Chapter 4: Data and Plan Preparation

This chapter describes the base study area data that was gathered throughout the development of the Long Range Transportation Plan. This chapter also provides an overview of the planning tools that were utilized for evaluating alternatives used for the developing the Needs Plan and the Cost Affordable Plan.

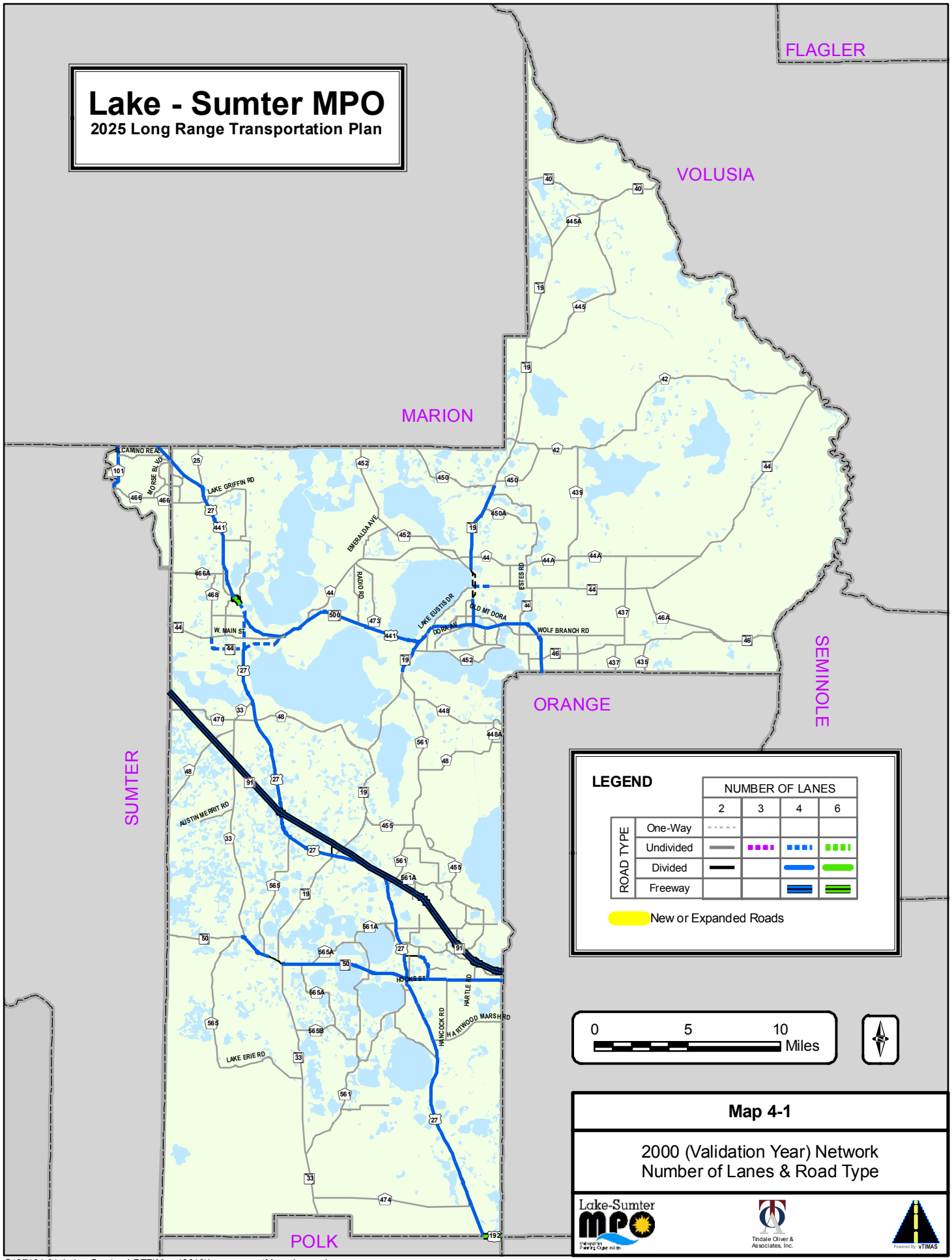
The first section of this chapter describes the base network and the development of the Existing + Committed roadway network. The base conditions are the conditions in year 2000, which correspond with the validation year of the Central Florida Regional Planning Model, Version 4 (CFRPM-IV) developed by a consultant under the direction of the Florida Department of Transportation. The Existing + Committed Network represent the roadway inventory that is reasonably expected to exist in the year 2010 resulting from roadway improvements documented in the Lake County and Sumter County Capital Improvement Plans and the FDOT Work Program.

The second section of this chapter discusses the planning tools used throughout the alternative development process. These tools include the travel demand forecasting model, the roadway inventory and analysis software, and other technical approaches that were utilized for the development of the Long Range Transportation Plan.

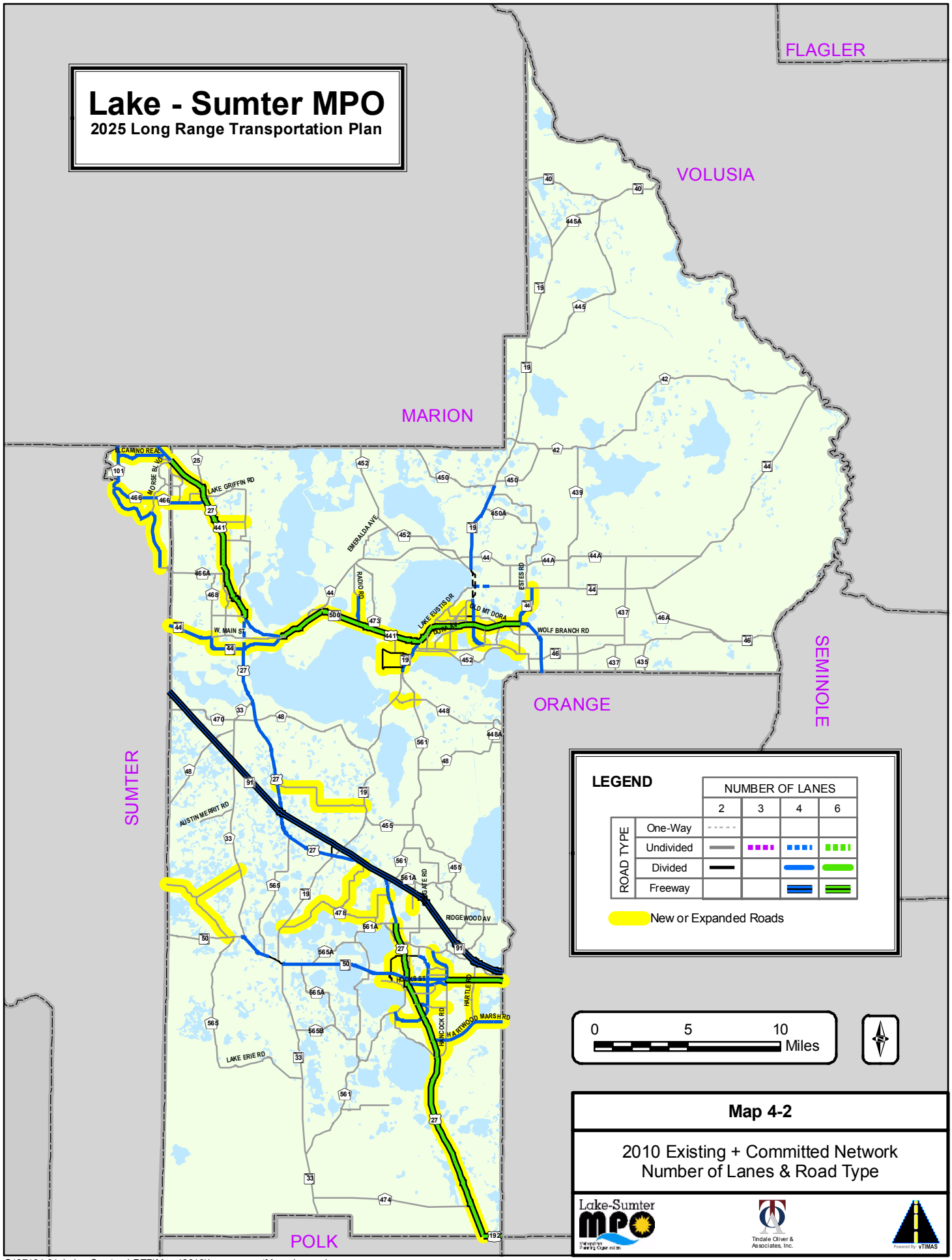
Base Network and Existing + Committed Network

The base network for the Long Range Transportation Plan represents the roadway network that existed in the year 2000. The year 2000 validation network is illustrated in Map 4-1. This network corresponds with the validation model network used in the Central Florida Regional Planning Model, Version 4.

The 2010 Existing + Committed network includes the base network plus any improvements that are expected to be constructed prior to the end of the year 2010 as identified at the beginning of the Needs Plan development in mid 2005. This network represents the base year for costing, as the improvements in the Existing + Committed network are assumed to be funded in the Lake County and Sumter County Capital Improvements Plans or the FDOT Work Program. This network was developed with the assistance of the Lake County Public Works Department and the Metropolitan Planning Organization staff. The Existing + Committed network is illustrated in Map 4-2. The improvements from 2000 to the 2010 existing + committed network are summarized in Table 4-1.



G:\37401.04_Lake_Sumter_LRTP\Maps\2010\ImprovementMap_doc.mxd



G:\37401.04_Lake_Sumter_LRTP\Maps\2010\ImprovementMap_doc.mxd

Table 4-1: 2000 to 2010 Roadway Improvements

On Street	From Street	To Street	2000 Road Type	2010 Road Type
ARDICE AV	KURT ST	SR 19	2-Lane Undivided	2-Lane Divided
BAPTIST ISLAND RD	TUSCANOOGA RD	CR 33	N/A	2-Lane Undivided
BUENOS AIRES BLVD	ELCAMINO REAL	US 27/US 441	2-Lane Undivided	4-Lane Divided
CAPT. HAYNES	DEAD RIVER RD	US 441	N/A	2-Lane Undivided
CHERRY LAKE RD	CR 478	E APSHAWA RD	N/A	2-Lane Undivided
CR 101	CR 466	CR 466A	N/A	4-Lane Divided
CR 19A (E)	CR 441 (OLD)	CR 19A (W)	2-Lane Undivided	4-Lane Divided
CR 441 (OLD)	SR 19	MERRY RD	N/A	2-Lane Undivided
CR 466	CR 101	US 27/US 441	2-Lane Undivided	4-Lane Divided
CR 478	US 19	SOUTH LIBBY RD	N/A	2-Lane Undivided
DAVID WALKER RD	CR 441 OLD	KURT ST	N/A	2-Lane Undivided
DEAD RIVER RD	CONNECTOR	S DUNCAN	N/A	2-Lane Divided
DEWEY ROBBINS RD	SR 25 (US 27)	S. DEWEY ROBBINS	N/A	2-Lane Undivided
E. APSHAWA RD	CHERRY LAKE RD	SR25 (US 27)	N/A	2-Lane Undivided
E. DEWEY ROBBINS RD	S. DEWEY ROBBINS	SR 19	N/A	2-Lane Undivided
E. GRAND HWY	EAST AVE	SR 25 (US 27)	N/A	2-Lane Divided
EAST AVE	LAKE SHORE DR	E GRAND HWY	N/A	2-Lane Divided
EDWARDS RD	US 27/US 441	GRAYS AIRPORT RD	N/A	2-Lane Undivided
EICHELBERGER	SR 19	CR 561	N/A	2-Lane Undivided
ELCAMINO REAL	CR 101	BUENOS AIRES BLVD	2-Lane Undivided	4-Lane Divided
GRAND HWY	HOOK ST	SR 50	N/A	2-Lane Undivided
GRASSY LAKE RD	TURKEY FARMS RD	SULLIVAN RD	N/A	2-Lane Undivided
HANCOCK RD	LAKE LOUISA RD	HARTWOOD MARSH RD	N/A	2-Lane Undivided
HANCOCK RD	SR 50	CR 50	N/A	4-Lane Divided
HARTLE RD	HARTWOOD MARSH RD	SR 50	N/A	2-Lane Undivided
HARTWOOD MARSH RD	SR 25 (US 27)	ORANGE COUNTY	2-Lane Undivided	4-Lane Divided
HOOKS ST	SR 25 (US 27)	HANCOCK RD	N/A	4-Lane Divided
HUFFSTELLER RD	LAKESHORE DR	KURT ST	N/A	2-Lane Undivided
HUNT TRACE BLVD	CITRUS TOWER BLVD	HANCOCK RD	N/A	2-Lane Undivided
JACKS LAKE RD	JOHNS LAKE RD	SR 50	N/A	4-Lane Divided
JALARMY RD	CR 561 A	CHERRY LAKE RD	N/A	2-Lane Undivided
JOHNS LAKE RD	SR 25 (US 27)	EAGLE LAKE RD	N/A	4-Lane Divided
JOHNS LAKE RD	EAGLE LAKE RD	HANCOCK RD	N/A	2-Lane Undivided
LAKE LOUISA RD	HANCOCK RD	SR 25 (US 27)	N/A	2-Lane Undivided
LAKESHORE DR	HOOK ST	LAKE AVE	N/A	2-Lane Undivided
LIBBY RD	S. LIBBY RD	N. LIBBY RD	N/A	2-Lane Undivided
NORTH-SOUTH CORRIDOR	CR 466	OAK ST	N/A	2-Lane Undivided
MORSE BLVD	CR 101	CR 466	N/A	2-Lane Undivided
MT. HOMER RD	LAKE EUSTIS DR	DAVID WALKER RD	N/A	2-Lane Undivided
N. LIBBY RD	LIBBY RD	SR 25 (US 27)	N/A	2-Lane Undivided
OAK ST	NORTH-SOUTH CORRIDOR	CR 25	N/A	2-Lane Undivided
RADIO RD	SR 500 (US 441)	TREADWAY SCHOOL RD	2-Lane Undivided	4-Lane Divided
S. CLERMONT CONN	LAKESHORE DR	JACKS LAKE RD	N/A	4-Lane Divided
S. DEWEY ROBBINS	E. DEWEY ROBBINS RD	DEWEY ROBBINS RD	N/A	2-Lane Undivided

On Street	From Street	To Street	2000 Road Type	2010 Road Type
S. LIBBY RD	CR 478	LIBBY RD	N/A	2-Lane Undivided
SR 25 (US 27)	SR 530 (US 192)	CR 561A	4-Lane Divided	6-Lane Divided
SR 44	SUMTER CO. LINE	CR 468	2-Lane Undivided	4-Lane Divided
SR 44	CR 468	SR 500 (US 441)	4-Lane Undivided	4-Lane Divided
SR 44B	SR 500 (US 441)	SR 44	2-Lane Undivided	4-Lane Divided
SR 50	HANCOCK RD	ORANGE CO. LINE	4-Lane Divided	6-Lane Divided
SR 500 (US 441)	SR 44	CR 44B	4-Lane Divided	6-Lane Divided
STEVES RD	US 27	HOOKS ST	N/A	2-Lane Undivided
THOMAS AV	CR 460	CR 25A	N/A	2-Lane Undivided
TUSCANOOGA RD	SUMTER CO. LINE	HONEYCUT RD	N/A	2-Lane Undivided
TUSCANOOGA RD	HONEYCUT RD	SR 50	N/A	2-Lane Undivided
US 27/US 441	SR25 (US 27)	CR 466A (S)	4-Lane Undivided	6-Lane Divided
US 27/US 441	CR 25A (S)	WEST BOONE CT	4-Lane Divided	6-Lane Divided
WOODLEA RD	CONNECTOR	S DUNCAN	N/A	2-Lane Divided
WOODLEA / DEAD RIVER CONNECTOR	WOODLEA RD	DEAD RIVER RD	N/A	2-Lane Divided

Planning Tools

Several tools were utilized throughout the Needs Plan and Cost Affordable Plan alternative development process. These tools were used to forecast traffic conditions in the future, analyze those traffic conditions based on the improvements in the alternatives, and display the alternatives using maps to convey information in a format fit for general understanding. These tools include:

- The Central Florida Regional Planning Model, Version 4 (CFRPM-IV), a travel demand forecasting model used to forecast roadway conditions in the future. This model is based on the Florida Standard Urban Transportation Model Structure (FSUTMS) in a CUBE environment.
- The Visual Transportation Inventory Management and Analysis Software, or vTIMAS, a multi-function tool previously developed by the consultant that was used to analyze forecasted roadway conditions and project roadway improvement costs
- ArcMap Geographic Information Systems software, used to create maps and to perform calculations based on geographic features, such as length, acreage, and even complex spatial overlay calculations

The organization and interaction of these tools is diagrammed in Figure 4-1. This figure illustrates where each tool was applied in the alternative evaluation process. Each of these tools is discussed in greater detail below.

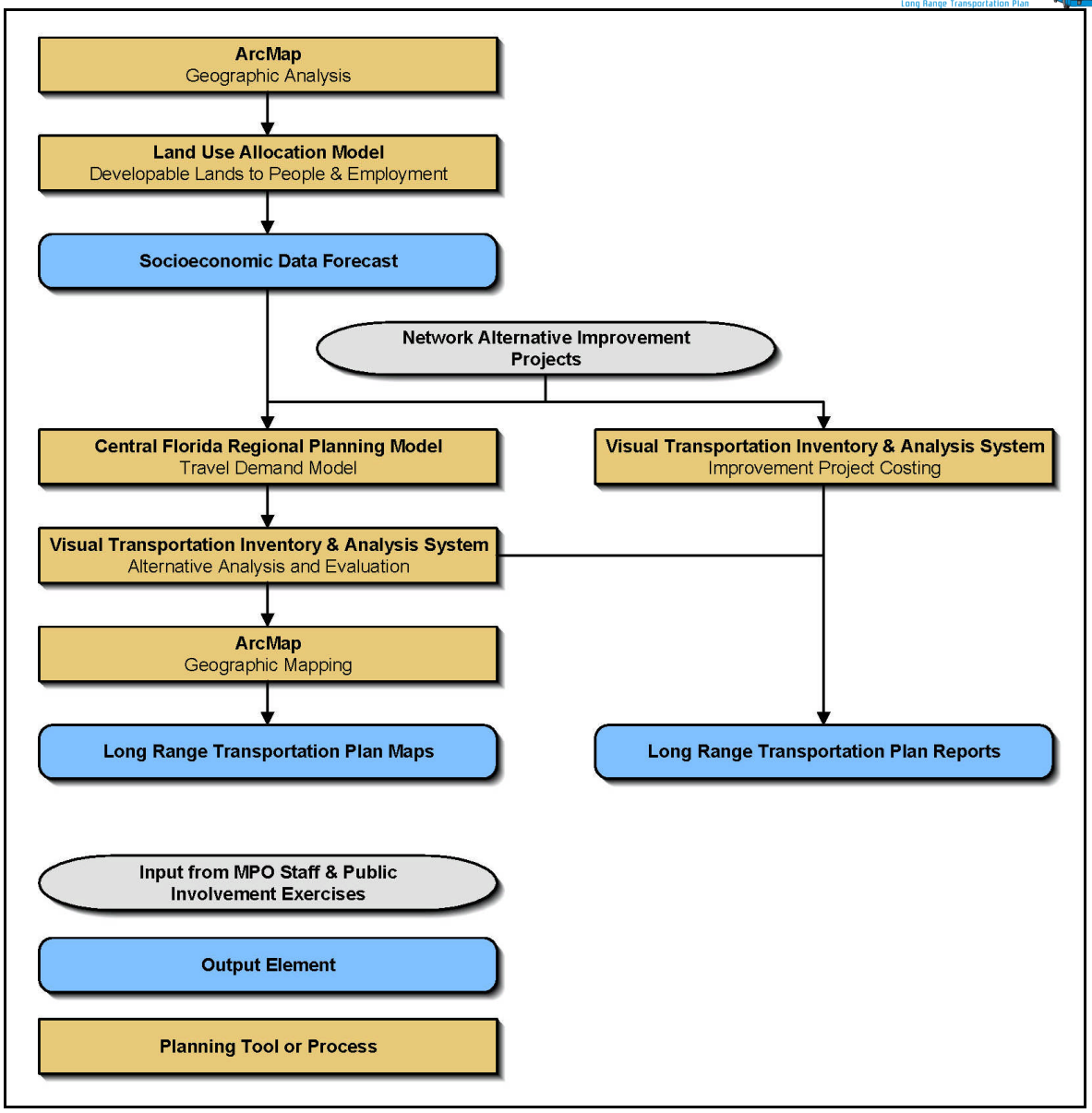


Figure 4-1: LRTP Tools Organization and Process

The Central Florida Regional Planning Model Version 4

The Central Florida Regional Planning Model Version 4 is a district-wide travel demand forecasting model that includes the geographic area that makes up the Florida Department of Transportation, District 5. The model includes the following counties in Central Florida:

- Lake
- Sumter
- Marion
- Orange
- Seminole
- Volusia
- Flagler
- Brevard
- Polk

CFRPM-IV is a Cube-TRANPLAN model, which uses TRANPLAN scripts in the Cube interface. The model was validated for the year 2000, meaning that the volumes forecasted for the year 2000 are within acceptable limits to the actual count volumes from the year 2000 for a sample of the links.

This model was used to forecast travel demands in the year 2025. To forecast these travel demands, the alternative network was coded into the model and the socioeconomic data that the model uses to generate trips was updated to represent forecast 2025 land use data.

The Visual Transportation Inventory Management and Analysis Software

The vTIMAS system is a multi-function application previously developed by Tindale-Oliver & Associates to assist in transportation planning. The vTIMAS system performs the following functions:

- Roadway inventory database management
- Improvement project costing
- Linking and importing model volumes
- Level of Service analysis

These software functions are described in detail below.

Roadway Inventory Database Management

The vTIMAS system manages roadway information at three levels, the Master Road Network level, the Analysis File level, and the Analysis Set level.

The Master Road Network includes data attributes that apply to all analysis years. These attributes do not normally change over time. These attributes include street names, From- and To-limit street names, Florida Intrastate Highway System (FIHS) and Strategic Intermodal System (SIS) designations, and GIS Mapping information.

The Analysis File level includes attributes that could be expected to change from year to year. These values include the number of lanes, road type, annual average daily traffic, and many of the level of service input values.

The Analysis Set level includes special attributes that are used while analyzing base-to-future year scenarios, such as when evaluating an LRTP alternative. The attributes stored at the Analysis Set level include the Raw Model Volume, the Smoothed Volume, the Volume Smoothing Method, as well as information relating to project costs. The Raw Model Volume is the volume that the model forecasts without any adjustments. The Smoothed Volume is a forecasted traffic volume that is adjusted based on the performance of the model in validation year. The method of adjusting the Raw Model Volume is the Smoothing Method. These smoothing methods are discussed in detail in Technical Appendix 4A.

Project Improvement Costing

Part of the vTIMAS System includes functionality to produce estimated project costing. This project costing is based on several user-selectable methods available in the system. The vTIMAS software can calculate the costs for right-of-way, design, construction, and unique costs through calculations based on length, total lane miles, added lane miles, or percent of another cost (such as percent of construction cost). The module also accommodates alternative costing methods such as the use of manual costs. More information on the unit costs applied can be found in Chapter 6 of this report.

Linking and Importing Model Volumes

One of the significant processes in vTIMAS is called FSUTMS Volumes Input, or FVolsIn. The FVolsIn process links the output of a FSUTMS model to vTIMAS and imports the raw model volumes. As part of this process, vTIMAS also applies volume smoothing calculations to the raw model volumes to determine the future-year annual average daily traffic to use for level of service analysis. Volume smoothing involves applying adjustments to raw future year volume forecasts based on the quality of the validation year model estimates compared to the actual counts reported in the field. This volume smoothing process significantly improves the reasonableness of forecasted traffic volumes used for the development of this plan.

The volume smoothing calculations are defined in National Cooperative Highway Research Program (NCHRP) Report #255, and are described in greater detail in Technical Appendix 4A.

Level of Service Analysis

The vTIMAS System was designed to accept inputs and perform generalized and conceptual level of service. The generalized level of service uses the Florida Department of Transportation Generalized Volume Tables to identify the level of service for a roadway segment and facility. The software also has the ability to run conceptual (Art-Plan) level of service analysis; however this type of analysis was not performed as a part of this long range transportation plan. For each the processes that vTIMAS performs, it generates reports that display the data inputs and results of the operation performed. This includes cost reports, level of service reports, volume smoothing reports, and other reports summarizing the data that was used in the vTIMAS system and the results provided from the system. The vTIMAS System can also export data to Microsoft Access, Dbase IV, or Comma-Separated Values to facilitate custom queries to be performed on the data and to allow the data to be used with other software packages.

ArcMap

ArcMap, a Geographic Information Systems software package, was used to create maps and to perform spatial calculations. These calculations include length of segments, area of Traffic Analysis Zones, and intersections of future land use, vacant land, water features, and approved developments to determine the developable land used in the socioeconomic data forecast.

Land Use Allocation Model

The Land Use Allocation Model is a tool developed by Tindale-Oliver & Associates to forecast the development of population and employment throughout a study area. This model uses Microsoft Excel to evaluate using allowable land use densities, land use multipliers, developable land, and activity centers to determine the amount and location of population and employment growth. This model allocates growth based on the gravity model, which calculates an attractiveness of a traffic analysis zone to an activity center based on the size of the activity center divided by the square of the distance from the activity center. The model allows for additions and overrides based on approved developments, proposed developments, or professional judgments and guidance provided by local agency staff.

The developable land is calculated using ArcMap Geographic Information System software and is input into the spreadsheet in future land use categories, which are based on the future land use plan that was used throughout the development of the socioeconomic data. The results of this process are discussed in Chapter 5 of this report.

Conclusion

This chapter begins with a discussion of the base conditions used in the Lake~Sumter Long Range Transportation Plan. This includes the 2000 and 2010 Existing + Committed Networks that were used as a base for modeling and for costing purposes. This chapter also discusses the various tools used through the development of the Plan. These tools include the Central Florida Regional Planning Model, Version 4, the Visual Transportation Inventory Management and Analysis System, ArcMap Geographic Information Systems software, and a Land Use Allocation Model developed in Microsoft Excel. These tools were used to develop, analyze, and display roadway network alternatives.