# UNIVERSITY DRIVE

# MOBILITY IMPROVEMENTS

# PLANNING STUDY

## 3.2 Data Driven Analysis

## Final Travel Demand Modeling Methodology

## Deliverable # 55 & 56

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# 1.0    Introduction/ Guiding Principles

This document summarizes HDR's travel demand modeling methodology to support the University Drive Mobility Improvements Study. The travel demand modeling effort for this project will provide firm and clear understanding of existing and future travel markets and transportation needs in the corridor to inform decision making.

This methodology framework has been developed in coordination with the Broward MPO and Florida Department of Transportation considering the specific dimensions of the study. The following discussions helped frame the preferred travel demand modeling approach for the study:

- The main objective of this study is to identify multi-modal improvements along the University Drive corridor that will provide congestion relief, improve traffic operations, achieve high-capacity premium transit service, promote transit oriented development, improve mobility and enhance the overall livability of the study area. Thus the travel demand modeling effort must produce both highway and transit forecasts and also acknowledge the relationship between transportation and land use.

- Given the objective of the study to integrate transportation and land use in analyzing the corridor and developing a multimodal plan, a traditional four step travel demand model is the preferred modeling tool (as opposed to a data driven approach that focuses on transit ridership forecasting only).

- SERPM 6.7 is the preferred version of the regional travel demand model for this study given that the transit module is better calibrated and validated as compared to SERPM 6.5.

- AECOM is currently refining SERPM6.7 for the University Drive corridor and will provide the model to HDR by the end of May 2013. The refined model will be utilized for the Tier 2 analysis.

- The travel demand forecasting requirements and the associated level of scrutiny are different for various transportation funding programs. As no specific funding strategy has been developed for this project, the travel demand modeling approach is expected to keep the options open so that a number of funding programs can be pursued depending on the recommendations of the study. On the highway side, FHWA travel demand modeling standards will be followed (as included in FSUTMS standards). On the transit side, FTA Small Starts and Very Small Starts guidelines will be followed in order to assess eligibility of the project for discretionary FTA 5309 program funds. Based on the discussions with the project stakeholders, it is very unlikely that the contemplated transit improvement cost in this corridor would exceed $250 million dollars.

- Thus, New Starts funding approach has been ruled out for this project. For Very Small Starts projects, FTA requires quantifying existing benefiting transit riders in the corridor based on observed data. For Small Starts projects, FTA requires development of opening year forecasts only (as opposed to a 20 year horizon forecast). This is in line with the Broward MPO's objective of generating a near to mid-term transportation plan for the corridor. Thus, the travel demand modeling effort will focus on existing conditions and opening year (2020) analysis.

- It is also important to acknowledge the recent MAP-21 changes and the New FTA New Starts and Small Starts Policy Guidance (January 9, 2013).

From a travel modeling perspective, it is important that the proposed methodology lends itself to producing the type of measures required by the new evaluation framework so that the potential for pursuing FTA funding can be assessed. However, please note that developing a Small Starts or Very Small Starts application is not included in this scope of services.

## 2.0    Travel Demand Modeling Methodology

Given the project coordination, the following steps outline the travel demand modeling methodology for this project.

### I.    Travel Market Analysis

A thorough travel market analysis will be conducted in order to gain insights about the existing travel patterns and behavior in the study corridor. A good understanding of the travel markets will help define the purpose and need for the project and subsequently design appropriate alternatives that meet the purpose and need for the project. HDR will utilize existing sources of data to analyze the existing travel markets and identify potential future travel markets in the University Drive corridor. These data sources include, but are not limited to, U.S. journey to work data and other census data, on board survey, BCT and MDT APC data, BCT Route 2 and University Breeze OD survey data provided by FDOT, outputs from the SERPM model, land use data from the Broward County Planning Council, traffic counts, and surveys that can quantify relevant travel markets. These data sources will be assessed in order to assemble a comprehensive summary of the markets in the corridor, including:

- Geographic distribution of households by size, vehicle ownership, age, race, income, number of workers, and number of children

- Regional trip making behavior, including trip production and attraction totals and corresponding densities of trip making by trip purpose

- Major destination points or activity centers along the University Drive corridor

- Available transportation options and associated accessibility

- Key geographic travel markets, reverse commute, and suburb-to-suburb commute

- Existing stations and stop locations, with passenger boarding/alighting counts and transfer points to east/west routes

- Existing transit ridership, boarding/ alighting by stop, origin-destination of riders, and profile of riders
- Highway volumes and network deficiencies

HDR will review and analyze existing data to understand and document existing revealed travel patterns in the corridor by trip purpose, relationship between the transportation network and demographics of the population within the travel shed of the corridor, and origin-destination of travelers in the corridor. The analysis will reveal spatial and non-spatial patterns of who is traveling in the corridor, using what modes, the potential target travel markets for the new premium transit services, etc. Special consideration will be given to identifying target market segments, including not only the traditional home-to-work commuters but also other less traditional, less well understood markets (like university trips, shopping trips, etc.). Both highway and transit travel markets will be reported in order to understand the network supply needs for both modes, which will eventually facilitate the development of the alternatives. The currently available version of SERPM 6.7 will be utilized for this analysis.

## II.   TIER 1 Evaluation of Alternatives

For this study, a tiered screening of alternative transportation strategies for the corridor is proposed, to eliminate non-viable alternatives early in the evaluation process. The tiered process will also enable us to conduct more detailed screening on a manageable number of the most promising alternatives. The Tier 1 screening of alternatives will involve eliminating transit modes that don't meet the purpose and need for the project. Generally, qualitative assessment of modes will be conducted in light of the corridor characteristics to determine whether further evaluation of a given mode is desired for the study. The Tier 1 screening methodology and criteria will be developed as a separate document.

## III.   TIER 2 Evaluation of Alternatives

The refined SERPM 6.7 model, which will be available in May 2013, will be utilized for the evaluation of alternatives that survive the Tier 1 screening. A No Build model will be developed and executed for 2020, which will serve as the basis for comparing the alternatives. Appropriate network and socioeconomic data assumptions will be developed in coordination with the stakeholders. The highway network will include projects that would be constructed and open by the year 2020 in the immediate vicinity of the study area. The E+C transit network being utilized by other similar studies, which is very similar to the existing transit services, will be utilized as the No Build network. The 2020 socioeconomic data will be developed by interpolating the existing SERPM datasets and refined for the study corridor based on available information on development projects, as needed. Subsequently the alternatives will be modeled and statistics on both highway (volumes, volume to capacity ratios, vehicle miles of travel, vehicle hours of travel, etc.) and transit modes (ridership) will be reported for alternatives evaluation and screening.

In addition to generating ridership forecasts for the transit alternatives, HDR will also conduct a detailed analysis of model outputs to answer a number of key policy questions such as:

- The effect of future highway congestion on transit market

- The sensitivity of transit ridership to level of service, parking and fare assumptions

- The impact of transit operating assumptions (mixed right-of-way versus exclusive right of way) on projected ridership

- The effect of demographic growth on study area travel markets

A set of performance measures, which will also serve as crucial input to a variety of environmental, livability and financial analyses, will be developed including but not limited to the following:

- Total ridership for each transit alternative under consideration including boarding and alighting tables

- Ridership by demographic market segments (including transit dependent) and access modes

- Improvement in overall accessibility

- Accessibility improvements to low-income and minority populations

- Total vehicle-hours, vehicle-miles, passenger-hours, and passenger-miles of travel

- Screenline travel volumes by mode

- Highway and transit market shares and corresponding volumes

- Travel information by mode e.g. origins, destinations, trip interchanges etc.

- Forecasts for transit feeder services, and

- Forecasts of park-and-ride utilization

- Forecasts of hub/station utilization

The alternatives will be subsequently refined in order to maximize the productivity of each alternative, which will eventually lead to the identification of the locally preferred alternative. The locally preferred alternative will be modeled in greater detail in order to generate the final set of forecasts for the study.

## IV.    Interagency Coordination

HDR consultants, in coordination with the project team, will participate in consistent dialogue with Broward MPO, FDOT, and other agencies including FTA, as needed, throughout the study to ensure that the travel demand modeling process meets their expectations. These meetings will address modeling methodology, validation approach, coding conventions, model results, reasonableness of model output, and other technical aspects of the modeling effort.

## V.    Documentation of Results

HDR will produce a detailed technical report documenting the methodology and results of the travel demand modeling effort.