system will serve as the foundation for future deployments including an Adaptive Traffic Signal Control (ATSC) system for signalized corridors and a comprehensive city-owned fiber network.

The SPS infrastructure and sub-systems include parking occupancy systems for all city garages and 35 surface lots. This system will serve as the foundation for future deployments including wayfinding parking systems; parking locator systems; and parking availability applications, both web-based and smartphone-based. Ultimately leading to the development of the Miami Beach Traffic and Parking application, which will provide citizens with information on traffic conditions, travel times, road closures, other incidents, and available parking for selected parking garages and lots.

Leveraging local relationships, the City of Miami Beach partnered with the Florida Department of Transportation (FDOT) District Six and secured available office space within the SunGuide Transportation Management Center (TMC) in Miami, Florida. This office space will be converted into the City of Miami Beach TMC allowing for a co-location of state and city staff within the same facility. A copy of the co-location agreement is provided in Appendix A. This venture will result in coordination of individual transportation network operations of adjacent facilities across multiple government agencies, creating a unified and interconnected system capable of sharing cross-network travel management to safely and efficiently improve the movement of people. TMC operators will monitor the ITS and SPS technologies on central control software integrated with local software and hardware. A block diagram of the system is illustrated below to show the data flows of the future system.

Figure 2: System Block Diagram



The TMC will serve as the focal point for monitoring, controlling, and coordinating various functions required to manage the city's transportation system. At the TMC, information about the city's arterials, traffic signals, and parking facilities is collected, processed, and combined with other operational data to initiate control strategies to improve system performance. The TMC will also provide a center for communicating transportation related information to other agencies and to the traveling public. The maintenance of the technologies will be monitored by the TMC and an appropriate repair schedule will be developed as technologies are implemented. Repair technicians will be notified of the repair schedule and called upon as necessary to maintain the equipment.

Select study corridors were identified for inclusion in this project. These corridors were prioritized based on their proximity to each other, however other factors taken into consideration include roadway volumes, device density, and corridor length. Once all corridors were identified, they were assigned a respective phase to facilitate a systematic implementation resulting in an expanded city-wide ITS and SPS network.

Phase 1 includes the deployment of ITS devices along the corridors listed below, the citywide replacement of portable DMS, installation of interactive DMS at parking entry points to show real-time garage occupancy, as well as the conversion of the available office space that will serve as the TMC location at the FDOT District Six SunGuide Center.

PHASE 1

- 17th Street - Collins Avenue to Dade Boulevard
- Alton Road - Julia Tuttle Causeway to 17th Street
- Dade Boulevard - Alton Road to 23rd Street
- Alton Road - 5th Street to 17th Street
- Julia Tuttle Causeway - City Limits to Alton Road
- MacArthur Causeway - City Limits to 5th Street

Phases 2 and 3 includes the deployment of ITS devices along the corridors listed below and the installation of interactive DMS at parking entry points to show real-time surface lot occupancy.

PHASE 2

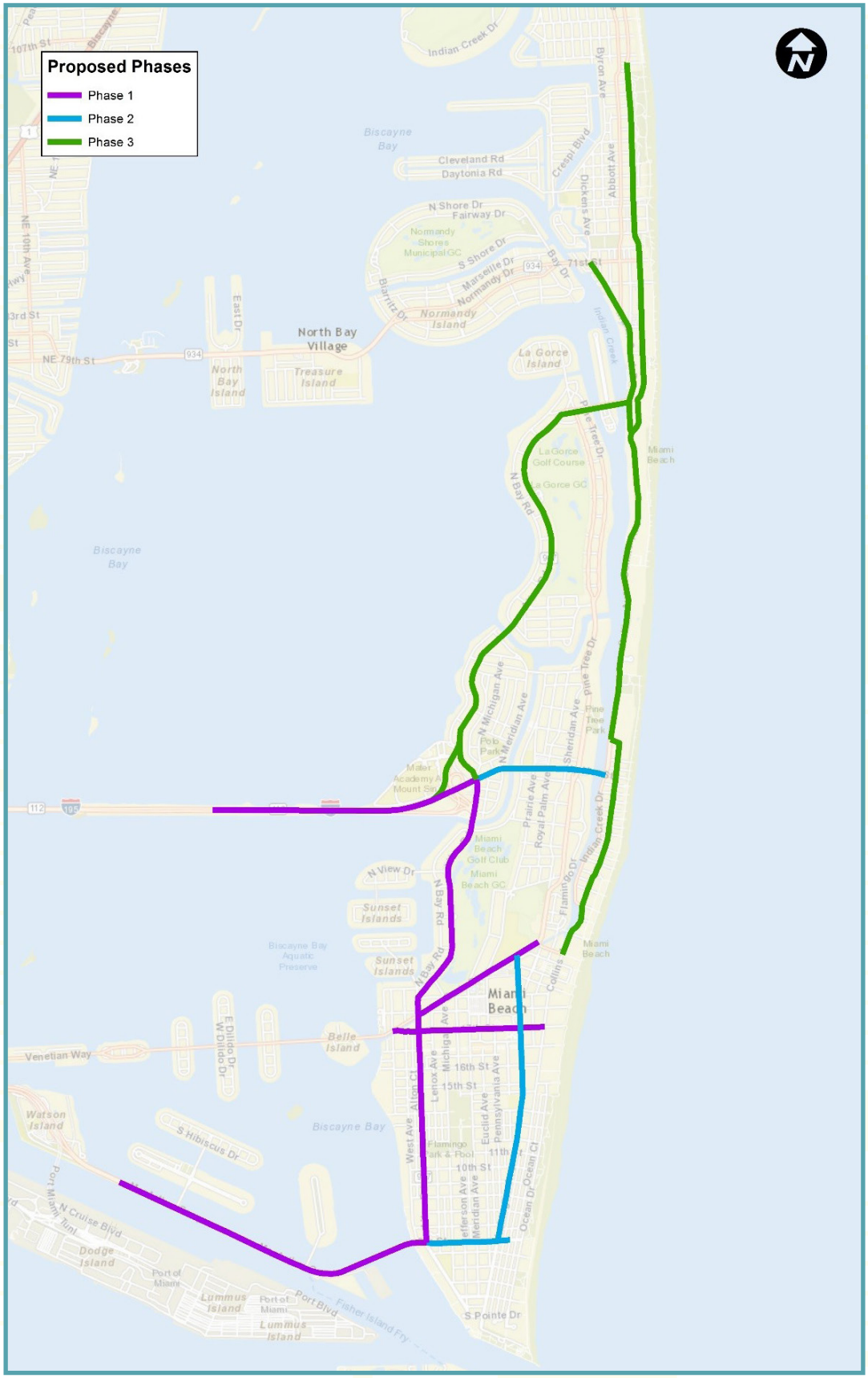
- 41st Street - Collins Avenue to Julia Tuttle Causeway
- SR A1A/5th Street - Alton Road to Collins Avenue
- Washington Avenue - 5th Street to Dade Boulevard

PHASE 3

- Collins Avenue - 23rd Street to 44th Street
- Indian Creek Drive/Collins Avenue - 44th Street to City Limits
- Alton Road - Julia Tuttle Causeway to Indian Creek Drive

Figure 3 on the following page illustrates the overall project phasing.

Figure 3: Project Phase Map



1.6 Deployment Plan

For support on the project, the City has retained a Program Management Consultant Firm. The Program Managers and City staff have worked together to develop all necessary system engineering documentation for this project. A Project Systems Engineering Plan (PSEMP) and Concept of Operations (ConOps) were produced and were used as the foundation to develop other project documents including a Project Plan, Performance Measures Requirements, Minimum Technical Requirements, and Concept Plans.

During the approval process, the City Commission recommended a Design, Build, Operate, and Maintain (DBOM) procurement for this project. One firm will be selected by the City following the standard procurement process. The City of Miami Beach Procurement Department will conduct the procurement process, selection, and award of the DBOM contract. With a DBOM contract, a private entity is responsible for design and construction as well as long-term operations and maintenance services.

The Design Consultant from the DBOM Firm will complete the design documents in compliance with the previously mentioned Minimum Technical Requirements. The DBOM Firm will perform construction/installation, which will be supervised by the City of Miami Beach Project Manager. Ultimately, system acceptance will be supervised by the City.

The high-level schedule milestones are discussed in **Section 1.13**. An initial schedule was developed by the City of Miami Beach Program Manager and will be fine-tuned with the DBOM Firm schedule once selected. Following selection, the DBOM Firm will be responsible for developing a construction schedule and providing periodic updates to the City's Project Manager.

The City of Miami Beach will use the performance measure requirements and goals to monitor and report on the quality and timeliness of operation and maintenance services in order to monitor system performance and returns on investment. Recommended measures, all of which are within the capabilities of the proposed systems are provided in **Table 3**.

Table 3: Recommended Performance Measures

COMMUNICATIONS NETWORK	ITS, SPS, AND TMC
Packet Loss	Hours of Operation/Staffing
End-to-end Delay	Incident Response/Validation
Delay-variation	Equipment Accuracy (e.g. parking occupancy validation)
Throughput (Bandwidth)	Equipment Availability/Spare Parts
Response Time	Subsystem Availability (i.e. uptime)
Uptime (i.e. Availability)	Standard Operating Guidelines (SOG) Development/Updates
Service Experience	Meetings/Training (i.e. SunGuide® Training Preventative Maintenance

Individual thresholds of performance were developed through further analysis and stakeholder consensus. Measures of Effectiveness (MOEs) are used to determine how well the system design meets the requirements and to quantify the project benefits. The following MOEs will be summarized by the contractor for the City of Miami Beach on a monthly and an annual basis:

- Travel Time Reliability
- Corridor Throughput
- Increased/Balanced Parking Occupancy
- Incident Management Metrics
  - Clearance Time
  - Response Time

The City of Miami Beach shall use the aforementioned performance measure requirements and goals to monitor and report on the quality and timeliness of operation and maintenance services provided for the TMC, ITS, and SPS. The performance measure requirements outline the general guidelines of operations and maintenance requirements to be followed by the DBOM Firm.

1.7 Obstacles to Deployment

There are no institutional obstacles in place regarding this project. The City Commission of Miami Beach understands the pressing need for an innovative approach to improving the transportation system and desire immediate implementation. The City Transportation Staff and related stakeholders have been diligently meeting biweekly to develop a plan for the ITS and SPS project. However, the expedited time schedule set by the Commission adds a constraint to where certain construction items, such as a full fiber network, cannot be implemented within the timeframe the Commission desires. This results in a phased approach to implementation.

All proposed systems included in the ITS and SPS project are dependent on the programming of funding and the availability of funding at the start of construction. A series of phases have been developed that will allow the City to deploy, operate, and maintain the ITS system incrementally over time as funding allows. Currently the City has funding programmed for the construction and operation of Phase 1. Future phases may not be completed without funding secured for both construction and operations, as the ability of the operating and maintaining agencies to provide adequate staff and maintenance is also dependent upon availability of sufficient funding.

At this time, there are no known regulatory or legislative obstacles to deployment. The governing bodies under whose jurisdiction this project falls, understand the many anticipated benefits and support its deployment.

1.8 System Performance Improvements

SYSTEM EFFICIENCY

In 2013, the City of Miami Beach launched a smaller-scale traffic monitoring and management study, the Event Traffic Monitoring and Management Project, to document the performance of this technology in advance of extending the services to what would later become this ITS and SPS project. The analysis was based on a comparison of travel time data and travel speed data collected during two special events prior to deployment of the traffic management system and during two special events after the system was fully operational. The “High Impact Period” events included in the study were Winter Party Week, the Winter Music Conference, the Ultra Music Festival, and Memorial Day weekend. Pan-tilt-zoom (PTZ) cameras, Bluetooth and WI-FI data collectors, and DMS were included in the traffic monitoring and management efforts. The study area was divided into six critical routes, and travel time and average speeds along these six routes were used as the basis of comparison to gauge performance of the system. Significant improvements in travel time and travel speed performances were observed along these corridors after the Event Traffic Monitoring and Management Project was deployed. **Table 3** summarizes the comparison of before and after conditions reported in the study. Data from three peak periods (morning, mid-day, and afternoon) were averaged to get one value of travel time and speed representing three peak periods for each event individually.

Table 4: Results of Event Traffic Monitoring and Management Project

ROUTE NUMBER	ROUTE DESCRIPTION	CHANGE IN TRAVEL TIME	CHANGE IN SPEED
1	Northbound Alton Road from Flyover at West Avenue and 5th Street to 17th Street	-7%	8%
2	Eastbound 17th Street from Alton Road to Meridian Avenue (Travel Times increased due to a Detour through 17th Street)	58%	-172%
3	Southbound Alton Road/Michigan Avenue to Meridian Avenue/17th Street	-39%	33%
4	Southbound Alton Road from Michigan Avenue to 17th Street	-59%	42%
	Northbound Alton Road from 17th Street to Michigan Avenue	-230%	58%
5	Southbound Alton Rd via West Avenue Detour from 17th Street to West Avenue and 5th Street	-43%	35%
6	Northbound Dade Boulevard from Alton Road to Meridian Avenue	-66%	36%

In 2013, FDOT provided a Pilot Project program through which the City of Miami Beach was able to have a consultant provide traffic monitoring and management during the 2013 Art Basel Festival that took place at the Miami Beach Convention Center. The event attracted an audience of more than 75,000 people over the event's duration. DMS were deployed to provide real-time traffic and parking availability updates along MacArthur Causeway, Julia Tuttle Causeway, and SR 907 (Alton Road). Social media was also utilized to communicate conditions to visitors. The consultant of the City of Miami Beach was able to monitor travel times through the use of Bluetooth and WI-FI data collected technology and to manually adjust traffic signal timings along event routes, as needed. The consultant also worked with the City of Miami Beach Police Department to identify when police assistance was needed at an intersection, which allowed the Police Department to more efficiently and effectively allocate its resources. The efforts of this program were found to be effective and were a valuable addition to event planning and operations. The attendee experience and resident quality-of-life were directly improved through these efforts.

SAFETY

In the previously mentioned traffic monitoring and management study, crash data were obtained for the time period during which the study took place and for the same time period of the previous year. ITS components of this project can minimize opportunities for conflicts by decreasing the number of stops, reducing queues, and reducing delay. ATSC can optimize signalization as they adapt in real-time to changing traffic demands, resulting in reduced stop frequency, delay, and travel time. As a result, it is expected that a decline in intersection-related crashes, primarily rear-end crashes, will be observed. It is also expected that implementation of the SPS will result in crash reductions. The SPS will provide real-time travel information on parking availability to travelers, leading them to make more efficient route choices. This will reduce the number of vehicles wandering on roadway network looking for a place to park.

1.9 Safety, Mobility, and Environmental Benefit Projections

The following sections provide a monetary breakdown of travel time savings, fuel consumption savings, and air quality improvements that are anticipated to result from implementation of the ITS and SPS project.

TRAVEL TIME SAVINGS

ITS Implementation

Data analyzed in the travel time savings analysis was provided by the City of Miami Beach. The data was collected during the Event Traffic Monitoring and Management Project. Ten routes were developed for the study and were monitored for each special event. Of the ten routes, six critical routes for internal and regional connectivity were identified. ITS technology was used to monitor and manage all ten routes; however, performance data for a baseline condition without ITS and for monitored conditions with ITS were only gathered for the six critical routes during two special events. Although performance data was collected for the six critical routes, observations indicate that there were significant improvements in traffic alone for all ten routes.

With the goals of establishing a sound analytical basis for its investment to enhance overall mobility, the City commissioned a comprehensive simulation effort conducted by reputed and independent experts at Florida Atlantic University. Travel time for the baseline conditions and monitored conditions were compared to calculate average travel time savings. Annual Average Daily Traffic (AADT) and growth rates were gathered from the FDOT Florida Traffic Online website, from information provided by the City, and from previous studies in the area. An average attendance of 70,000 attendees per event was assumed and a 1.2 vehicle occupancy factor was applied. Three peak periods (morning, mid-day, and evening) were used to for the calculation of travel time savings. Travel time was valued at $19 per hour. The Net Present Value of the travel time benefits of implementing an ITS is calculated at $30,494,371 (7 percent) and $43,298,309 (3 percent). The values for benefits and costs are monetized in 2015 dollars and future dollar values were discounted using a real rate of 7 percent and an alternate of 3 percent.

SPS Implementation

Studies suggest that approximately 1/3 of the volume of traffic in areas of high activity are cruising for a parking space at an average speed of 10 mph and spending an average of eight minutes before finding a place to park, significantly contributing to the amount of congestion. The Average Daily Traffic (ADT) of major arterial and collector roadways within the City of Miami Beach were used to estimate how many vehicles hold up traffic while looking for a place to park on a daily basis. It was estimated that an average of 7,500 vehicles per day cruise around the city while looking for parking. An average yearly growth rate was applied to the average annual number of vehicles for the life of the project, to reflect AADT growth. Driving at an average speed of 10 mph for an average of 8 minutes of searching time, vehicles in Miami Beach spend approximately 363,083 hours per year and drive approximately 3,630,828 miles per year while looking for a place to park.

According to companies currently providing SPS, the implementation of these systems reduced the time it normally takes to find parking by 42 percent and the total mileage travelled by 23 percent. These values were used to monetize the travel time savings benefits of implementing a SPS in the City of Miami Beach. The Net Present Value of the travel time benefits of implementing a SPS is calculated at $34,342,323 (7 percent) and $49,014,449 (3 percent).

FUEL CONSUMPTION SAVINGS

ITS Implementation

The quantified benefits of fuel consumption savings from ITS implementation were calculated based on travel time reductions. The difference in travel times was considered to be the time that cars would otherwise remain delayed, and therefore idling. Rates for fuel consumption while a vehicle is idling were obtained from publications by the United States Department of Energy (US DOE). **Table 4** presents average idling fuel consumption rates for different engine sizes. The idling fuel consumption rate used as an average was 0.48 gallons/hour, as the average engine size was assumed to be three liters. A current average gas price of $2.657/gallon was used to monetize the fuel consumption benefits of implementing ITS. The Net Present Value of the fuel consumption benefits of implementing an ITS is calculated at $2,046,911 (7 percent) and $2,906,365 (3 percent).

SPS Implementation

Fuel consumption savings benefits were estimated based on the vehicle miles traveled (VMT) annually while searching for parking, obtained using the methodology described above. An average rate of 20 mpg, obtained from the 2013 Fuel Economy Guide published by the United States Environmental Protection Agency (EPA), was used to calculate the amount of fuel consumed annually while attempting to park within the city. A current average gas price of $2.657/gallon was used to monetize the fuel consumption benefits of implementing a SPS. The Net Present Value of the fuel consumption benefits of implementing a SPS is calculated at $1,314,971 (7 percent) and $1,876,768 (3 percent).

AIR QUALITY BENEFITS

ITS Implementation

The quantified benefits of emission savings from ITS implementation were calculated based on travel time reductions. The difference in travel times was considered to be the time that cars would otherwise remain delayed and therefore idling. Average idling emission rates were obtained from literature published by the US EPA and are provided in **Table 5**. The yearly emission savings were obtained by multiplying the average travel time reduction by the pollutant emission rates. The monetized value of emission saving was estimated by using US DOT guidance and are summarized in **Table 6**. The Net Present Value of the air quality benefits is calculated at $59,300 (7 percent) and $84,418 (3 percent).

SPS Implementation

The quantified benefits of emission savings from SPS implementation were calculated based on VMT reductions. VMT estimates were obtained from travel time savings estimate. Average emission rates were obtained from literature published by the US EPA and are summarized in **Table 7**. The yearly emission savings were obtained by multiplying the VMT by the pollutant emission rates. The monetized value of emission savings was estimated using US DOT guidance summarized in **Table 6.** The Net Present Value of the air quality benefits is calculated at $80,832 (7 percent) and $115,365 (3 percent).

1.10 Vision, Goals, and Objectives

The mission of this project is to create a transportation management system that improves and enhances the safety, efficiency, and reliability of moving people and goods throughout Miami Beach, all while reducing transportation-related emissions and creating pathways to jobs and economic opportunity. Four project-specific goals were identified:

- **Improve Quality of Life.** Miami Beach is a very livable community and was recognized as one of the top small to mid-sized cities in which to live in Florida by Livability.com. The City of Miami Beach wants to maintain a high quality of life for residents and visitors by enhancing mobility to achieve this goal.
- **Increase Tourism.** Tourism is the economic engine for Miami Beach; however, traffic congestion has negative impacts on tourism. Over 62 events take place each year where visitors must travel into and out of the city and often have trouble finding parking. Tourism also has an impact on residents and the city desires to ensure events are a good experience with minimal impact on the transportation network.
- **Economic Growth.** Ultimately if the tourists enjoy their visit and more events are held each year, the city will continue the pattern of economic growth that it has experienced.
- **Improved Predictability.** With an improved understanding and assessment of the existing transportation and parking systems through the ITS and SPS project, system predictability and reliability is anticipated. Improved assessments of historical trends, such as peak hour trends and impacts of special events, future events and general parking and transportation trends can be quantified and then predicted for future events and typical occurrences.

When completed, this project will result in a transportation network with improved operational efficiency, improved corridor throughput, enhanced personal mobility, improved access, safety, and parking, enhanced present and future economic productivity of individuals, organizations, and the economy as whole while meeting goals of sustainability and livability.

These goals are visionary and are targeted to meet the regional vision for the City of Miami Beach Transportation Department as summarized below:

Our vision for the ITS and SPS is to create a robust system that enhances transportation through the safe and efficient movement of people, goods and information with greater mobility and fuel efficiency, less pollution, and increased operating efficiency.

This vision also resonates well and is consistent with the City of Miami Beach's Transportation Mission as summarized below:

To ensure the safe, secure, and efficient movement of people and goods in a transportation system that provides mobility, livability, and accessibility, and promotes alternative modes of travel, while ensuring environmental and economic sustainability, and improving the quality of life for all who live, work, and play in our vibrant, tropical, historical community.

The City of Miami Beach ITS and SPS project embraces and addresses the USDOT vision elements. The table below summarizes this alignment. More importantly, the project team has defined an approach that builds on these elements and enables us to achieve the vision we have framed for the City: use innovative technology solutions to improve access to jobs, connect visitors to transportation options, use smart logistics to stimulate economic prosperity, connect our residents to safe reliable transportation, and efficiently move people and goods through environmentally sustainable practices.

1.11 Partnerships

Given the technical nature of this project, management of project objectives as well as technical requirements for various aspects of the project was important for development of project components and procurement documents. As such a Technical Steering Committee (TSC) was established to discuss the appropriate requirements for each project subtask during progress meetings and to guide the project development process of this project. TSC members included representatives from Florida Department of Transportation (FDOT) District Six, Miami-Dade County, Miami-Dade Expressway Authority (MDX), the City of Miami Beach Transportation Department and representatives from other City Departments such as Police. The committee began the process with development of high-level functional requirements which were further clarified with more descriptive technical requirements as needed.

The TSC met bi-weekly to discuss the advancement of the Miami Beach ITS and SPS Project as well as opportunities for coordination. With relationships formed through the TSC, the City was able to partner with local agencies to not only leverage existing transportation investments but optimize future transportation investments as well. The benefits that stemmed from the relationships that developed are highlighted with each respective agency.

MIAMI-DADE COUNTY

In Miami-Dade County, signal operation is under the jurisdiction of the Miami-Dade Department of Transportation and Public Works. City of Miami Beach staff is in constant communication with the County's engineers to report issues with signal timing, progression, and phasing in an effort to improve Level of Service and to reduce congestion throughout the City. As the agency that has the ownership over signal operation, Traffic Signals and Signs Division (TS&S) of the Miami-Dade Transportation and Public Works Department is one of the partners in this project. Because Miami-Dade County is the maintaining agency for all traffic signalization within the County, a strong partnership between the City and County is very important.

Given the documented responsiveness challenges faced by the County due to its reduced staffing, the City has taken a more proactive step in the operations and maintenance of their existing system. As of 2015, the City placed a Traffic Signals Operations Engineer to manage the 278 Signals within Miami Beach. The intent of the added involvement and coordination is to provide an improved level of responsiveness in anticipation of the ITS and SPS project. The City also currently has an Memorandum of Understanding (MOU) in place with the County granting access to KITS®, the advanced traffic management system used by the County . Miami-Dade County is also represented on the TSC.

FLORIDA DEPARTMENT OF TRANSPORTATION

Most of the major arterials in Miami Beach are state roads under FDOT jurisdiction. FDOT is a very important partner in all transportation projects throughout the city and the City of Miami Beach and FDOT have partnered on several projects over time. For implementation of the ITS and SPS project, the city has continually consulted FDOT for guidance and FDOT staff have been invited to serve as part of the evaluation committee for the selection of the ITS and SPS Program Manager. Representatives from FDOT are also on the Technical Steering Committee and through this platform, the City of Miami Beach has been able to execute an agreement with FDOT to have access to the FDOT highway camera system and was able to capitalize on the opportunity to co-locate the TMC at the SunGuide Center for improved effectiveness.

MIAMI-DADE EXPRESSWAY AUTHORITY

The Miami-Dade Expressway Authority is represented on the Technical Steering Committee.

FLORIDA ATLANTIC UNIVERSITY

Florida Atlantic University is represented on the Technical Steering Committee. FAU has also completed a study on adaptive signal control for the city.

EXISTING AGREEMENTS

The City of Miami Beach currently has the following agreements in place with the identified agency. All executed agreements are included in Appendix A. Baseline responsibilities of each agreement party is detailed below.

- Notice to Municipalities (December 2015) – Procurement and Installation of Traffic Control Devices in Miami-Dade County
  - The County allows local jurisdictions with a written agreement to install their own traffic control devices at their own cost, but requires devices to be on the Miami-Dade County's QPL.
- FDOT/City Video Sharing Agreement to view FDOT Cameras
  - FDOT invites agencies to have viewing access to the cameras through a video sharing agreement. FDOT maintains ITS devices including DMS and CCTV cameras along several causeways and throughout the City of Miami Beach. These devices are monitored and controlled at the District Six SunGuide Center. The City of Miami Beach is in the process of executing the agreement for access to the FDOT cameras.
- City/FDOT TMC Colocation Agreement

FUTURE AGREEMENTS

The City of Miami Beach has used existing agreements to provide an understanding of the options available to engage or fund operations and maintenance services. Recognized opportunities in the form of potential future agreements are listed below.

- County/City Video Sharing Agreement to view County Cameras
- County/City Installation Agreement to install ITS devices including cameras on County roadways
- City/County ITS Sharing Agreement to view City cameras and other ITS devices

1.12 Existing Local and Regional Advanced Transportation Systems

The term ITS refers to using technology to enhance mobility by making more effective use of the transportation network. This is accomplished by merging existing and emerging technologies that provide systematic monitoring, management, control and information sharing. These strategies and tools allow for improved management of traffic flows and for reduced congestion and incidents. The equipment and software chosen for this project will be compatible with the components that already exist for the City of Miami Beach in order to provide a homogeneous system that facilitates the operation and maintenance of all ITS devices. All applicable devices will be listed on the FDOT Statewide Approved Products List (APL), which will ensure they have been tested by the FDOT Traffic Engineering Research Lab (TERL) and certified to meet FDOT Standards.

CURRENT TRAFFIC SIGNAL NETWORK

The current Traffic Signal Control System will be used and improved upon to provide the efficient flow of traffic for the reduction of incidents, environmental impact and user dissatisfaction. Currently, traffic signals within Miami Beach are monitored for deterioration of travel times and when deterioration is found, a signal operations engineer is dispatched to remedy the issue. Additionally, as part of ongoing event traffic management and monitoring

services, the City has developed special event traffic signal timing plans to help improve traffic progression along ingress/egress corridors during high impact periods.

CITY OF MIAMI BEACH POLICE CAMERAS

Existing cameras installed and maintained by the City of Miami Beach Police Department will be integrated with the ITS and SPS project. The images obtained by CCTV cameras can also be helpful to the City of Miami Beach police and fire departments for security monitoring and emergency response. The general guideline for deploying cameras is to place them at locations with high traffic volumes and high incident rates. The City of Miami Beach TMC and the City of Miami Beach ITS devices will also be accessible from the FDOT District Six SunGuide® TMC, the Miami-Dade County TMC, and by the City of Miami Beach Police Department at the EOC. However, control of ITS devices is not anticipated by FDOT, County, or Police Department personnel.

CITY OF MIAMI COMMUNICATIONS NETWORK

The City of Miami Beach Police Department (MBPD) currently has an existing wireless network comprised of five primary locations and one temporary location, to provide additional coverage. As such, a total of six wireless nodes have been used to build out the MBPD core wireless network infrastructure. Throughout the city limits are wireless access points deployed as part of the network. The six antenna locations may be available for antenna installation as a part of this project.

DYNAMIC MESSAGING SIGNS

The City of Miami Beach is currently modifying traffic signal timing during events and using dynamic messaging signs to disseminate travel time information and incident information to the traveling public. The deployment of the ITS and SPS project include replacing existing DMS with new, attractive, and context-sensitive DMS.

SMART PHONE APPLICATIONS

The City of Miami Beach currently offers two mobile parking applications, ParkMobile and ParkMe, covering the garages and metered parking throughout the city. The mobile applications can be used to identify municipal parking facilities, including directions to their facility of choice. Upon arrival, users may then pay for their parking session by selecting the payment option. Features of the smartphone application include:

- Remote initiation of parking session on your phone/smart phone from the comfort of your vehicle
- Text message alerts with reminders alerting users when parking sessions are about to expire
- Parking session extension (e.g. ability to add more time) via smartphone application from any location throughout City

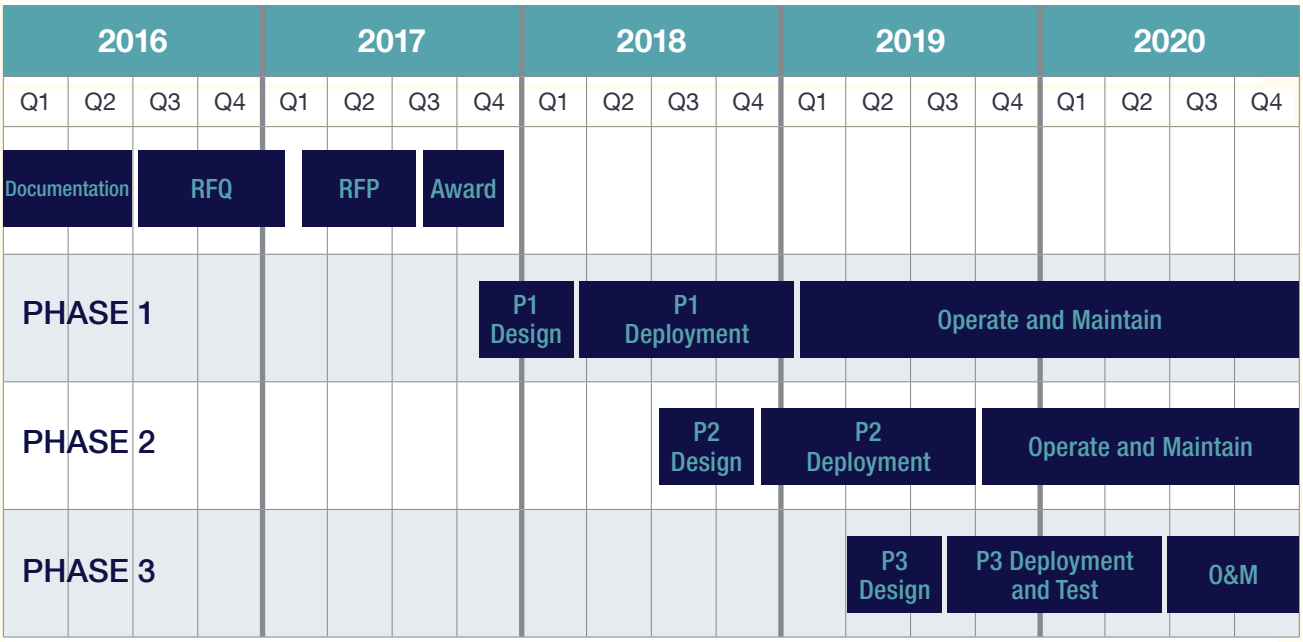
These two applications will continue to be used into the future and should be incorporated into the SPS technologies that are part of this project. The ability to determine the number of parking spaces available at each parking garage will help limit vehicle miles traveled and reduce frustration for users around the city.

1.13 Deployment Schedule

The following project schedule was developed specifying project milestones. The project phasing and initial schedule was developed by the Project Program Manager with input from the City. This schedule is anticipated to undergo modifications as necessary as the project progresses. A detailed schedule will be provided by the DBOM Firm. The City and its Program Manager will review the project status on a monthly basis to ensure tasks are on schedule and that the team is aware of critical path milestones. The project schedule will be reviewed with the team members during project status briefings, and schedule status updates will be provided by the DBOM Firm as part of the regularly scheduled progress briefings. Any changes to schedule, as a result of construction, scope changes, or other impacts will be coordinated with the City of Miami Beach Project Manager, and an updated schedule if needed, will be developed and submitted to the City.

The work breakdown structure and estimated schedule for all project phases is summarized below in **Figure 4.** A preliminary program schedule was developed by the Program Manager and identifies the following general phases:

Figure 4: Project Schedule



Ongoing procurement processes to secure a DBOM Firm are underway with the intent to have this technical deployment team under contract by October 2017. Following procurement of the DBOM Firm, the project team will commence immediately upon notice to proceed (NTP) with development of a Project Management Plan (PMP) and refinement of the project schedule. The project team anticipates a start date as early as November 2017.

1.14 Innovative Technology Initiatives

This project is intended to work in support of the Joint Program Office's Intelligent Transportation Systems Strategic Plan 2015-2019. The Mission of the Strategic Plan is to conduct research, development, and education activities to facilitate the adoption of information and communication technology to enable society to move more safely and efficiently. The Miami Beach ITS and SPS project has already been meeting this mission statement and will continue to meet the mission through the funding of this project. The ITS Strategic Plan includes program categories to provide the necessary structure for research, development, and adoption of ITS technologies. These categories reflect modal and external stakeholder input about the areas where attention, focus, and resources should be devoted. This project will have features that will address the ITS Strategic Plan 2015-2019 categories listed below:

- **Emerging Capabilities:** Focuses on future generations of transportation systems.
- **Enterprise Data:** Continues existing efforts in operational data capture from stationary sensors, mobile devices, and connected vehicles and expands into research activities involving the development of mechanisms for housing, sharing, analyzing, transporting, and applying those data for improved safety and mobility across all modes of travel.
- **Interoperability:** Focuses on how to ensure effective connectivity among devices and systems.
- **Accelerating Deployment:** Advances the work from adoption to wider-scale deployment in coordination with several other DOT agencies.

The ITS Strategic Plan 2015-2019 also highlights the importance of vehicle automation and interconnectedness in future transportation systems. This ITS and SPS project provides technological advancements and interconnectivity improvements to a stressed transportation system and meets many of the themes established by the ITS Strategic Plan.

STAFFING DESCRIPTION

2.1 Project Leadership

The Miami Beach project team will direct, manage, and coordinate the project through design, deployment, and operation. City Transportation initiatives are guided at the policy level by an experienced Assistant City Manager and Transportation Director. Day to day project management will be guided in house in collaboration with highly qualified ITS consulting professionals.

The City Project Manager will coordinate both the internal City and the consulting team in providing project guidance, schedule oversight, communications coordination with internal and external stakeholders, contractor and equipment procurement, grant management, and record management. [redacted]

Contracted Program Management support will assist the Miami Beach team with:

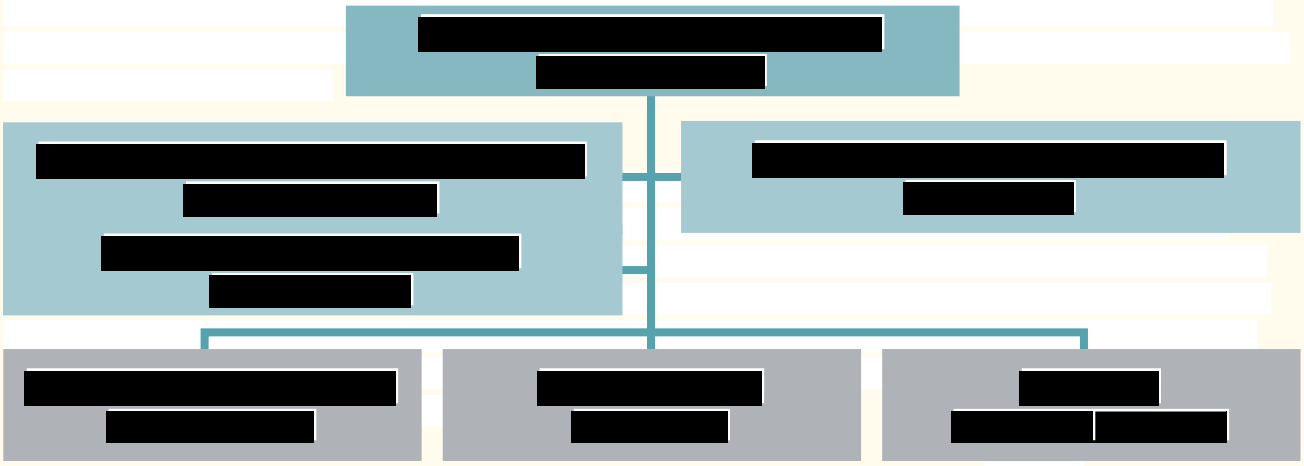
- StakeholderCoordination,Agreements, and Documentation
- Review Costs and Determine Breakdowns Throughout Project
- Monitor/Track Budgets, Schedules, and Funding
- Prepare Design/Pre-proposal/Bid/Construction Documents and Meetings
- Review Documents and Plans, Make Recommendations, Value Management

The project will be implemented through Miami Beach procurement of a specialized ITS firm under contract to Design, Build, Operate, and Maintain (DBOM) this ITS project. The Request for Proposals (RFP) process will comply with Miami Beach, State, and Federal procurement standards. It is anticipated that the RFP will be a two-step process, with firms first evaluated on their qualification and selected firms requested to provide scope and budgets.

Specifically, it is anticipated that the DBOM Firm will be responsible for system:

- Design
- Construction
- Testing
- Integration
- Training
- Operations
- Maintenance

The figure below illustrates the project's organizational structure.



2.2 Staff Experience

The following team will ensure successful delivery of this project.

PROJECT MANAGEMENT

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Appendix A **Executed Agreements**

TRANSPORTATION DEPARTMENT

DATE:	April 28, 2017
TO:	Jimmy Morales
FROM:	Jose R. Gonzalez
SUBJECT:	FDOT Closed Circuit Television Agreement

Routing

Jimmy Morales	
Kathie Brooks	

For: (check the one that applies)

	Information Only
X	**Review and approval**
X	**City Manager's Signature**
	Other Signature _____
	Other

Comments:

Closed Circuit Television Agreement to view FDOT cameras within the City of Miami Beach for Traffic Monitoring Purposes.

Return to:

Josiel Ferrer-Diaz X 6831

Date Needed:
ASAP

CLOSED CIRCUIT TELEVISION (CCTV) AGREEMENT

THIS CLOSED CIRCUIT TELEVISION AGREEMENT (this "AGREEMENT"), made and entered into this _____ day of _____ by and between the Florida Department of Transportation, an agency of the State of Florida, hereinafter called the "Department" whose office address is 605 Suwannee Street, MS #90, Tallahassee, Florida 32399-0450 and the City of Miami Beach, Florida _____, hereinafter called the "Requestor", whose office address is 1700 Convention Center Drive, Miami Beach, FL 33139 _____. Collectively, all of the signatories to this AGREEMENT shall sometimes be referred to as the "parties" and individually as a "Party."

1. The Department operates computerized motorist information systems which monitor traffic conditions on certain portions of the State Transportation System.

2. The Department's computerized motorist information system provides a "live" video image ("video images"). The video images are not recorded.

3. Requestor has asked for remote electronic access to the video images created by the Department's computerized motorist information system operated in the South Florida (Miami) _____ area.

4. Pursuant to Section 119.07(2)(a), Florida Statutes, the Department is authorized to provide access to public records by remote electronic means, provided exempt or confidential information is not disclosed.

5. Pursuant to Section 119.07(2)(c), Florida Statutes, the Department is authorized to charge a fee for remote electronic access including the direct and indirect costs of providing such access.

6. The Department will provide to Requestor the requested video images generated by the Department's Closed-Circuit Television (CCTV) cameras used for monitoring traffic conditions in the South Florida (Miami) _____ area, as available. The video images provided shall be those currently available to the Department control room operators from the images on the traffic surveillance monitors within the control room. This AGREEMENT is non-exclusive and nothing herein shall be deemed to limit the ability of the Department to provide the video images referenced herein to other parties.

7. In order to receive the signal Requestor shall provide, operate, and maintain, at its own risk and expense, all equipment, hardware, or software (including, but not limited to, the interface equipment to tie into the Department's video matrix switcher). The Department assumes no responsibility for any equipment or property placed in the Regional Traffic Management Center(s) (RTMC) or another Department approved facility and Requestor hereby expressly relieves and discharges Department from any and all liability for any loss, injury, or damage to persons and property that may be sustained by reason of the use or occupancy of the Department's RTMC(s) or Department approved facility. Requestor agrees to immediately move or relocate, at its sole expense, any or all of the equipment, hardware, or software at the request of the Department. Requestor shall provide a fully trained contact person who is solely responsible for the operation and maintenance of Requestor's equipment and all activities associated with this AGREEMENT. The Department shall have no responsibility to provide any training or supervision of Requestor's contact person associated with this AGREEMENT other than to allow the contact person to attend all briefings and/or training sessions provided by the Department which relate to the equipment, hardware, or software. The contact person shall have access to Requestor's equipment, hardware, and software between 8:00 a.m. and 5:00 p.m., Monday through Friday, excluding State Holidays, for purposes of maintenance, repair, replacement, or upgrading of said property of Requestor. When possible, such access will be arranged in advance. A Department escort may be required during these hours in accordance with security measures at these facilities.

8. Requestor agrees that it will not install or operate any equipment, hardware or software that may interfere with the Department's CCTV traffic surveillance camera systems, any Department communications equipment or other Department electronic systems. In the event any such interference occurs, Requestor shall immediately remedy all problems caused by such interference. Requestor further authorizes the Department to disconnect or deactivate any equipment, hardware or software causing such interference and waives any claim it might otherwise assert as a result of such disconnection or deactivation.

9. The Department requests that the Requestor give appropriate on-screen, on-air, online, and in-print attribution to the Department for use of the video images.

10. The Department requests that the Requestor bear in mind the content of the images when broadcasting. The video feed may contain sensitive images that can be disturbing or offensive to some viewers, potentially including images of persons or vehicles involved in fatal accidents; law enforcement stops or pursuits of vehicles; identifiable images of the general public or license plates of vehicles; or images of catastrophic events.

11. The Department requests that the Requestor provide a disclaimer of any Department endorsement of any advertising located near or in association with the presentation of the video images.

12. The Department does not guarantee the continuity of the video images, nor does it in any way warrant the accuracy or quality of the images provided.

13. The risk of use of the images is the sole responsibility of Requestor and it agrees to be fully and solely responsible for and to the extent allowable and subject to the limitation on the Requestor's liability as set forth in Section 768.28, Florida Statutes, to indemnify, defend, and hold harmless, the Department, its agents, officers, and employees from any and all claims, damages, suits, actions or other proceedings for damages arising out of or in any way associated with the use of the video images by Requestor or in any way arising out of or associated with the placement or removal or failure to remove its equipment.

14. Vendor/Contractor:

    (1) shall utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the Vendor/Contractor during the term of the contract; and

    (2) shall expressly require any subcontractors performing work or providing services pursuant to state contract to likewise utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the contract term.

15. If Requestor wishes to stop receiving the video images, Requestor shall advise the Department in writing and shall remove all of its equipment, hardware, and software within thirty (30) days. If Requestor fails to remove its equipment, hardware, or software within thirty (30) days the Department may remove and dispose of any equipment, hardware, or software, without any liability to the Requestor.

16. **Video Images Use Fees and Term,** Select one (1) of the following options:

    a. ☐ The Requestor is a Media Partner or Non-Government Agency Partner, and the following provisions apply:
        i. The video images will be provided to the Requestor on an ongoing basis at no charge. However, to cover the cost of security and logistics coordination during the initial video connection phase, a non-refundable One Thousand dollar ($1,000) fee will be required at each RTMC or approved Department facility, where Requestor installs equipment. Requestor will pay an annual fee of Five Hundred dollars ($500) at each RTMC or approved Department facility where Requestor has installed equipment, covering the cost of security and logistics coordination for providing access to Requestor's equipment in order to perform routine equipment maintenance. The Requestor will be invoiced for the routine equipment maintenance access fees annually on the date of the original agreement. The Department may adjust the annual routine equipment maintenance fee for a subsequent year upon providing written notification to Requestor of the change. Any subsequent major equipment upgrades may require an additional One Thousand dollar ($1,000) fee at each RTMC or Department approved facility, where Requestor has installed equipment. In the event the Department determines that Requestor caused damage to Department equipment or facilities, Requestor shall reimburse the Department for all damages it caused within 30 days of notice from the Department.
        ii. The Term of this AGREEMENT will be for three (3) years with the option to renew for three (3) additional years. At the end of the term, the Requestor must request and sign a new agreement to continue to access the Department's video images.

    b. ☒ The Requestor is a Government Agency Partner and the following provisions apply:
        i. The Requestor shall not be charged any fees under this AGREEMENT. In the event the Department determines that the Requestor caused damage to Department equipment, facilities,

or software the Requestor shall reimburse the Department for all damages it caused within 30 days of notice from the Department.

ii. The Term of this AGREEMENT will be for three (3) years with the option to renew for three (3) additional years. At the end of the term, the Requestor must request and sign a new agreement to continue to access the Department's video images.

c. ☐ The Requestor is a Department Contractor and the following provisions apply:

i. The Requestor shall not be charged any fees under this AGREEMENT. In the event the Department determines that the Requestor caused damage to Department equipment, facilities, or software the Requestor shall reimburse the Department for all damages it caused within 30 days of notice from the Department.

ii. The Term of this AGREEMENT will be for three (3) years with the option to renew for three (3) additional years. At the end of the term, the Requestor must request and sign a new agreement to continue to access the Department's video images. The Department may terminate this AGREEMENT in its sole discretion if the Requestor's contract(s) with the Department related to the use of video images under this AGREEMENT, _____(Contract Number(s)) expire or are terminated.

17. The Department may terminate this AGREEMENT at any time and without notice should the Requestor not comply with the terms of this AGREEMENT.

18. This AGREEMENT embodies the whole agreement of the parties with respect to the video images from the Department's CCTV traffic surveillance camera systems in the South Florida (Miami) area. There are no promises, terms, conditions, or obligations other than those contained herein, and this AGREEMENT shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto. The terms and conditions herein, whether general or specific, shall take precedence over and supersede any inconsistent or conflicting provision in any attached terms and conditions.

19. It is understood and agreed by the parties hereto that if any part, term, or provision of this AGREEMENT is by the courts held to be illegal or in conflict with any law of the State of Florida, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the AGREEMENT did not contain the particular part, term, or provision held to be invalid.

20. Any questions or matters arising under this AGREEMENT as to validity, construction, enforcement, performance, or otherwise, shall be determined in accordance with the laws of the State of Florida.

21. In any legal action related to this AGREEMENT, instituted by either Party, the Requestor hereby waives any and all privileges and rights it may have under Chapter 47 and Section 337.19, Florida Statutes, relating to venue, as it now exists or may hereafter be amended, and any and all such privileges and rights it may have under any other statute, rule, or case law, including, but not limited to those grounded on convenience. Any such legal action may be brought in the appropriate Court in the county chosen by the Department and in the event that any such legal action is filed by the Requestor, the Requestor hereby consents to the transfer of venue to the county chosen by the Department upon the Department filing a motion requesting the same.

22. The parties hereby agree to bear their own attorney's fees and costs with respect to this AGREEMENT.

23. The parties hereby agree and covenant that this AGREEMENT is binding on the parties, their heirs-at-law, and their assigns and successors in interest as evidenced by their signatures and lawful executions below.

24. A modification or waiver of any of the provisions of this AGREEMENT shall be effective only if made in writing and executed with the same formality as this AGREEMENT

25. **Public Records**: The Requestor shall allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the Requestor in conjunction with this AGREEMENT. Specifically, if the Requestor is acting on behalf of a public agency the Requestor shall:

a. Keep and maintain public records that ordinarily and necessarily would be required by the Department in order to perform the services being performed by the Requestor.

b. Provide the public with access to public records on the same terms and conditions that the public agency would provide the records and at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.
c. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law.
d. Meet all requirements for retaining public records and transfer, at no cost, to the Department all public records in possession of the Requestor upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. All records stored electronically must be provided to the Department in a format that is compatible with the information technology systems of the Department.

Failure by the Requestor to grant such public access shall be grounds for immediate unilateral cancellation of this AGREEMENT by the Department. The Requestor shall promptly provide the Department with a copy of any request to inspect or copy public records in possession of the Requestor and shall promptly provide the Department a copy of the Requestor's response to each such request.

26. The parties agree to comply with s.20.055(5), Florida Statutes, and to incorporate in all subcontracts the obligation to comply with s.20.055(5), Florida Statutes.

27. By their signature below, the parties hereby acknowledge the receipt, adequacy and sufficiency of consideration provided in this AGREEMENT and forever waive the right to object to or otherwise challenge the same.

IN WITNESS WHEREOF, the parties to this AGREEMENT have signed this AGREEMENT as of the date written below:

CITY OF MIAMI BEACH
REQUESTOR (Print Name of Requestor above)

By: _____

Jimmy L. Morales
(NAME PRINTED)

City Manager
(TITLE)

Date: 4/28/17

STATE of FLORIDA
DEPARTMENT of TRANSPORTATION

By: _____

(NAME PRINTED)

(TITLE)

Date: _____

Legal Review: _____

APPROVED AS TO
FORM & LANGUAGE
& FOR EXECUTION

City Attorney 3-29-17 Date

NK

Appendix B **Letter of Support**

PHILIP LEVINE
MAYOR

June 8, 2017

Ms. Elaine Chao
U.S. Secretary of Transportation
1200 New Jersey, SE
Washington, DC 20590

Dear Secretary Chao:

I am writing in support of the City of Miami Beach's proposal for federal funding under the ATCMTD (Advanced Transportation and Congestion Management Technologies Deployment) grant.

As a premiere vacation destination and home of more than 14 yearly major special events, including Art Basel and the International Boat Show, the City of Miami Beach is an ideal location for deployment of advanced transportation management technologies. The City's proposal to deploy a system that will allow for response to dynamic traffic conditions supports the City's initiatives that parallel the Department's goal of using real-time transportation related information to improve mobility and reduce congestion. The implementation of this project will also improve the relationship between the state's major agencies, already fostering partnerships with the Florida Department of Transportation District 6 and Miami-Dade County.

The City of Miami Beach is always seeking effective ways to help citizens. Greater access to transportation alternatives and real-time multimodal transportation information are among the many benefits this proposal will make available for our residents. Not only will this project help to maintain that the City of Miami Beach remain a desirable place to host special events year-round, but it will provide residents with more information on travel choices to make informed decisions.

I am excited to support this proposal, as it would enhance the quality of life throughout the City of Miami Beach. Selection of Miami Beach's proposal as one of the ATCMTD winners will produce the desired goals set forth by the USDOT. It will also set in motion a great project with strong partners that will advance transportation and the social advantages that excellent transportation can bring to a community. I would like to thank you and your team for your thoughtful consideration of this grant proposal and reiterate my strong support and commitment to build a more connected community.

Sincerely,

Philip Levine
Mayor, City of Miami Beach

CITY OF MIAMI BEACH
1700 CONVENTION CENTER DRIVE, MIAMI BEACH, FLORIDA 33139
TEL: (305) 673-7035 • FAX: (305) 673-7096 • E-MAIL: PHILIPLEVINE@MIAMIBEACHFL.GOV

Appendix C **Staff Resumes**

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