University City
PROSPERITY PROJECT 2013
Advanced TOD and Informed Traveler Program
# FY2013 TIGER Discretionary Grant Narrative: UniversityCity Prosperity Project

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I. Project Description
The UniversityCity Prosperity Project (UniversityCity) defines a transformative complex of pedestrian-oriented, multimodal and intermodal improvements. By linking the City of Sweetwater (Sweetwater) and Florida International University (FIU) with the competitive world economy and providing a healthy and educational enriched urban built environment. UniversityCity will support long term prosperity in a balanced and just sustainable community.

The two communities that today comprise Sweetwater and FIU’s Modesto A. Maidique Campus (Maidique Campus) are part of a heavily populated, hurricane flood prone, suburban western Miami-Dade area located approximately 8 miles from the Everglades Watershed. Sweetwater residents and visitors, and the students, faculty and employees at Maidique Campus have:

- Growing travel congestion in their daily commutes
- No connective pedestrian-oriented mutual corridor
- No jointly accessible regional express transit or multimodal choices to link them to other communities in Miami-Dade County (MDC), the Southeast Florida region and beyond.

While they still lack some of the infrastructure required to test their resolve, they commit, with this TIGER award, their joint efforts to build a more prosperous, sustainable community. UniversityCity is envisioned as a high-density, vibrant urban community that helps to attract students and faculty to FIU, as well as global talent, businesses, and investors to Sweetwater.

With the UniversityCity improvements, transit access will be vastly enhanced to provide Bus Rapid Transit (BRT) service at UniversityCity. As a multicultural, knowledge-based, highly walkable and increasingly prosperous community, UniversityCity will be linked with:

- The Miami Intermodal Center (MIC) via SR 836 Express Enhanced Bus Service (836 Express) provided by Miami-Dade Transit (MDT) by 2016
- Miami Beach via the Miami Beach Airport Flyer from the MIC
- International and national destinations via MIA Mover and Miami International Airport (MIA)
- National destinations via Amtrak
- Southeast Florida destinations via Tri-Rail
- Miami-Dade County destinations via Metrorail, Metromover and Metrobus including the express buses operating as the South Miami-Dade Busway, the Kendall Cruiser, and 95 Express
- The proposed 75 Express bus service and Palmetto Express bus service (2017/2018) and existing 595 Express bus service (also see the January 8, 2013 Industry Workshop presentation regarding the I-75 and Palmetto Express Lanes here).

To make transit and UniversityCity destinations more accessible and draw large numbers of
students, residents, and visitors throughout Sweetwater and Maidique Campus, including to and though US 41, multiple types of pedestrian and bicyclist safe passage strategies will be deployed at the SW 109th Avenue intersection. These pedestrian-oriented capital improvements will constitute components of an Advanced Transit Oriented Development (ATOD) and transform what had been a dangerous highway barrier blocking congress between the two communities (e.g., the 9 lanes of congested and at times deadly higher speed traffic on US 41) into a gateway opportunity. Much larger numbers of pedestrians and bicyclists will more frequently access transit and safer and healthier pedestrian trips will grow in length and frequency based upon:

- Frequent community transit crossing the US 41 intersection at SW 109th Avenue (see two Sweetwater Trolley 26 passenger community transit vehicles, two Sweetwater Circulator 18 passenger community transit vehicles and two FIU CATS Shuttle 25 passenger community transit vehicles)
- At-grade safety street crossing improvements at the intersection of US 41 and SW 109th Avenue
- A new, attractive, wide single pylon cable-stayed shared-use pedestrian-oriented bridge
- Repair and reuse of an old bridge across the Tamiami Canal, for pedestrian and bicyclist use with access to a bus stop/shelter
- A unified establishment a complete street, pedestrian-oriented pathways and community plazas along the SW 109th Avenue corridor between Sweetwater’s City Hall and FIU’s Stephen & Dorothea Green Library (Green Library).

By using a specific arrangement of pedestrian-oriented improvements (attractive, wide, landscaped, and hardscaped sidewalks, boardwalks, shared-use paths and bridges, transit greenways, mixed-mode streets, and plazas), mixed-use development, student housing, important destinations (civic, academic and health), community transit, intermodal stations and transit stops, these UniversityCity components will leverage more frequent passage between both the Sweetwater and FIU segments of the UniversityCity community and facilitate greater use of the transit services they will share. More frequent transit use, intermodal transfers and safe pedestrian-oriented transit access will be further enhanced in this multimodal urban environment via an advanced and comprehensive electronic wayfinding system built for the first time in the United States that is defined by proposed Informed Traveler Program and Applications (ITPA).

“Every now and then, you’ve got to ask the hard questions. The one we choose to ask is: How will Miami-Dade County shape itself in the knowledge-based economy of the 21st century?” FIU President Mark B. Rosenberg

A. Introduction
Throughout the Southeast Florida region, cities and neighborhoods are seeking to redefine themselves to align their human needs with available assets. Residents and visitors to Southeast Florida want a better life and seek guidance as to how their communities might prosper. UniversityCity begins this transformation effort by envisioning a robust, sustainable, affordable, and equitable community centered at Sweetwater and FIU. Today Sweetwater is a low-income,
immigrant, and predominately Spanish speaking community. Most residents carry on their daily routine separately from FIU. FIU is an anchor public institution of higher education for Miami-Dade County (MDC) and could benefit by more outreach to their close neighbor. Together they want to become a UniversityCity that prospers in the emerging global knowledge economy.

As depicted in Figure 1, UniversityCity will help transform the FIU/Sweetwater relationship to a truly unique and collaborative relationship that will create a growing, sustainable and innovative community. UniversityCity is an important part of this process and proposes to help achieve a shared community vision in two innovative ways:

- Establishing the parameters of ATOD that, within very clearly defined public places and mixed-use communities, lengthen the pedestrian travel shed, increase frequency of pedestrian to transit trips and improve intermodal access
- Development and use of ITPA to provide real-time and predictive multimodal wayfinding advice to seamlessly mix modes, identify current or likely roadway obstructions, reserve and identify available structured parking, and optimize every trip in a timely and convenient manner with ITPA’s expanding capabilities

An ATOD for UniversityCity creates a best practice for infrastructure improvements that shift trips away from private passenger vehicles to transit, bicycle and pedestrian movements, while simultaneously supporting the economic growth related to a major public research university and an adjacent small city. The ATOD strategically weaves together:

- Vibrant and mixed-use “Main Street” community access with pedestrian pathways and bridges, high quality public spaces, and multi-modal transit station environments;
- Innovative transit greenways and mixed-mode streets
- Traffic-calmed streets and intersections
- Metered street parking and smart structured parking with liner buildings
- Coordinated community transit feeder service for FIU (CATS), Sweetwater Shuttle and the Doral Trolley
- Safe bike paths and multi-use corridors
- Two private development projects that establish higher residential densities within Sweetwater along SW 109th Avenue
• Advanced Intermodal & Multimodal Station (AIMS) built into the structure of a smart new parking garage adjacent US41 at Maidaque Campus with comfortable, safe, useful, interesting and fun public space, waiting areas, and pedestrian/bicyclist access in addition to raised platforms, and ITPA and/or public arrival and departure announcements. See newly approved parking garage (PG6) with multimodal station for FIU and MDT express bus service, MDT metropolitan bus service, and Sweetwater and FIU community transit and Ambulatory Care Clinic here.

• Express bus service (i.e., the proposed 836 Express) that operates with BRT efficiencies given the ATOD and AIMS components, Traffic Signal Priority (TSP) system, ITPA or other transit locator system enhancements, and eventually pre-boarding, ticketing and seat reservation technologies for express bus services, metropolitan transit services connecting UniversityCity with neighboring Miami-Dade communities.

• An attractive signature single pylon cabled-stayed pedestrian bridge that provides, with at-grade pedestrian crossing improvements and frequent community transit, safe passage through the SW 109th Avenue intersection with US 41 (without all three conveyances, US 41 becomes a deadly blockage for congress as between Sweetwater and FIU).

The UniversityCity ATOD overcomes very real alternate mode obstacles and encourages a significant modal shift from private passenger vehicles to pedestrian, bicycle, and transit modes.

The ITPA will provide personalized, accurate and timely information and advice regarding the most efficient and cost effective travel modes, paths, and time for travel for consumers using real-time information. It will include a parking management and information system that covers Sweetwater and the FIU campus, a car/bicycle sharing system and an advanced traffic signal control system to accommodate expected changes in traffic patterns and multi-mode operations (passenger cars, transit, pedestrians, and bicycles). The ITPA will enable users to make better travel decisions even before they get in their vehicles and offer express transit routes and faster parking in smart garages as major time savers. ITPA gives travelers the information, motivation and courage to change routes or take transit instead of following a reflective pattern of automotive travel. The advanced management of travel in passenger cars, transit, pedestrian and bicyclists will ensure optimum operations and encourage shifts between modes and spreading out demand to better fit capacity. In time, ITPA will also allow managers to game the system to find the most cost effective transportation capacity improvements and strategies.

This unique and innovative combination of computing technology, transit station improvements, and pedestrian-oriented infrastructure will take advantage of express transit deployment and will be a first-of-its-kind effort that serves as a model for other communities throughout the nation. Significant expected benefits include reductions in congestion, travel time, accidents, vehicle miles travelled, and travel costs for businesses and households. UniversityCity will demonstrate how to connect strategies for sustainability, innovative mobility, technology transfer, new urbanism/smart growth, and equitable economic prosperity through leadership provided by a major public research university. In a globally competitive knowledge economy and a region willing to become more resilient to identified climate change impacts, UniversityCity will point the way forward. See NOAA’s Global Sea Level Rise Scenarios for the United States National Climate Assessment here and the 2013 draft National Climate Assessment Report here.
At the same time, this is project addresses systemic and urgent problems in western MDC. Communities such as Sweetwater and City of Doral (Doral) have used annexation and incorporation as a strategy to revitalize themselves and give shape to new opportunities for their residents. The rapid growth and expansion of nearby FIU, whose enrollment is approaching 50,000, gives these cities and their neighbors an unprecedented opportunity to build new partnerships, generate fresh approaches to problem-solving, and improve their quality of life. This sustainable prosperity plan of FIU, Sweetwater, Miami-Dade Expressway Authority (MDX) and other partners and participants fosters a more seamless campus-community dynamic that helps to fulfill the need for talent development, job creation, sustainability, enhanced public transportation, and new forms of residential and neighborhood development. This unique combination of innovation and adaptive community building, with a very strong and enthusiastic alliance of public and private participants, will further the goals and principles of the Sustainable Communities Initiative partnership and the TIGER program. Eventually, this pedestrian-oriented urban design, grounded in an uplifting socioeconomic mission and optimized application of technologies and community building strategies, will bring prosperity to Southeast Florida.

Project roles and contributions include: the use of National Science Foundation Industry-University Cooperative Research Center for Advance Knowledge Enablement (I/UCRC-CAKE) as an organizational platform for expert multi-disciplinary and inter-institutional collaborations; The Lehman Center for Transportation Research (LCTR) Integrated Intelligent Transportation Systems (IITS) Laboratory as a premier research and test bed facility; International Business Machines Corporation (IBM), as a I/UCRC-CAKE member, brings with it the world-class solutions from its Smarter Planet, Mobile First and Analytics initiatives; private real estate developers are proceeding with a $35 million student housing investment in Sweetwater adjacent to FIU in the first of many phases of mixed use projects; international business interests have begun discussions about future investments; and the entire MDC Congressional delegation has expressed their very strong support. By using these innovative constructs and world-class partners and participants, FIU will build at full scale one of the most advanced sustainable communities living laboratories in the world.

B. The Challenges
This proposal is the first step in catalyzing the long needed transformation of an important segment of our region that has been isolated and often too passive in the past despite significant opportunity to move forward. While western MDC has a sizeable population, it lacks significant alternative modes of transportation (i.e., non-automobile) and walkable communities. UniversityCity builds upon FIU’s nascent role as an anchor institution and a community awakening about the need for a more deliberate and determined effort to create a prosperous and sustainable future. Public Research Universities such as FIU play a major role in creating global economic competitiveness. U.S. strategic investments in the places surrounding universities are essential in order to attract, develop, and retain the very best talent that drives the innovation economy. A number of partners have organized around a series of shared goals and visions to form the UniversityCity Alliance (UCA) to secure necessary strategic investments.

As the only public research university in Florida’s most populous and diverse metropolitan area, FIU is among the 25 largest universities in the country, and it plays a very special role in the Southeast Florida Region. While continuing to attract, develop, and retain internationally experienced talent, FIU fulfills its role as the largest Hispanic serving research university in the

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country. FIU expects to grow enrollment to over 50,000 within the next decade, including many students who are the first in their families to attend college and come from limited English households. With over 7,000 faculty/staff and 150,000 alumni in South Florida, FIU: serves as an anchor for the emerging South Florida Life Science corridor; attracts over 500,000 annual visitors for cultural and sporting events; and leads the development of a billion dollar economic development cluster centered on the Herbert Wertheim College of Medicine (Wertheim COM). But traffic congestion, emerging water supply and drainage issues, parking shortages, and the lack of vibrant urban places adjacent to campus threaten both FIU and its partner Sweetwater. Affordable living options and limited transportation choices are frequently stated concerns of both local residents and talented FIU recruits. With completely congested major roadways acting as barriers to nearby communities, FIU and Sweetwater are in danger of becoming isolated locations that few want to visit. If it takes too much time and effort to reach FIU, the anchor institutional missions cannot be accomplished. If the residents of Sweetwater are stranded within their community, prosperity will just be a slogan and never an economic reality.

FIU has limited room on campus to expand and therefore seeks to attract additional housing, retail, smart parking, and other uses to livable Sweetwater places that, with infrastructure improvements, can provide high quality and large-scale walking environments within reasonable walking distances to campus. But poor mobility linkages across the 9 lanes of high-speed traffic on US 41 at SW 109th Avenue (and similar conditions on SW 109th Avenue and West Flagler Street) have hindered private investment and prevent a meaningful and daily connection between the Sweetwater residents and businesses and the FIU students, faculty, employees and visitors.

This situation is expected to worsen as traffic conditions increase the danger for pedestrians and bicyclists over the next five years when the Florida Department of Transportation (FDOT) widens SW 107th Avenue and the nearby Florida Turnpike. Without the innovative solutions contained in this UniversityCity proposal, the combination of these challenges will:

- Stifle Sweetwater’s plans to redevelop and FIU’s plans to grow
- Lessen positive impacts on surrounding communities
- Reduce the ability of Sweetwater and FIU to serve students and resident needs
- Inhibit the development of knowledge workers essential for economic prosperity

Sweetwater envisions a high-density, vibrant urban neighborhood that helps FIU attract students, as well as global talent, businesses, and investors. Sweetwater also acknowledges the need for additional capacity to:

- Emerge as a high quality urban built environment
- Create new jobs and useful connections to the amenity-rich FIU Maidique Campus
- Improve public spaces for a downtown Sweetwater
- Provide for quality educational opportunities for their predominantly low-income, immigrant residents (Sweetwater’s population is 93% percent Hispanic).

For this reason, the Mayor of Sweetwater with the full support of the City Commission has agreed to actively participate in the UCA with FIU and the UCA Steering Committee.

The transformation from a place of isolation and congestion to a sustainably connected global UniversityCity requires strategic and innovative infrastructure investments. TIGER funding will help Sweetwater, FIU, MDX, and our other transportation and development partners accomplish
this major prosperity and sustainability initiative. These unique combinations of proposed improvements in UniversityCity do not fit typical funding categories or programs, but they offer great promise beyond MDC once they are built, measured, and proven. In fact, once successful, they will create completely new standards for very smart, pedestrian-oriented, and multimodal systems that support national, state, regional, and metropolitan area goals, strategies, and desired outcomes for prosperity and sustainability.

To accomplish this vision, UCA and other partners have agreed to accelerate UniversityCity by engaging in a number of coordinated activities including:

- Approvals for construction of PG6 to house a multimodal stations ($35,407,356)
- Planned development for an Ambulatory Care Center ($8,551,554)
- Funding requests to the John S. and James L. Knight Foundation for $250,000 in additional planning funds for the City of Sweetwater enhanced land use planning efforts to ensure they meet the goals and objectives of the Sustainable Communities Initiative
- FDOT agreement to proceed with a $408,000 Sustainable UniversityCity Sub-Area Mobility Study
- Agreement with MDX to proceed with a $265,000 MDX research study to produce an ITPA Work Plan & Way Forward Strategic Vision regarding efforts to complete any needed ITPA technology development and undertake the deployment of a robust localized ITPA consistent with ongoing efforts by MDX and FIU to transform public transportation see previous SR 826 Express Bus Study expense expended by MDX with FIU LCTR here.
- Endeavoring to procure TIGER funds via this proposal
- Agreement with MDX to secure funding for an additional $10 million in matching ITPA Technology Development & Deployment funds from MDX and elsewhere after: i) the ITPA Work Plan is completed funded by MDX ($265,000) starting November 2013 immediately upon announcement of 2013 TIGER Discretionary Grant award for the UniversityCity submittal; ii) the achieving a proof of concept funded by this TIGER grant all of which was based on the SR 836 Express Bus Service Study funded by MDX and completed by FIU in 2010 ($182,306.00). See here.
- Other TIGER related commitments as provided for within the 2013 TIGER/UniversityCity submittal

C. UniversityCity TIGER Proposal Components
This section provides detailed descriptions of UniversityCity components for which TIGER funding is being requested. It also provides an overview of other aspects of the project paid for using non-TIGER funds. One goal of this plan is to create pedestrian-oriented spaces similar to spaces that have been successfully created in other areas of the world (see Figure 3). A summary of this proposal is contained in the UniversityCity PowerPoint from March, 2012 here.

1. Advanced Transit Oriented Development
Near-station environments have a major impact on transit ridership, bicycle use and distances travelers will walk as part of a multi-modal trip. See the December 2010 report entitled “SR836 Express Bus Study” by LCTR, found here. This is clearly evidenced by current transportation funded efforts across the country to create better catchment areas for trains and express bus systems by improving crosswalks, installing wider sidewalks with landscaping and hardscaping to make them attractive and adding bike lanes.
In UniversityCity, ITPA users get real-time and predictive information that helps them reach their destinations faster and easier, including through increased use of transit. With ATOD improvements (see ATOD description found here), transit users need to experience an intuitive near-station urban environment to eventually rival the best places in Europe. This combination creates more frequent and extensive mode shifts to transit/biking/walking, more affordable living opportunities, greatly improved pedestrian safety and comfort, and reduced congestion, pollution, and energy use. (Gustafson, T., Growing the New American Economy, Feb. 2009, found here; Zacharias, J., The Amsterdam Experiment in Mixing Pedestrians, Trams and Bicycles, ITE Journal, Aug. 1999, found here). The UniversityCity ATOD contains several new and traditional components innovatively woven together to address the total travel path of individual travelers and many of these components are integrated into the information provided by ITPA for enhanced travel choices. Travelers will not wait in place if there is nothing to do within a short walk while they wait. As can be seen Figure 4, the various elements use both TIGER and other sources of funding, and include:

- AIMS inside a new Smart Garage that uses Intelligent Parking System technologies
- Pedestrian bridge across US 41 wide enough to also accommodate bicyclists and intermittent golf carts operating as parking garage shuttle vehicles
- Improvements to widen sidewalks, add landscaping and hardscaping, decorative lighting and higher elevations so some portion of the sidewalk rises at least the floor height of adjacent buildings, along a mixed-use “Main Street” corridor (SW 109th Avenue) and safety improvements within the intersections at SW 109th Avenue and US 41
- A new City Hall Plaza, City Hall Mixed-Use Smart Garage, City Hall Intelligent Plaza and Parking Area (CHIPPA);
- Upgraded pedestrian plazas, community transit stops, and bicycle and pedestrian crossings and pathways;
- Sidewalk, landscape and hardscape improvements and metered parallel on-street parking on SW 5th, 6th and 7th Streets between SW 110th & SW 107th Avenues
- Special attention to personal security throughout the ATOD area, using environment, program, and strategic communications improvements
- Complete street improvements on SW 109th Avenue between US 41 and Flagler Street
- Upgraded Sweetwater transit vehicles coordinated with FIU collector bus vehicles
- FIU Panther Express use of the 836 Express and similar routes
- Proposed 836 Express and various station improvements between western MDC and MIC
- Multi-modal management of the transportation system
The UniversityCity AIMS is planned to serve as the transit hub for western MDC. It will:

- Accommodate FIU’s existing Panther Express bus service between the Maidique and Biscayne Bay campuses
- Support the proposed 836 Express to the MIC along the Dolphin Expressway (SR836)
- Serve as a hub for the local UniversityCity metropolitan and community transit vehicles
- Accommodate bicycles and car sharing facilities and equipment
- Provide airport-quality retail services and air-conditioned waiting area amenities for transit customers
- Connect to a number of safe and attractive pedestrian and bike pathways that flow through nearby mixed-use areas to encourage a combination of walking and transit trips

Security cameras and other design and operations features create a safe and comfortable indoor and outdoor waiting environment. With a special access drive providing bus entryway and exit directly from and back onto US 41, raised bus platforms, and pre-ticketing, the AIMS will reduce boarding time and headways.

As part of the ITPA system within the AIMS, transit vehicle arrival and departure information is communicated via: i) direct view of transit vehicles from conveniently located terminal waiting areas and platforms; ii) audio broadcasts and electronic sign messages in the terminal waiting areas and retail establishments; iii) electronic kiosk information boards within and outside the waiting area and plaza, and iv) notifications sent to the smart phones of the ITPA customers.

A new smart garage located west of the smart Red Parking Garage contains the AIMS (see Figure 5) and the ITPA system lets users know when parking is available, when various buses will arrive, the availability of bike lockers, and real time rates for car and bicycle sharing rentals. The garages contains a total of over 4,000 parking spaces for private cars, 100 spaces for bicycles, 60 reserved spaces for ITPA subscribers, at least 12 spaces for the car sharing program, and 35,000 square feet of shell space for classrooms and FIU related retail space that might include research and business incubator use or other UniversityCity compliant use. A UniversityCity related liner building starting 20 feet above the exterior stop area will eventually be built upon the columns planed within the bus parking area. Addition, a convenience store, coffee shop, news stand, or similar retail outlet will provide activity, amenity, and natural surveillance both day and night to enhance transit rider comfort and safety. A raised outdoor mall and arcade provides for pedestrian-oriented transit waiting areas. As

Figure 4. UniversityCity ATOD elements.

Figure 5. Proposed ATM
part of an economic inclusion and small business policy, preference will be given to potential retail business operators who are current residents of UniversityCity.

A shared-use pedestrian-oriented bridge, community transit vehicles, and safe crossing at-grade improvements across US 41 at SW 109th Avenue (see Figure 6) provides a safe and critical link between the residential neighborhoods, FIU parking garages, AIMS, FIU Maidique Campus, FIU Engineering Campus, and pedestrian mixed-use districts along SW 109th Avenue in Sweetwater. By using a wide, single pylon, cable-stayed, curvilinear structure, the bridge allows disabled persons and bicycles to use it safely and easily. Lighting and other features help create a safe pathway after dark, and the design eliminates the need for elevators and provides opportunities to enliven the pathway with vendors, public art, and other activities. This bridge will serve a key “place-making” purpose by connecting the City of Sweetwater and FIU, and as a symbol of the UniversityCity. Additional pedestrian bridge designs and images can be found here.

High quality pedestrian space connects the Green Library to Sweetwater City Hall via the narrowing of street lanes, widening of sidewalks, landscaping and hardscape along a mixed-use “Main Street” corridor between Sweetwater City Hall Plaza and the Community Transit Grove Stop (CTGS) on the Maidique Campus, the Green Library boardwalk, and a transit greenway route around the Engineering & Computer Science (ESC) building. CTGS is established within a grove of mature shade trees and helps to establish an environment that serves to “capture” pedestrians and funnel them to travel modes other than the private passenger automobile. The CTGS improvements are shown in Figure 7 and detailed description of such pedestrian-oriented spaces can be found in the ATOD definition found here.

A City Hall Plaza and mixed-use smart garage with pedestrian-oriented sidewalk landscape and hardscape improvements and metered parallel parking along SW 5th Street, 6th Street and 7th Street between SW 110th Avenue and SW 107th Avenue is located at the north terminus of these UniversityCity improvements (see Figures 8 and 9). The CHIPPA is planned to be initially developed within the city block between SW 5th Street and SW 6th Street immediately east of SW 109th Avenue and has a mixed-use liner building facing the City Hall Plaza. CHIPPA provides a terminating feature and focal point for events that support the pedestrian nature of the ATOD. The smart garage is planned to initially contain 180 spaces, be bordered by mixed-use liner buildings. It is to be completed by or prior to 2018, and will be strategically located to direct traffic flow to and from SW 107th Avenue and other facilities.
Avenue instead of the pedestrian-oriented SW 109th Avenue. CHIPPA will also have technology that feeds into the ITPA to allow users to know when parking spaces are available and when reserved parking is an option. Local shuttles will stop at the City Hall Plaza and ITPA users will have real time information about their arrival. Conceptual plans and diagrams for the City Hall Plaza and CHIPPA are available [here](#).

Improved at-grade pedestrian safety features at the intersection of SW 109th Avenue and US 41 (see Figure 10) are expected to include narrowed travel lanes on both roadways to reduce speeds, specially designated crosswalks, eventually widened and protected medians on US 41 to allow for pedestrians to safely pause at the middle of the 8 lane highway (useful for the elderly or disabled), improved signage to make drivers aware of pedestrians, higher lighting levels for pedestrian visibility after dark, improved sidewalks across the canal on the north side of US 41, “countdown” pedestrian crossing signals, and similar features. Upgraded pedestrian plazas and pathways on the FIU Maidique campus will begin with the addition of wide plazas and small pavilions at the southwest and southeast corners of US 41/SW 109th Avenue. These will link through improved and widened crosswalks and sidewalks to a new covered walkway providing rain, wind, heat, cold and sun protection along a more direct route to the center of campus, including the Graham Student Center and the Green Library (see images [here](#) for details).

The pathway will include resting points with benches, shade producing gazebos, and a large terminating gazebo classroom structure. At least one feeder community transit route will stop at CTGS to the south of the FIU Red Garage. This crucial connection greatly improves the accessibility of FIU Campus amenities to Sweetwater residents. A quick and safe walk, bike ride, or transit ride will make visiting the Frost Art Museum, Green Library, FIU and Tamiami Park sports venues, Graham Center, and Wertheim Performing Arts Center and open spaces (see [http://campusmaps.fiu.edu/](http://campusmaps.fiu.edu/)) a normal and enjoyable part of life for Sweetwater residents.

Special attention to personal security throughout the ATOD area, using built environment, program, and strategic communications improvements will ensure that after-dark portions of the travel path remain pleasant and comfortable for transit, bicycle and walking. Lighting, natural surveillance, retail store layout and hours, maintenance schedules, and land use patterns will all be designed and managed to maximize safety. As project construction plans are developed, they
will be reviewed by FIU, Sweetwater, and the UCA Steering Committee. Complete street improvements on SW 109th Avenue and related streets between US 41 and Flagler Street will eventually support the transit/bicycle/walking environment between FIU’s Maidique Campus and the Engineering Center and in support of the many small businesses along the strip. Initially, the FDOT and TIGER improvements will create safer crossing conditions at SW 107th and SW 4th Street to connect FIU with Sweetwater Elementary, Senior Center, and Carlow Park and facilitate safe pedestrian and bicyclist access to ongoing Sweetwater Programs with FIU’s Honor College as described here. By upgrading Sweetwater Shuttles, coordinating operating schedules with the FIU CATS, the Doral Trolley and multi-passenger FIU cart shuttle vehicles, launching a new electric rubber-tired trolley service between City Hall and the Green Library, and expanded use of FIU Golden Panther Express (GP Express) on the SR836, SR112, Florida Turnpike Homestead Extension, and when operational, the SR826 Express lanes and I-75 Express lanes or other roadways within ITPA network, UniversityCity transit vehicles with combine to provide a robust community transit feeder system and convenient transit experience. Sweetwater will continue to refurbish existing 12-passenger buses and will add an electric small rubber tire trolley to create a unified look and comfort standard in line with the FIU CATS shuttles. FIU buses and motor coaches will adjust routes and schedules to increase headway frequency and enhance mobility by using multiple community transit vehicles for safe crossing of US 41 at SW 109th Avenue and safe crossing of SW 107th Avenue at SW 4th Street. Supported by the ITPA with real time arrival times and enhanced trip planning capabilities for UniversityCity/Sweetwater residents and businesses, FIU students, faculty and staff, and the many visitors to FIU and Sweetwater, this shared community transit system will become a major UniversityCity amenity.
The ATOD will include a number of advanced management components to improve mobility, reliability and safety. The components will include adaptive signal control, bus priority, pedestrian and bicycle detection and management, and traffic monitoring using mid-block detectors and Bluetooth MAC address re-identification readers. Working in conjunction with each other and the ITPA, these components will provide shorter travel time and safer transportation options. For example, using the mobility detection and management capabilities, the system will be able to detect the approach of express buses and adapt by changing the timing of traffic lights to give travel priority to those buses. In addition, car and bicycle sharing and electronic payment of parking fees can be supported. This initial implementation in Miami-Dade County will provide an example that other parts of Florida and the nation can follow in the future to support successful implementation of similar systems.

836 Express between University City and the MIC will connect the ATOD quickly and easily to the major transit routes throughout Miami-Dade County, South Florida and beyond. With a key 836 Express stop at the University City AIMS and with supportive information from the ITPA, this combination of ATOD, ITPA, passenger rail, rail transit and express bus service is expected to increase transit ridership by University City users by 10% or more (see Gustafson, T., Growing the New American Economy, Feb. 2009, found here; also see LCTR, SR836 Express Bus Study, Dec 2010, found here). In addition, there is a potential for the GP Express (see images of vehicles here) to add service from the AIMS when equipped with TSP systems being employed by the 826 Express to significantly improve headways during peak demand periods.

2. Informed Traveler Program and Applications
   
a) Overview
   The ITPA uses a smartphone-based interface to provide personalized, timely information and advice regarding the most efficient and cost effective travel paths for users. This includes information about whether to use transit, delay the start of a trip to avoid congestion, or take an alternate route to avoid construction or accident delays. The software is predictive in nature, allowing users to make better travel decisions even before they get in their private vehicles, and it also offers the potential for faster parking in smart garages as a major time saver. The system will work on any smart phone, and will include audio and visual capabilities similar to standard in-vehicle navigation systems, but with intelligence behind the system that considers user needs, situational conditions and safety concerns. The flow through the system for a requested parking reservation can be found here.
Both the ATOD and ITPA components of UniversityCity work together with substantial previous Intelligent Transportation Systems (ITS) investments by FDOT and MDX to help reduce congestion, accidents, travel time, Vehicle Miles Traveled (VMT), travel stress, and travel costs. Both contribute significantly to regional economic development by supporting the growth of FIU and area businesses. Using advanced information technology platforms, ITS, and smartphone-based software, ITPA development will be realized via three separate initiatives:

- With funding from MDX, our team will initially research and identify the needed systems improvements and plan to fully operationalize the UniversityCity ITPA, including deployment plans, feedback systems, and user interface systems.
- With funding from the TIGER program, our team will develop a location-specific proof of concept and working prototype linked to the ATOD surface transportation improvements.
- With funding from MDX and others, once an acceptable prototype and operations plan are in place, our team will fully deploy a localized robust ITPA.

This localized robust ITPA deployment for up to 20,000 users will be UniversityCity-centric and limited to routes used by the 836 Express, the Miami Beach Airport Flyer, and routes expected to be used by the GP Express buses. This robust, scalable, and flexible platform will support further deployment throughout MDC and South Florida as an ultimate objective.

There are many transportation system benefits arising from ITS deployment. ITS deployments maximize the capacity of infrastructure and reduce the need to build additional highway capacity. For example, ITS can contribute significantly to reducing congestion, which costs U.S. commuters 4.2 billion hours and 2.8 billion gallons of fuel each year, costing the U.S. economy up to $200 billion per year. Overall, ITS can reduce congestion by as much as 20 percent or more. ITS also enables transportation agencies to collect the real-time data needed to measure and improve the performance of the transportation system, making ITS a centerpiece of efforts to reform surface transportation systems and achieve measurable results.

(i) Scenarios
For a better understanding of how the ITPA benefits users, consider the following scenarios:

The Frustrated Employee - Annette is driving on a congested I-95 on her way to FIU. Using real-time information on current traffic conditions combined with Annette’s current location and desired destination, the ITPA determines that SR836 is equally congested, and an alternative route that uses public transit would make her travel faster and easier. The system automatically alerts her and she decides to park at the Sheridan Street Tri-Rail Station and take the Tri-Rail train that is scheduled to leave within minutes of her arrival. Annette rides to the MIC where she boards the 836 Express that departs 10 minutes after she arrives, giving her time to call her office.
and order a cup of coffee. She arrives at FIU 40 minutes faster than Bob, who was traveling in the car next to Annette in Hollywood but stayed on I-95 and SR836 all the way to FIU. Because the ITPA updates and alerts Annette automatically, there is no need for her to fumble with buttons while she’s driving. She knows she can trust the system and feels safe using it.

**The Rushed Student** – Francisco is an FIU Honors College student so focused on exams, studying, after school activities, and budgeting his expenses that he forgets to leave on time for a final exam. He knows that finding a parking spot at school could be the longest part of his trip, and he is late! Before he leaves, he quickly connects to the ITPA program via his smartphone. He reserves a spot in the Smart Parking Garage. When he arrives he immediately parks his car in the reserved space. He not only made it to school on time for his final exam but he also saved 20 minutes and lots of gas trying to find a parking spot. Immediately after the exam he moves his car to less expensive unreserved parking and enjoys a well desired late lunch with friends.

**The Hard-Working Immigrant Father** – Jose, a Sweetwater resident, is focused on providing a comfortable home for his family. He is new to the area and works two jobs to make a living. His children are doing excellent in school, and he likes the local trolleys that take them to FIU for tutoring and advanced classes. To save money, he is a regular transit user. He is excited about a new transportation gateway and hub being constructed near his neighborhood because it will provide easy walkable access to a complete regional transit system via Express buses to the MIC and other destinations. His entire family uses the ITPA to manage their transit travel. With the money he saves, they are able to afford a larger home, save for college, and take in an occasional FIU sporting or cultural event. When he talks to his friends who drive to work about their gas bills, he realizes that the ITPA and other UniversityCity improvements have helped him create a high quality, yet affordable lifestyle for his family.

Once fully developed and deployed – with IBM as a key vendor and member of I/UCRC-CAKE, along with expert support from The LCTR and additional support from The University of Illinois in Chicago Computational Transportation Program and other experts within the field, the ITPA will provide one of the most advanced ITS in the world. It will help users to confidently make safe, interesting, affordable, and convenient trips by private passenger vehicle, transit, bicycle, or walking using smartphone connectivity.

**b) ITPA Prototype**

The ITPA Prototype is the first generation ITPA that will help UniversityCity-affiliated subscribers to travel to and from UniversityCity faster, easier and more enjoyable. Once developed and in operation, it will be expanded upon both in geographic scope and capabilities. As shown in Figure 13, the initial prototype will focus on four primary capabilities:

- Smart Parking use and integration
- Real-time situational aware data integration from multiple, heterogeneous sources;
- Travel suggestions
- Predictive guidance based on situational aware conditions such as traffic congestion, traffic accidents, weather conditions, road construction, and road hazards

**ii) Prototype Primary Capabilities**

*Smart Parking* - Smart Parking is an important component of the ITPA. As travelers near their destination in UniversityCity, they will receive information on their mobile device indicating the location of available parking in designated garages (initially the Red Garage at FIU). The system
FY2013 TIGER Discretionary Grant Narrative: UniversityCity Prosperity Project

will provide real-time information to University-affiliated subscribers regarding the availability of parking spaces within FIU’s Smart Garages while simultaneously the Sweetwater-affiliated subscribers will be informed of the parking status within the Sweetwater’s Smart Garages. The first installation will include general parking availability, with future expansion delineating exact types and locations of spaces available.

Reserved parking will be part of the system for those ITPA travelers willing to pay a premium. The flow through the system for a requested parking reservation can be seen here. At FIU, initially 60 metered parking spaces in the Red Garage (next to the new AIMS) will be specially equipped with a wireless detection system, electronic signage and an alert system. As soon as the space is reserved by the ITPA, the electronic sign will begin to display the reservation information to indicate to others not to use the space. The mobile app will tell the ITPA user where the parking spot is located. Using a wireless sensor and the user’s mobile device, the system will detect when the appropriate ITP user parks in the reserved space. If a different vehicle enters the space, the system will set off an audible/visual alarm at the space location and notify FIU personnel to have it ticketed and towed immediately.

The core of the smart parking system is a set of distributed sensors that are integrated with a smart computing grid. The types of sensors include radio-frequency identifications (RFIDs), cameras, and other wireless sensors. The system architecture (Figure 15) supports both intranet and internet communications along with an application server and a web server. The key feature of the system is a set of services that will be used by both application clients (iPhone/Android) as well as mobile/PC web clients. The service layer provides a modular interface to the database for requests from all clients and allows for an efficient upgrade/maintenance of the system. The project description can be accessed here.
ITPA users may reserve a space up to 20 minutes prior to their arrival. Pricing may vary depending on peak availability, demand elasticity, and whether the user is making a transit connection. In future expansion of the system, users will have the option of having their account automatically charged, eliminating the need for coins or even extra time to use the phone to pay. If demand for reserved parking by ITP users regularly exceeds the number of metered spaces at FIU, the number of spaces will be expanded. The planned smart parking space configuration for FIU’s Red Garage can be found here. The PG6 parking garage configurations will be developed to fit constructions plans. Additional smart parking location options at FIU, MIA, Sweetwater, and downtown Miami will be explored and evaluated starting with Miami-Dade Aviation Department (MDAD) and Sweetwater, and eventually the Miami Parking Authority, Miami Beach Parking and others. Letters of support and interest in this expansion can be found here.

Real-time situational awareness - An important ability of the ITPA is real-time situational awareness - having advance knowledge and awareness of conditions along potential travel routes. This “situational awareness” is the capability for a traveler to be informed of situations that will impact travel. Many of these are everyday occurrences such as traffic congestion, emergencies due to accidents, weather, traffic impactful events such as sporting events or concerts, construction delays, and government notifications. We have developed prototype applications for both web clients and smartphone clients (Figure 16) as described in the project description. For users who create online accounts, their sessions will be authenticated and their preferences such
as primary parking facilities will be saved on the server side. The advanced situational awareness will include with data integration and analysis of the following data:

- Detailed maps, routes and driving directions
- Express bus schedules to and from FIU Maidique Campus and Biscayne Bat Campus
- Real-time location and actual arrival/departure times for the 836 Express, Airport Flyer, and GP Express buses
- Real-time traffic and accident information on SR836, SR112 and related roadways as data becomes available
- Smart parking information at the FIU parking garages

All data will be updated at the most frequent intervals available. This capability will provide the system with the information needed to keep ITPA users up to date on conditions that will affect their travel and make informed recommendations to ITPA users as detailed below.

**Travel suggestions** - Travel suggestions are an important part of keeping ITPA users informed about their travel options and to provide route-related recommendations to users. These suggestions are based on the analysis of the multiple situational awareness elements and may involve recommendations to a change in a traveler’s planned route, schedule, or transit mode choice. Recommendations can include the following:

- Alter the traveler’s schedule for a specified period of time (e.g., leave in 10 minutes or wait 1 hour to avoid traffic congestion)
- Reroute planned travel via an automobile (e.g., take local roads instead of the SR836)
- Take public transportation on part or the entire route to the planned destination

One example is to inform a traveler that given the traveler’s plans and current situational awareness information, the typical delays for automobile transportation along a planned route is 75 minutes while the delays for public transport are typically 15 minutes. The system would recommend taking public transportation in this case, and provide information and routing guidance that includes parking and public transit information (e.g., which trains/buses or trains to take). This capability uses rules, analytics and prediction to calculate recommendations. For the initial prototype, travel suggestions will be limited to the routes described in the situational awareness discussion above for which situational data is available.

**Predictive guidance** - An expected capability of the ITPA involves alternate routing instructions and guidance based on the travelers planned destinations, smarter parking choices, situational awareness relative to road conditions, delays and alternatives. When routing is requested, the system will specifically include an analysis of available data regarding return trip conditions as they might exist based upon time of day. This provides users with more viable options; particularly in terms of the availability of public transportation (e.g., is it available at the expected time for the return trip and is there available seating, is it on schedule and what is the delay for arrivals/departures).

Routing guidance includes an analysis of real-time situational aware data for major highway routes when available. If real-time data is not available, then users are provided with, at minimum, turn-by-turn routing guidance similar to what is available in standard GPS devices. For UniversityCity, guidance will be at least the following two routes to FIU: SR836 and
SR112/I-195 and such other highways used by the GP Express on a day to day basis if the data is available. For this phase, public transport guidance will be limited to 836 Express, Miami Beach Airport Flyer, and Panther Express operating between FIU Maidique Campus and Biscayne Bay Campus and between FIU Maidique Campus and the MIC.

(iii) Prototype Architecture
To create the innovative ITPA, system and software assets already in use by IBM in “smart cities” around the world may be combined with intelligent transportation and business analytics, spatial analytics, and other components as suggested by the ITPA architecture in Figure 14.

(iv) Prototype Operational Environment
ITPA server components will be installed on hardware and software running in a laboratory environment at FIU. This environment will provide a flexible and robust environment that will allow for the analysis and development of the most appropriate, scalable hardware and networking design specifications and configurations to support the larger, production system in later phases. Initial deployment will be provided for up to 24 users (Honors College students or others that work and/or live in Sweetwater in order to capture Sweetwater-related needs) for system and user acceptance testing and with support eventually expanded for up to 20,000 users.

(v) Prototype Project Plan and Schedule
A more detailed plan describing the roles/responsibilities of the various experts and organizations, specific schedules and milestones, project deliverables, operational environment, user types and numbers, and more can be found at here.

c) ITPA Technology Development Phases

(vi) Workplan Efforts
This effort is funded by the above mentioned MDX $265,000.00 grant and will commence upon announcement for the TIGER award to FIU. This will involve developing a workplan and way forward to a localized and robust initial phase by researching, planning and documenting the user, system and data requirements for initial and full deployment of the ITPA project, including the analysis and determination of design elements that should be included to ensure appropriate scalability of the overall ITPA project.

This work will include:

- Research current and planned availability of relevant, situational-aware data sources on major thoroughfares, multimodal and public transportation corridors and Parking Garages
- Analyze available data to determine inclusion/exclusion in predictive modeling and routing recommendations
- Review and update currently available situational-aware data modeling technologies and algorithms for ITPA region-wide applications
- Research advanced strategies and technologies associated with the optimized multi-modal management systems
- Complete and document end-user and system requirements gathering for the Localized Robust Initial Deployment Phase
- Provide the Localized Robust Initial Deployment Phase preliminary project plans, statements of work and work breakdown schedules
- Provide high-level design specifications for phase integrations and design modifications for
subsequent phases

Work for this initiative will employ standard project management best practices to provide research, analysis and documentation regarding project requirements and planning for initial and full deployment of the ITPA project. Information garnered will also be used to help create a working prototype and a robust, scalable long-term solution.

(vii) ITPA Localized Robust Initial Deployment
The Localized Robust Initial Deployment Phase involves the deployment of an initial operational system that provides a capacity for real-time situational awareness, and support for future expansion of the geographic coverage with improved system capabilities for approximately 20,000 subscribers. The four primary capabilities will be provided as follows:

- **Capability 1 – Smart Parking**: Real-time usage information, statistical results on past parking information, and reservations for parking spaces will be available for FIU and Sweetwater Smart Garages. Support for other relevant Smart Garages will be implemented as they become available for intelligent parking guidance service.

- **Capability 2 – Real-time Situational Awareness**: This phase will involve the analysis of real-time situational aware data on key routes to/from UniversityCity, with later expansion to other routes as data becomes available (e.g., traffic conditions on any the of primary thoroughfares where express buses operate, bus and trains schedules and real time movement, latest real time airplane and other common carrier departure/arrival information, and cost and time comparisons)

- **Capability 3 – Travel Suggestions and Options**: Routing, timing, and mode guidance where alternative travel suggestions may be provided (i.e., Amtrak, Metrorail, MIA Mover, Metromover, Tri-Rail, express buses and identified common carriers) and additional types of information that would support guidance provided such as accidents, weather, major event information (e.g., sporting event)

- **Capability 4 – Routing Instructions and Guidance**: Routing guidance will be for key routes to/from UniversityCity, with later expansion to include other major public transit corridors and routes in the area

This phase will introduce an “Alerts” capability that provides traveler with alerts for information relevant to the traveler’s planned route that may change in travel times or a change in routing recommendations and guidance instructions. Alerts are generally triggered by a change in conditions along a traveler’s route based on situational aware data and analysis of the effects of that change. For example, if a traveler’s route includes riding on a public transit bus, a traveler could be alerted if a bus arrival time is likely to change such that the change would increase travel time or disrupt the trip sequence. If desired, this could be coupled with new routing recommendations and alternate guidance instructions that would potentially decrease travel time.

(viii) Expanded Regional Deployment
One additional phase to the ITPA is envisioned as a region-wide expansion of the system for use throughout the eastern South Florida region, from Indian River County to Key West. The focal point of ITPA phased development would include the ability to scale up ITPA to this expanded system. By this means, ITPA will be able to change its focus from travel to and from UniversityCity via the 836 Express, Miami Beach Airport Flyer, and to a limited extent via GP Express to travel to and from the MIC from throughout the region by any mode of transport. This
will greatly expand the usefulness and desirability of the system.

II. Project Parties:
The FIU Board of Trustees will lead the implementation of the UniversityCity at the direction of Ken Jessell, Senior Vice President and Chief Financial Officer. Over 20 FIU Vice Presidents, Department Directors, Deans, Project Managers, and expert faculty will also participate either directly or as part of the UCA, with project management by the I/UCRC-CAKE. Detailed qualifications for key project personnel are available at http://cake.fiu.edu/TIGER2013

A second key partner in the Project is Sweetwater, including direct participation by Mayor Manuel Maroño and Chief of Staff Robert Herrada. We expect regular participation and briefings with Sweetwater City Council. The UniversityCity will receive Police, Maintenance, Building and Finance Departments support as directed by the Mayor and City Commission.

Private sector partners, participants and vendors also play significant roles. As a primary expert vendor, IBM as an I/UCRC-CAKE member will work closely and extensively with FIU’s I/UCRC-CAKE, LCTR’s IITS to develop the ITPA proposal. RRAC University Apartments, LLC will build the first mixed-use project along SW 109th Avenue’s new “Main Street” and assist with infrastructure improvements. The RRAC partners and other real estate developers will be seeking to develop the residential and mixed-use liner buildings adjacent to the proposed City Hall Mixed-Use Smart Garage as well as along the US 41 southern terminus of Sweetwater adjacent FIU. The RRAC University Apartments, LLC letter of support can be found here.

Miami Dade Expressway Authority (MDX) is another major partner. They have committed $265,000 in support of the ITPA project components as well as access to extensive data sets and fiber optic connections when required and under conditions as they believe are helpful. They will provide technical guidance in the early phases of ITP, leadership in providing and raising funds for the ITPA implementation, and a real-world platform in which to deploy ITPA. The MDX letter of support can be found here.

Miami-Dade Transit (MDT) and FIU have agreed to closely coordinate our TIGER projects in order to create a seamless combination of new travel options and solutions for western MDC. A MDT letter of support can be found here.

Florida Department of Transportation (FDOT) District 6 is actively participating with direct involvement of District Director Gus Pego and several members of his senior staff. They are: providing partial funding for a Sustainable UniversityCity Subarea Mobility Study (SAMS); coordinating the SW 107th Avenue improvements; studying and assisting with the safe crossing at-grade pedestrian improvements at the SW 109th/US 41 intersection; and providing advice and support for construction and development of all UniversityCity components. Their letter of support can be found here.

Miami International Airport is working as part of the team to explore ITPA smart garage opportunities at MIA/MIC and to support the 836 Express connections between the UniversityCity AIMS and the MIC/MIA. Their letter of support can be found here.

The congressional delegation from Miami-Dade County has pledged their support for the project via a jointly signed letter. That letter and those of other partners can be found here.
### III. Grant Funds and Sources/Uses of Project Funds

The UniversityCity is the result of strong collaboration and has attracted resources from multiple organizations. A summary of the sources and uses of project funds is shown below including the percentage of revenue from each source, and a more detailed budget is available [here](#).

<table>
<thead>
<tr>
<th>SF424 Budget Line</th>
<th>TIGER FUNDS</th>
<th>Federal</th>
<th>Applicant</th>
<th>Local</th>
<th>Local</th>
<th>State</th>
<th>Project Total</th>
<th>% Total</th>
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</thead>
<tbody>
<tr>
<td>SW 107th AVE Improvements - 6 lanes</td>
<td>FIU</td>
<td>Sweetwater</td>
<td>MDX</td>
<td>FDOT</td>
<td>$32,875,708</td>
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<td>Sweetwater City Hall Intelligent Plaza and Parking Area (CHIPPA)</td>
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<td>$21,347,974</td>
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<tr>
<td>SW 109th AVE Complete Street Improvements</td>
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<td>Single Pylon Cable-Stayed Shared-Use Bridge over US 41</td>
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<td>FIU MMC Complete Streets Project - Campus Walkways and Boardwalk</td>
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<tr>
<td>FIU Construction Support Staff, Advisory Consultants, and Expenses</td>
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<td>Informed Traveler Program &amp; Applications</td>
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<td>Conceptual Advanced Intermodal &amp; Multimodal Station (AIMS) platform</td>
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<td>Smart Parking Retrofit of Additional FIU Parking Garages</td>
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With a total project cost of $123,809,794 and a total of $20,980,273 in requested TIGER funds, the percentage of project costs to be paid for by TIGER funds is 16.9%. As indicated in the attached funding commitment letters, all non-TIGER funds will be available on or before June 30, 2014 and will be completed projects within a five year term ending 2018. The additional commitments are summarized below.

- FIU has committed to fund the construction of a new Smart Parking Garage with room to house the AIMS platforms and related amenities. It will also fund the retrofitting of additional parking garages using the technology and techniques developed for the TIGER-funded Red Garage. FIU will route their CATS community transit vehicles and GP Express buses to serve the AIMS, and the CATS vehicles will shift their route to SW 109th Avenue. FIU is also planning to determine how best to provide UniversityCity support via regular evaluation surveys; a student orientation effort to encourage transit ridership; specialized crime prevention services for project design; and, in conjunction with the UCA, the development and management of a high quality web site to inform the community about Project construction, coordinated community transit and express bus and metropolitan bus schedules, ITP subscriptions, monthly transit passes, and related events and activities.

- Sweetwater has committed to fund the construction of the City Hall Plaza, City Hall Mixed-Use Smart Garage and CHIPPA improvements and the completion of landscape and hardscape improvements on 5th, 6th and 7th Streets, other metered street parking capacity, “Complete Street” improvements as right-or-way permits on SW 109th Avenue, and ongoing maintenance of the new “Main Street” amenities as they are identified.

- RRAC University Apartments, LLC has committed to building a 550–bed private housing tower that will include mixed-use retail space on the first floor and that will interface directly with the SW 109th Avenue pedestrian-oriented improvements and the Pedestrian Bridge and at-grade intersection improvements at US 41 and SW 109th Avenue.

- Miami-Dade Transit has agreed to explore sharing cost of the AIMS platforms to be built in the new FIU Smart Garage. They will coordinate their planned $24.5 million 836 Express with the UniversityCity by; using the AIMS as a key stop; working with FIU to determine how best to coordinate additional express service to the MIC and other FIU campuses (Biscayne Bay and Engineering Center); hopefully supporting FIU’s request to Miami-Dade County to use TSP technology on the GP Express to facilitate flexible routing in conjunction with the use of ITP to allow ITPA users to reserve GP Express seating and minimize wait time for transferring transit riders.

- MDX has committed to fully support the ITPA preliminary planning phase. When proof of concept is complete, MDX will also lead the co-funding of the Localized Robust ITPA deployment and its regional expansion. Finally, MDX has agreed to provide access to data streams from its extensive ITS.

Another committed partner is FDOT. They will contribute $32,875,708 for improvements to SW 107th Avenue that will allow better traffic flow and pedestrian access to the Sweetwater City Hall Plaza and CHIPPA. They have also initiated a study of potential pedestrian crossing
improvements at the US 41 and SW 109th Avenue intersection, and will make some of the needed improvements to enhance pedestrian flow and safety at grade. Finally, FDOT has agreed to provide $204,000 funding to FIU for a SAMS over the broader geography of UniversityCity (Sweetwater, Maidique Campus and adjoining properties). This analysis will examine multi-modal mobility challenges and potential solutions to achieve mobility and sustainability goals. Given the multifaceted nature of the UniversityCity, there are aspirational leveraged resources that would provide support to the project if funded. These include higher quality landscape and hardscape improvements ($3.5 m), mixed-use liner buildings around the new Sweetwater and FIU Parking Garages ($208.8m), and additional smart parking garages at MIA ($2.4m). Commitment letters from partners and cooperating entities are attached and available here.

IV. Selection Criteria
   A. Long-Term Outcomes
      1. State of Good Repair - Each of the components of UniversityCity help reduce vehicle miles travelled, eliminate unnecessary trips, reduce travel time, and increase the use of mass transit, walking, and biking. Various components also strategically upgrade surface transportation assets to reduce the current and projected levels of congestion that threaten network efficiency and roadway surfaces. In doing so, the project reduces wear and tear on existing roadway assets, creates additional sustainable revenues to maintain and expand transit operations, and enhances more efficient traffic flow. These benefits are more fully described and quantified in the Benefit/Cost Report found here. In addition, the commitment of FIU to support several of the Project components provides sustainable resources to reduce the long-term cost structure of the mobility systems.
      2. Economic Competitiveness - UniversityCity will substantially reduce overall travel time for workers and students, reduce total household expenses for transportation, attract and retain more educated workers to support business growth, encourage technology transfer activities from FIU research, and help attract additional private investment in businesses to Sweetwater that operate globally. Given FIU’s crucial role in attracting, developing, and retaining talent, the resulting growth of UniversityCity will improve both regional and national economic competitiveness in the global innovation economy. A unique measurable impact will be to cultivate the next generation of transit riders in the form of UniversityCity students, faculty, residents, business owners, employees and visitors. By creating systems and places that encourage a shift toward more transit use, UniversityCity creates a significant number of experienced long-term mode shift customers. ITPA also allows users to spend less time on travel, more productive time when traveling on transit, and less energy-draining stressful time operating a vehicle in congested traffic. It reduces employee tardiness and absences and this will result in higher worker productivity and economic competitiveness for businesses. There will be additional time for productive tasks that build economic value. This includes the ability of government agencies to plan around patterns of travel more effectively by transferring the technology developed and implemented in the project to enhance existing systems. Additional efficiency benefits, market value, and business development are expected for the region.
      3. Livability – By encouraging community engagement in land use planning, using mixed-use developments with higher density to make transit and walking/biking more convenient and efficient modal choices, and making FIU amenities and work/learn opportunities more accessible, UniversityCity provides major improvements in transportation choice, affordable lifestyles, equitable prosperity, educational opportunities and attainment, and
health outcomes. The disadvantaged populations within the UniversityCity area, including significant numbers of low-income and limited English households, elderly, non-driver immigrants, and first generation university students benefit more than others. By reducing VMT, facilitating the development of new housing close to work and school, and creating substantial shifts to transit-walking-biking. UniversityCity helps improve air quality, reduce energy use and dependence on foreign fossil fuels, and improve social equity in UniversityCity. The ITPA solution helps users by: increasing personal time; providing timely information to provide informed access to more transportation choices; enabling reliable and timely access to employment centers, educational opportunities, services, and other basic needs; focusing on existing communities resource and destinations; and, enhancing the unique characteristics of UniversityCity through the development of pedestrian-oriented affordable, safe, and low stress transportation opportunities. Focus on security along the total travel path substantially improves real and perceived safety, a key livability issue. UniversityCity creates a greater mode shift to transit-biking-walking and facilitates exercise and daily activity that improve health outcomes and benefits.

4. **Environmental Sustainability** - UniversityCity creates environmentally sustainable land use patterns and densities, transportation modal alternatives, support for sustainability initiatives, and an opportunity to demonstrate how powerful university-community partnerships can create a more environmentally sustainable transportation system and equitably prosperous community. By concentrating development in higher densities in Sweetwater, UniversityCity reduces development pressures on the nearby Everglades, a sensitive and threatened ecosystem of national and international importance. As detailed in the Cost Benefit Analysis, UniversityCity reduces greenhouse gas emissions and other air pollutants. ITPA reduces total trip time and related idle time, parking search time, fuel expenditures for those travelling in private vehicles and creates mode shifts to transit, biking, and walking, further reducing greenhouse gas emissions, fossil fuel consumption, non-point source roadway runoff pollutants, and particulate air pollutants.

5. **Safety** - A significant aspect of UniversityCity is that the highway separating FIU and Sweetwater (US 41) has been deadly to pedestrians and bicyclists. Those who use their cars, once they leave Sweetwater, the Maidique Campus or FIU’s Engineering Center, usually have no inclination to drive to community destinations. This is confirmed by recent survey results indicating that over 55% of FIU students and staff either never visit Sweetwater or visit only once per year. Creating a pedestrian environment that works for large-scale walking and does not put either side at risk requires multiple UniversityCity crossing strategies at the US 41/SW 109th Avenue intersection: cross with the light in a frequently arriving and departing small transit shuttle; cross by a wider than typical pedestrian bridge that is attractive, fun and wide enough for small vendors at the wider middle cross section; use of a small shuttle for some parts of the day to travel over the bridge or through to intersection; and, over time reduce the lane widths as US 41 traffic approaches the intersection with SW 109th Avenue and widen the median; placing hardscape, landscape and additional pedestrian-oriented bridge support in the median.

The UniversityCity improvements reduce the safety risk at the US41 and SW 109th Avenue crossing and increase transit access. ITPA helps travelers avoid congestion or hazardous conditions and reduces car trips and vehicular speeds in urbanized areas to reduce car accidents. Reserved parking reduces searching for parking at unsafe speeds and accidents in the garages.
B. Job Creation & Near-Term Economic Activity

Many of the components of $145 million project will not go to contract in 2014 and 2015 without the grant award. As scheduled, UniversityCity improvements will be mostly completed by December, 2015 and will be fully complete by July 2016. Match funded projects will be underway or completed by 2018. Short-term job creation identifies the jobs immediately created by project spending and constitutes planning, design, administrative, and construction related positions. Per the “Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009”, Issued and Developed by the Executive Office of the President - Council of Economic Advisors, one job-year is created for every $92,000 of government spending. Based upon this ratio, and the overall project budget and schedule, it is estimated that UniversityCity work will generate approximately 527 short-term jobs. Over a longer term, beyond construction, there will be new jobs created for people hired to operate the improved community transit created through this TIGER grant and further expansions of thereafter. New jobs will also be created after the AIMS is built for people employed to operate the terminal facilities for the 836 Express, GP Express and related transit and to work at jobs the associated storefronts businesses after SW 109th Avenue develops into a complete Main Street with mixed-use destinations from City Hall to the Green Library. Complete detailed project schedules have been developed to ensure that DOT will be able to obligate TIGER funds on or before June 30, 2014. They include finalization of any NEPA requirements and local approvals, scheduling for construction of the ATOD elements, ITPA prototype research and development, and the related projects constituting match commitments. A complete scheduling document can be found here.

As part of the project development, a Benefit Cost Analysis (BCA) for a 30 year period life span of the project was performed in order to determine the financial and economic feasibility of the project. The summary of the analysis is listed in the appendix which shows a Benefit-Cost Ratio of 4.25 and 2.09 based on 3% and 7% discount rates. The following table summarizes the long term outcomes of the project as a whole and a summary of the types of societal benefits expected. The benefits are further explained in the subsequent sections of this analysis.

<table>
<thead>
<tr>
<th>Long Term Outcome</th>
<th>Types of Societal Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livability</td>
<td>Changes the character of the neighborhood from vehicle-centric to multi-modal promoting reductions in VMT</td>
</tr>
<tr>
<td></td>
<td>Make University assets more accessible to the community</td>
</tr>
<tr>
<td></td>
<td>Property value Increase</td>
</tr>
<tr>
<td></td>
<td>Promotes a healthy lifestyle through promoting a more natural and friendly walking environment</td>
</tr>
<tr>
<td>Economic Competitiveness</td>
<td>Travel time reduction savings through complete street improvements and ITPA</td>
</tr>
<tr>
<td></td>
<td>Vehicle operation savings</td>
</tr>
<tr>
<td></td>
<td>Promotes the development of new business through more accessible real estate in the project vicinity</td>
</tr>
<tr>
<td>Safety</td>
<td>Reduced pedestrian involved traffic accidents through the implementation of complete streets, safe pedestrian environment, traffic calmed streets, community transit and a new pedestrian bridge to cross the busy U.S. 41 highway at the SW 109th Avenue intersection</td>
</tr>
</tbody>
</table>
1. Project Costs and Benefits

The cost side of the BCA equation consists of all monetized expenditures incurred by the grantee and its partners in order to fully develop the project to a usable and beneficial piece of infrastructure. Project costs consist of the total project budget including design, administration, construction, and future maintenance as defined in the TIGER 2013 proposal budget and supplemented by this document. As defined by the 2013 TIGER NOFA, “Benefits include the extent to which residents of the United States as a whole are made better off as a result of the project”. With this key point in mind, the benefits associated with this project were derived solely from the societal benefits identified in each component of this project. No transfer costs or economic impacts were considered in the derivation of this BCA. The benefits identified in this project consist primarily of four categories: 1) Modal Diversion, 2) Pedestrian Involved Accident Reduction, 3) Travel Time Reduction and 4) Residual Value of Infrastructure.

2. Benefit Cost Estimation versus Economic Impacts

Based on 3% and 7% discount rate, the project has a benefit cost ratio higher than one implying net benefit from the project. However, in our view the presented Benefit Cost Analysis provides a very conservative estimate of this project. Probably the most important benefit of this project is linking a small town with a major university campus in order to establish an upwardly mobile, better educated, sustainable community. The value of this interlinked sustainable community goes beyond what can be quantified by a Benefit Cost Analysis. For example, over the long run a major portion value creation will occur through: i) increased demand for real estate within a more densely developed urban form and resulting investment; ii) job creation due to increased connectivity to university education and higher living standards designed into the built environment within the area; iii) healthier lifestyles in walkable communities; iv) benefits of ITPA enabled optimal utilization of existing transportation infrastructures (e.g. underutilized parking facilities at MIA and elsewhere can be used more efficiently with an ITPA identified Park-and-Ride one). and, v) lower cost and dependable mobility through the local community, throughout the metropolitan area and the region, and to modes of state, national and international transport. These indirect and induced benefits are not easily captured in Benefit Cost Analysis and so the reported Benefit Cost ratio is highly conservative. But these indirect and induced benefits can be measured through economic impact analysis and by collecting data on user’s demand and preferences over the long run (a suggested 10 year period).

3. Tracking the Annual Trend of Users Demand and Preferences

Considering that broader economic impact of the project can be substantial, we suggest annual tracking of users demand for services and amenities provided by this project. We propose to survey potential users at the beginning of the project (in 2014) and then do follow up survey (in 2015 and 2016) when the project is partially operational to estimate the intended and realized demand for using the services and amenities provided by the UniversityCity improvements. Then
subsequent annual surveys can be conducted for the next 7 years funded by FIU in 2017 to 2023 would measure the trend of changing demand and preferences for key services and amenities provided by this project. By complementing primary survey data on users demand and preferences with secondary economic data using high tech survey techniques such as GPS tracking, we will estimate the broader economic impacts (including generative, redistributive and financial transfer impacts) of UniversityCity (see TRB 1998).

C. Innovation
The UniversityCity uses the ITPA, which will be developed based upon a selection of the best software programs, assets, services and capabilities available around the world through IBM. By combining ITS with Information Technologies (IT), and advanced modeling to facilitate large-scale Transportation Demand Management (TDM) with real time communications, the ITPA is innovation. When used to plan for a complex multimodal system, ITPA can help you take advantage of Accelerated Bridge Construction (ABC) and any application to pedestrian walking areas, uses Every Day Counts (EDC) to complete significant transportation improvements without delay and disruption, and Highway for Life (HfL) and other long duration of use structural techniques and technologies so that work undertaken is not disruptive. Used together, these innovations provide highly effective relief of transportation delays and dangerous conditions, and therefore optimize and preserve the transportation system with limited resources.

D. Partnership
As shown in the Project Partners section above, UniversityCity is led by a non-transportation public agency as part of a strong collaboration among a broad range of participants including a city, a university, a global technology corporation, private developers, and several transportation entities. A series of community meetings, Charrette, partner meetings, and the creation of a partnership alliance were all part of the planning process leading to this UniversityCity submittal.

V. Project Readiness and NEPA
UniversityCity would primarily use infrastructure associated with existing or planned projects that have either already gone through the regulatory permitting process or has begun initial coordination with the affected resource agencies. In March 2012, an Advanced Notification (AN) package was sent to the Florida State Clearinghouse for distribution to resources agencies that conduct Federal consistency reviews to solicit initial comments. This AN package included the project description, the purpose and need of the project, and potential impacts based on GIS analysis and field surveys. Comments from the resource agencies where received and this 2013 TIGER/UniversityCity submittal and the letter found here is a response thereto that provides reason to expect a Categorical Exclusion action will be forthcoming in early 2014.

Pedestrian/bicycle facilities and transit greenway improvements as proposed under this action may be identified as Categorical Exclusions pursuant to 23 CFR Part 771.117. Therefore, the proposed improvements associated with this TIGER Grant application are expected to be classified as a Categorical Exclusion under NEPA guidelines. As a Categorical Exclusion, NEPA documentation is anticipated to be completed within 6 months. The project lies within a built urban environment and impacts to the physical, natural and social environments are expected to be minimal. No additional right-of-way is required to construct the project and community opposition is not anticipated. The project is planned to improve community connectivity, reduce vehicle and greenhouse gas emissions, and encourage energy savings.

A. Project Schedule: Attached and available here
B. Environmental Approvals: NEPA Status - UniversityCity would use infrastructure associated with existing or planned projects that have either already gone through the regulatory permitting process or has begun initial coordination with the affected resource agencies. In March 2012, the AN package was sent to the Florida State Clearinghouse for distribution to resources agencies that conduct Federal consistency reviews to solicit initial comments. It included the project description, the purpose and need of the project, and potential impacts based on GIS analysis and field surveys. Comments from the resource agencies where received in mid-2012. Pedestrian/bicycle facilities and transit greenway improvements as proposed under this action may be identified as Categorical Exclusions pursuant to 23 CFR Part 771.117 and the proposed improvements associated with this TIGER Grant application are expected to be a Categorical Exclusion under NEPA guidelines. As a Categorical Exclusion, NEPA documentation is anticipated to be completed within 6 months. NEPA Comment - The project lies within a built urban environment and impacts to the physical, natural and social environments are expected to be minimal. No new right-of-way is required to construct the project. No community opposition is anticipated. The project is planned to improve community connectivity, reduce vehicle and greenhouse gas emissions, and encourage energy savings.

C. Legislative Approvals: None required.

D. State and Local Planning: In addition to Sweetwater and the private developer RRAC, Miami-Dade County (MDC), FDOT, MDT, MDX, and Miami Dade Aviation Department have all agreed to assist with this Project and their commitment letters are attached. The Southeast Florida Regional Partnership, a Sustainable Communities Initiative grant recipient, is also involved and supportive per their attached letter. In conversations with the Miami-Dade County MPO, a review of the proposal will be made and after deliberations the project components will be presented for necessary approvals and included in their 5-year plan in the event of TIGER funding. Any additional approvals will be complete on or before 6.30.13.

E. Technical Feasibility: TYLI, IBM, Ouri Wolfson, Perkins + Will, FIU’s I/UCRC-CAKE and LCTR, and Trias and Associates have provided the professional and expert information needed to ensure technical feasibility for the Project. Additional technical review and guidance has been provided by FDOT, MDX, MDT and others.

F. Financial Feasibility: The parking garage has been approved by the FIU Board of Trustees and, as with other parking garages, FIU has the capacity to finance the construction through Florida Division of Bond Finance and pay back the debt with student, faculty, other staff, and FIU visitors parking fees. The remaining funding commitments are well within the financial capabilities of FIU and other partners.

G. Project Risks and Mitigation Strategies: Potential project risks include procurement delays and lack of fully understanding technical needs and data access. We are taking a multipronged approach to mitigating these risks: (1) detailed work analyses have already been undertaken with primary vendors and partners and are ready for contracting once TIGER is awarded; (2) in-depth risk assessment, planning and data availability and analysis will take place as part of the $265K MDX contract that occurs prior to the start of the TIGER project.

VI. Federal Wage Rate Certification
Attached and available here.