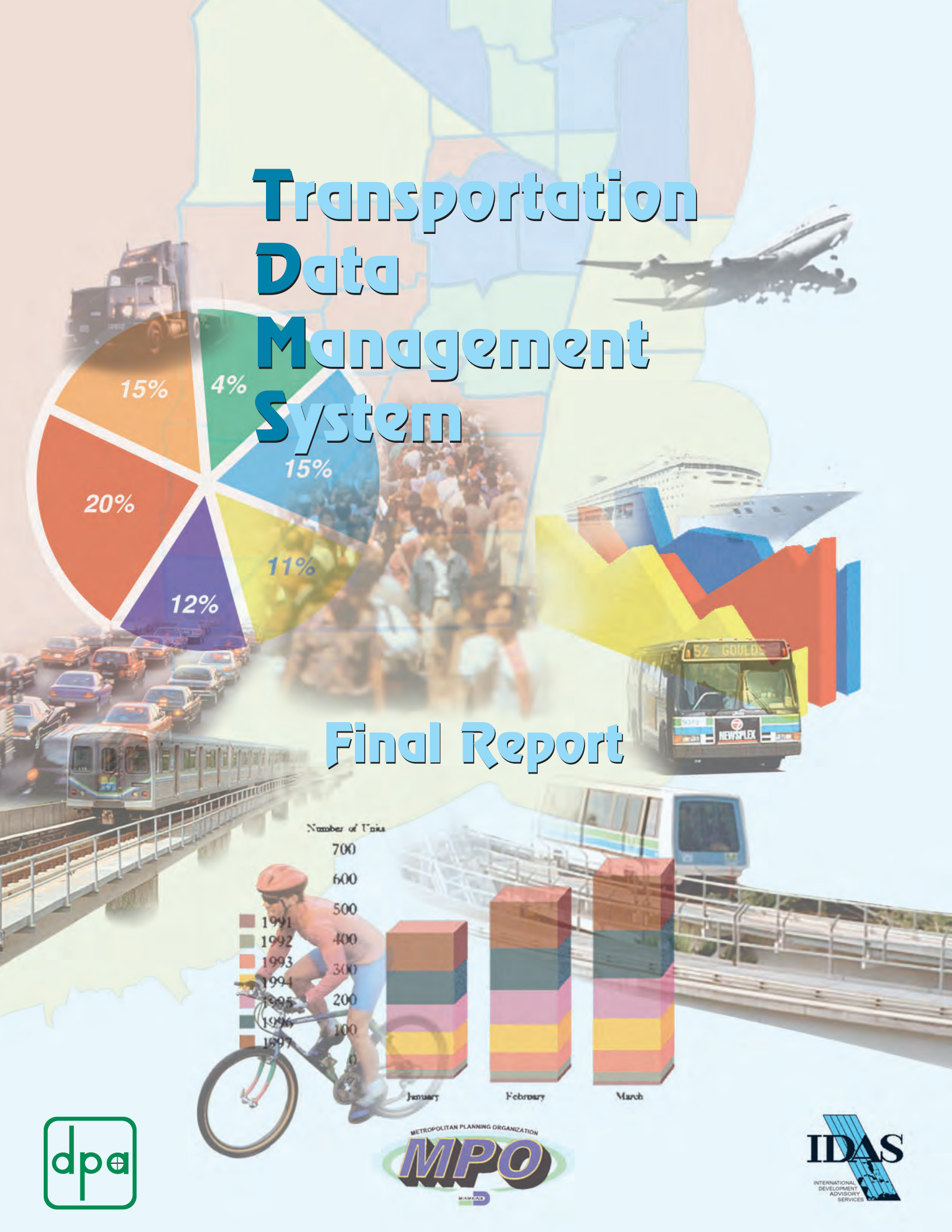
Transportation Data Management System

Final Report



METROPOLITAN PLANNING ORGANIZATION
MPO
MIAMI-DADE

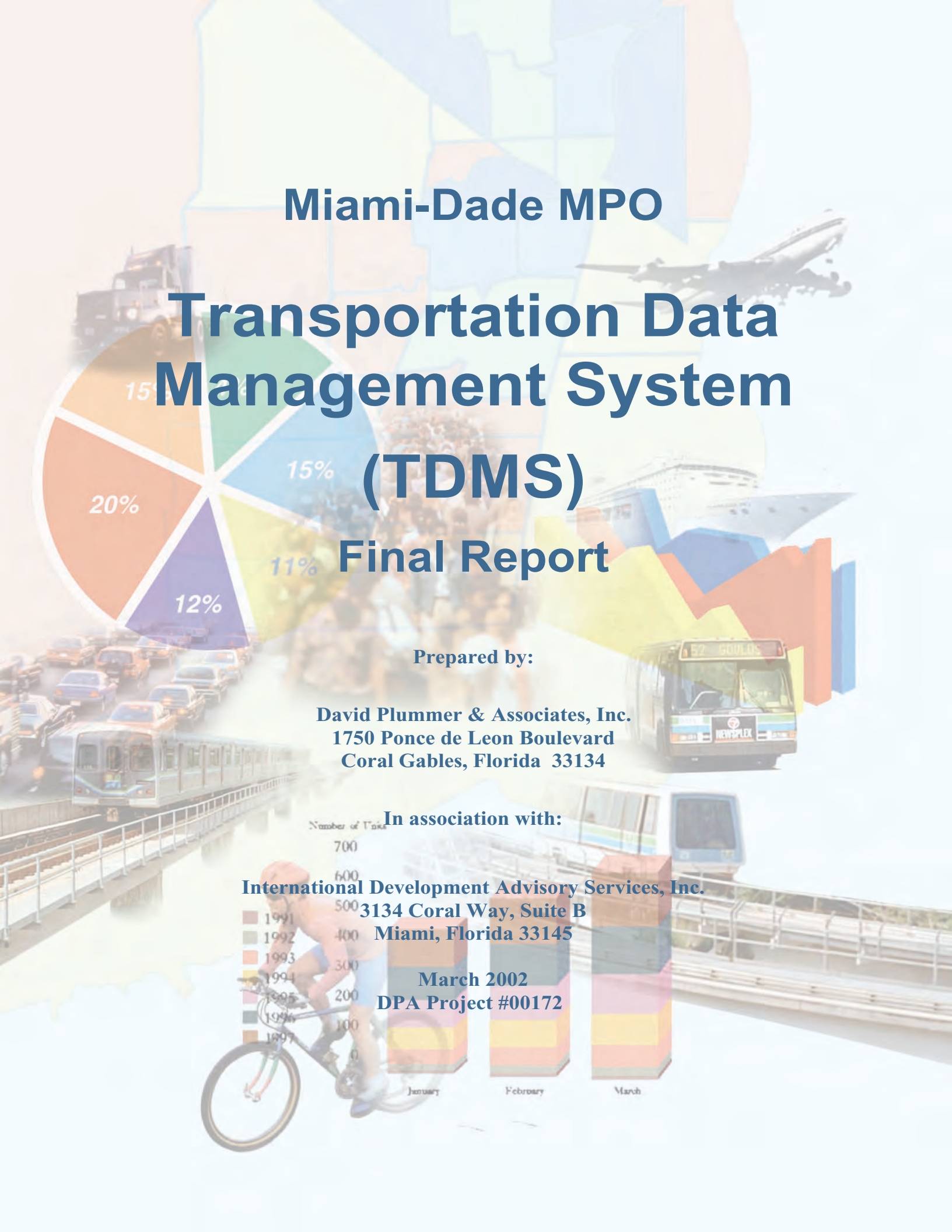
dpa

IDAS
INTERNATIONAL DEVELOPMENT ADVISORY SERVICES

Miami-Dade MPO

Transportation Data Management System (TDMS)

Final Report



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March 2002
DPA Project #00172

Miami-Dade MPO

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1.0 INTRODUCTION

The objective of this project was to develop and implement a flexible, expandable, computer-based electronic database. The database now resides at the Miami-Dade Metropolitan Planning Organization (MPO). The database holds transportation-related information that allows statistical, temporal, and geographic analyses.This data has been assembled into a product called the Transportation Data Management System (TDMS).The system is capable of generating reports in tabular, chart and/or map formats. The information in the system can then be used in reports, handouts, presentation exhibits, electronic presentations, and/or for publishing onto the Internet.

1.1 Background

A disparate array of information in a variety of formats and assorted media were available from numerous locally involved federal, state, and local public and private agencies.Travel demand model input data, and limited output data, were available in other formats. Various efforts are being pursued by other agencies. However, there was no central location capable of making these data available.

1.2 Purpose of This Report

The purpose of this report is to document the research, processes, and implementation details of this project. In addition, documentation which provides more details on several aspects of the system, is available within the report. More information on these other documents is provided in chapter 7.

1.3 Study Coordination

The concept of the Study Advisory Committee was implemented by extracting feedback from a core group of users at the MPO. Meetings with the core advisory group were held to present progress, make suggestions, obtain feedback, and coordinate technical and review efforts.

2.0 NEEDS ANALYSIS

The needs analysis for this project involved several components. The investigation of needs, however, relied heavily in some of the research conducted by the MPO in anticipation of this project. The various components of the needs analysis are described below.

2.1 Other Systems

The research of other similar systems indicated that no other jurisdiction has developed a transportation database system similar to this product neither in scope, nor purpose. Even a previous effort by the MPO, the Integrated Transportation Management System (ITMS), was not as extensive in terms of transportation-related data. The ITMS was developed to address specific requirements of the Integrated System Transportation Efficiency Act (ISTEA) Management Systems. Most of the transportation-related data in the ITMS was reused for this project. However, the TDMS was specifically designed to be a more flexible and powerful in-house quick-response tool which analyzes and prepares data summaries for presentations and reports.

2.2 Potential Users

The target user population of the system will be the staff members of the MPO. The TDMS is specially designed to allow the extraction of information in order to answer questions from public officials. Other agencies may use the system at the MPO offices, provided that the agencies have personnel who are trained in the underlying engine software packages (Access and ArcView), and that the system is available. Alternatively, information requests may be filed with the MPO and will be honored on a first come, first served basis as the MPO staff becomes available to handle such requests.

2.3 Data Needs

The information contents for the system was designed around the user needs.These data needs were identified with the assistance of the MPO and the Study Advisory Committee.Some of the main transportation system components that were considered are:

- Infrastructure
    - Roads
    - Bridges
    - Signs and Signals
    - Sidewalks
    - Bike Facilities
    - Intersections
    - Intermodal Facilities
    - Other
- Socio-Economic Data
    - Area
    - Population
    - Employment
    - Households
    - Income
    - Vehicle Registration
    - Number of Licensed Drivers
    - Other
- Travel Modes
    - Highway
    - Metrobus
    - MetroRail

  - MetroMover
  - Paratransit
  - TriRail
  - AmTrak
  - Jitney
  - Maritime
  - Air
  - Bicycle
  - Pedestrian
  - Other
    - Carpool
    - Vanpool
    - Taxi
    - Freight
- Transportation System
  - Safety
  - Air Quality
  - Fuel Consumption
  - Travel Characteristics
  - Funding

Additionally, certain parameters were also considered to allow for a more precise analysis of the data obtained. For instance:

- Political jurisdiction
- Geographic aggregation/breakdown (Traffic Analysis Zones)
- Census geographic boundaries

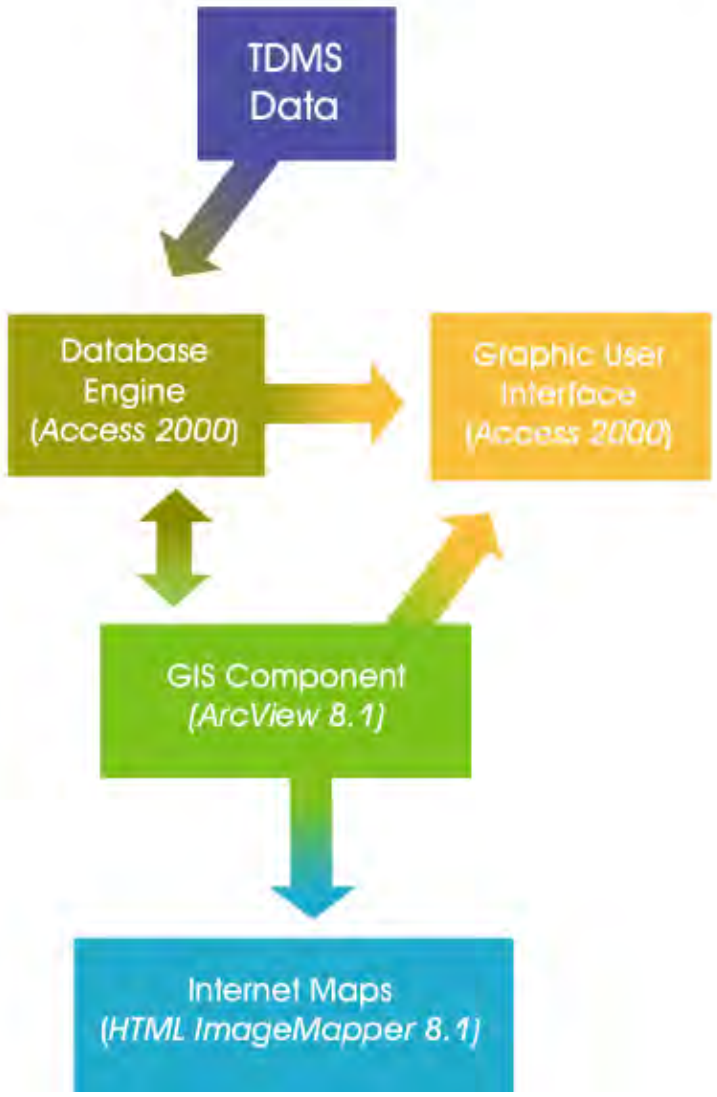
- Time of day/season
- Year (past, present, future)
- Financial period

Given the extensiveness of the transportation system, and the multitude of variables, it was very evident that the initial stage of this project could not incorporate all possible data items in the list. Therefore, each data item was prioritized by the MPO staff that developed the list. The initial stage of this project then set out to locate, secure, test, and install most of the data items classified as first priority. A complete listing of the data items and priories is included in Appendix A.

3.0 DATABASE ELEMENTS AND STRUCTURE

The various components comprising the TDMS can be accessed in three different ways: a) directly through a combination of compatible database and GIS software (See Exhibit 1) b) by a user interface, and c) by an Internet mapping program. The individual components and their relationship are described below.

Exhibit 1
TDMS Components/Relationships



3.1 TDMS Components

The three main components of the TDMS are described below.

3.1.1 GIS Component

The GIS is the primary graphical and visual analysis component of the system. The software providing these capabilities is ArcView 8.1, from The ArcGIS 8 family by Environmental Systems Research Institute (ESRI). This latest version of ArcView is more powerful and

flexible than previous versions. A major improvement is the ability to more readily interface with relational databases such as Microsoft Access. The database holds the data that is then attached to the geographic features available in ArcView.

Selection of this software was driven by factors such as its proven reliability, ease of use, familiarity to a wide range of users, compatibility with most common databases, and compatibility with the available source data as well as other MPO databases. The program is extremely flexible, which makes it an ideal off-the-shelf tool that the MPO can tailor to their specific needs as they change over time. In addition to the initial training that was part of this project, ArcView training and training materials are commonly available from many sources. The ArcGIS family of programs further assures a robust system that can be expanded even further in the future if and when the need arises.

3.1.2 Database Engine

The database software used in the TDM's is Microsoft Access 2000. This program is a relational database that holds the TDMS data. It is fully compatible with ArcView. Access is a member of the Microsoft product line and, as such, it is highly compatible with other Microsoft products such as Excel and Word. Additionally, the program is capable of importing files from other databases and converting them into Access format. Access, although relatively new, is also considered a mainstream program which is very flexible and adaptable to the future needs of the MPO. Extensive training and training materials are also available to the MPO from a multitude of sources for the future training needs after the completion of the project.

The program is compatible with other MPO tools and databases including Visual dBASE. Access, however, is more user-friendly and flexible, has many similarities with Excel, and offers powerful database functions in addition to charting and reporting options. Access is used to store the transportation-related data that can be displayed and analyzed graphically using ArcView.

3.1.3 Internet Mapping

The third component of the TDMS is an Internet mapping application. The software package is known as HTML ImageMapper 8.1 by Alta 4. This software allows the creation of Internet – ready maps directly from the Access and ArcView information contained in the system. While the user can see only the information provided in the map, a series of features make the map user-friendly and somewhat interactive.

3.2 Database Integration and Access

The integration of the GIS and the database components of the system is achieved in two levels. The first level is the intrinsic codependent built-in relationship, between ArcView and Access, by virtue of the GIS's ability to display and manipulate data attached to geographic features. The second level of integration is achieved by means of a Graphic User Interface (GUI) that allows access to the information through a series of screens with buttons. The screens group the information by category and present various options for its use. These levels of integration are described below. (see Exhibit 2)

EXHIBIT 2

TDMS COMPONENT INTEGRATION/ACCESSIBILITY

System Component	Intended User	Data Accessibility
Access/ArcView	Access and ArcView Users	Full Access
Graphic User Interface	Proficient Computer Use	Extensive Access
Internet Maps	Casual Internet User	Limited Access

3.2.1 GIS/Data Integration

The GIS/Database integration will be transparent to most users. In essence, once certain data are set-up on the system, there are layers of information that can be turned-on from the GIS (ArcView) environment. In other words, ArcView already knows the location of the data (as an element of a larger database) and automatically "calls-up" the information onto the corresponding map. Once displayed, a series of functions are available through ArcView. These functions allow the user to display, analyze, print and otherwise use the information in many formats. Direct use of ArcView to access the information does provide access to all the powerful functions built-into the ArcView. However, this method of accessing the data does require a certain level of ArcView and Access knowledge, as well as a proper understanding of the data available and its location.

When any information that is already included in the database is updated, a simple replacement of the database file (or component) is all that is needed to make the information useable inasmuch as ArcView already knows where the information is located and how to display it. When new information is added to the database, the information must first be set-up by creating the layers that define how the data is attached to particular geographic features. This process does take several steps to complete, but is a very common function that quickly becomes an automatic routine.

3.2.2 Graphic User Interface

The Graphic User Interface level integration provides a somewhat less powerful, yet easier, means of accessing the information. The GUI is organized as follows:

Data Store	**Model/Analysis**	**Help**	**Exit**
• *Tables*	• *FDOT D6 Applications*		
• *Maps*	• *ITMS*		
• *Web Enabled Pages*	• *FSUTMS*		
• *Graphics*			
• *Pictures*			
• *Reports*			
• *Presentations*			
• *Main Menu*	• *Main Menu*		
• *Help*	• *Help*		

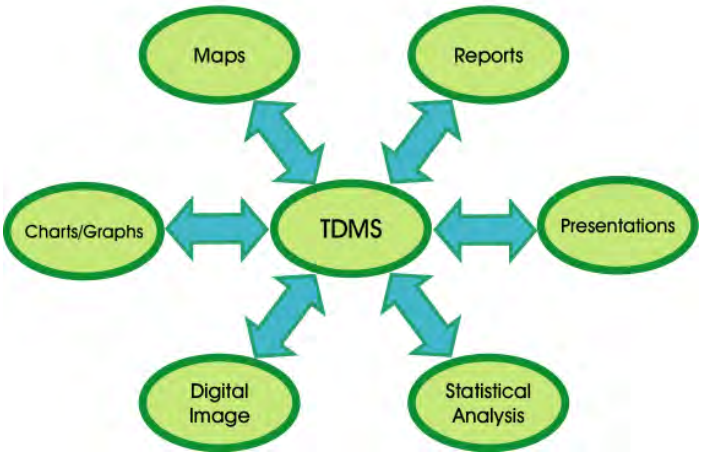
The bold and underlined options are the main menu. The items in italics are submenus under the corresponding main menu items. The Data Store functions are all related to the TDMS. The Model and Analysis module contains transportation data-related applications developed by others. Should the MPO have any concerns about access to these modules, the links activating access to specific applications can be easily removed.

The GUI has been developed within the Access Database using Access. It was created using preset pull down menus with dialog boxes that can be easily modified to add, redirect, or change the information to be extracted. This set-up provides maximum flexibility to MPO staff as available data and needs change in the future.

3.3 System Capabilities

The TDMS has been designed with the specific needs of the MPO in mind. The primary objective is to be able to easily access transportation data and to use the data to answer questions posed by public officials, area residents, and public agency staff. The system is to allow extracting and combining data to create maps and reports portraying the information in an easy-to-understand and attractive format including electronic (PowerPoint) presentations (see Exhibit 3).

Exhibit 3
TDMS Capabilities



The system was assembled from off-the-shelf, mainstream GIS, and database platforms, that ensure multi-level compatibility with multiple data sources. The off-the-shelf components provide the MPO with an unlimited source of training and ease of use by a large number of individuals that are presently using these programs (ArcView and Access) for other purposes.

Additionally, this project incorporated MPO personnel training as an integral part of the system development, set-up and testing. MPO staff, therefore, already have hands-on training on the use of the system. Moreover, training during the system development stage has given MPO staff an insider understanding of how the system is configured and how to make changes to the initial configuration. This deliberate training strategy provides the MPO with unlimited ability to modify the system in the future as the need arises.

Given the extensiveness of the capabilities and the data in the system, only an overview and general descriptions of the system capabilities are provided below. No attempt has been made to provide a complete listing of data or system output options. These will continue to change and grow over time. A complete picture of the system's contents is best obtained by reviewing the system itself. The Training Manual contains examples of how selected products and outputs can be assembled from the information in the system. This assembly process will be needed from time to time as more data is added to the system. Templates for various types of common outputs are already included in the TDMS. Additionally, the original software documentation for both Access and ArcView contain all the information needed to assemble those products as well.

3.3.1 Maps

Maps are considered a basic tool in transportation planning. Maps allow the display of transportation facilities in an easy to understand format. Moreover, maps also allow other information to be displayed in conjunction with, or relative to, transportation facilities.

GIS is a very powerful tool that allows the display of geographically oriented information. In general, information that pertains to specific geographic areas or specific facilities can be shown in maps. The ability of ArcView to display layers of information allows the user to see the specific information of interest. It also allows overlaying different data layers to examine relationships between data in a particular category or across categories such as infrastructure, socio-economic data and travel mode data. Finally, ArcView also allows the user to construct specific queries that extract relationships defined by specific parameters (e.g. Traffic Analysis Zones with more than 50 households, without a car, and income of less than $10,000).

ArcView also allows the creation of map templates that simplify the process of creating maps in a finished form while ensuring consistency in the layout, look, and type of basic information displayed such as legends, north arrow, color selection, titles, logos, etc.

3.3.2 Reports

Report creation, as it relates to the TDMS, refers to the extraction, compilation, formatting and printing of tabular data. The report creation capabilities of the system are those provided by the database software (Access). These capabilities are extensive and quite flexible. Like most word processing software, Access also provides the user with the ability to select page format, font size/style, etc. While text can be added to tables as needed, reports with extensive text are best handled by exporting the database report into a word processing package such as MS Word and combining the tables with the needed text. Access also allows the creation of templates and/or specific default formats that simplify the creation of reports while maintaining common elements constant for consistency.

3.3.3 Charts/Graphs

The database program, Access, also has powerful capabilities when it comes to 'business graphics". This category of graphics refers primarily to bar charts, line graphs and pie charts. Data extracted from the system can be directly used to generate these types of charts as needed. Templates again are used to provide consistency. A series of sample charts are already part of the system. Examples in various formats abound. Only data availability limits the number and type of charts that can be created in the future. Incidentally, Access also allows the creation of charts on 3 Dimensional (3D) format for added visual impact. Finally, ArcView also has capabilities for creating charts that can be integrated with maps as needed.

3.3.4 Presentations

One of the objectives of the TDMS is to extract information and analysis that can be used in presentations. The MPO already uses MS PowerPoint on a regular basis, using the necessary projection equipment, to make presentations to various groups and the committees that participate in the county's transportation planning process.

The TDMS acts as both a depository for PowerPoint presentations and as a tool to help in the assembly of new presentations. Standard maps and tables available from the system can be easily incorporated into PowerPoint presentations as need by exporting them as graphic format files (e.g. jpg). As data is updated in the future, the updated materials can be used to keep the presentations up-to-date. These presentations can address specific issues or can look at information at a given point in time, as well as historically, within the available data in the system. Other products contained in the system (such as images from the image bank) further help to complement and provide finishing touches and/or expand beyond the information on the maps and tables.

3.3.5 Digital Images

Nowadays images are an integral part of reports and presentations. Graphics in different formats not only help make information more clear and understandable, but they are expected by most audiences. Images give both reports and presentations more impact and make them both more attractive and easier to remember.

Images can be created, converted and stored in various formats, depending on the source. While many images may be available in electronic format from other sources, the MPO at times needs to create certain images from scratch. The MPO has software that can be used to generate some images such as charts. Other images can be created using drawing programs such as Corel Illustrator. There is also, at times, the need to replicate or reproduce images. The MPO has hardware (a scanner) that allows them to copy images from paper and generate an electronic file.

Finally, the MPO also has a digital camera that will create an electronic file of any image that can be captured as a picture.

The Digital Images portion of TDMS is a bank for the storage of images. The possible applications of this image bank are limitless. The images may include: pictures of transportation facilities, locations, or people; flowcharts; business charts; schedule charts; general illustrations; report covers; logos; etc. This bank already contains a number of images that can be supplemented with others as the need arises. The "Digital Images" directory is intended as a central depository of images that can be used on a regular basis in the future. For simplicity, the bank is organized in several categories by subject. Within those categories, however, the images should be stored in only a few formats such as a general image format like "jpg" and an Internet compatible format such as "html".

3.3.6 Internet Maps

The system also includes a mapping application for the Internet. The software package ImageMapper has been included in the TDMS to allow the MPO to prepare Internet ready maps for posting at their web site. The application creates a somewhat interactive map that can be accessed by Internet users. In essence, a specific map set up in GIS (which may include several data layers) can be turned into an html file. Once posted, the user can view the map, zoom in/out and/or pan, or turn specific layers on or off as needed.

The program can make portions of the database readily accessible to the general public. The end product is easy to use and versatile enough to let the user find and look at (or print) the information relevant to him or her within a specific area of interest in the county.Maps posted without this application are not easy to use because of their size and limited zoom-in capabilities.

3.3.7 Statistical Analysis

A traditional and logical use of databases is to analyze the data and reduce it to meaningful, easy-to-understand facts, and/or to determine whether there are relationships between various elements of the database.Statistical analysis of the information, therefore, is a convenient tool to have whenever large databases need to be analyzed. Access per se, does not have statistical analysis functions and tools to facilitate this analysis. Microsoft Excel, however, does have a variety of statistical analysis functions and is compatible with Access databases.

Excel allows extraction of simple statistics such as sums, averages, standard deviations, maximums/minimums, etc. It also provides for the plotting of the data and fitting a line describing the relationship between two datasets (linear trend analysis). Additional statistics about the resulting linear regression and the data relationships are also available. Graphical representation of the fitted line is possible as well.

3.4 Ease of Use

The system has been designed for ease of use by two different types of users: a) the occasional user (or the user that needs to access only certain recurring type of information), and b) the frequent user that needs access to the entire database and needs to manipulate the data and/or extract specific information, analysis, etc. While the TDMS is a single system, access to the information is achieved through the core software (Access and ArcView), or through a Graphic User Interface (GUI).

The most simple method to access most of the system information is by using the Graphic User Interface screens. This method is ideal for the occasional user that simply wants to gain access, use, and print the most common information (reports and/or maps) that is stored in the system. Examples of this data may be specific socio-economic data, such as population by Traffic

Analysis Zones (TAZ). In this case, the user does not want nor need to go beyond those simple requests.Therefore, the GUI provides quick, direct, and simple access to certain information.

The second method, while not as straightforward as the GUI, is still relatively easy provided that the user is familiar with Access and ArcView. During the development of the system, MPO personnel was trained in the use of these programs. Therefore, at project completion, the MPO was fully capable of operating the system in its entirety. These capabilities include: importing/updating data; data input, extraction and manipulation; data analysis; preparation of maps and reports; etc. The ease of use comes from the intrinsic features of the core software, as well as the intentional design/structure of the system. Both programs are windows-based, providing uniformity and familiarity with the most common functions for any windows user. Additionally, both programs are fully compatible with each other. Finally, due to ArcView's dependency on the data managed by Access, moving between the programs is essentially seamless. Output from the system, whether in hardcopy form or electronic, is also possible using standard formats compatible with the MPO printers and plotters as well as other personal computers.

3.5 Data Input/Accessibility

While the system holds a variety of information and data, the bulk of the information is in the form of: a) tabular information in (mostly numeric) database format, and b) geographic relationships information in the form of maps and/or coordinate location relationships (shape files, layers, etc.). The data is directly accessible through the corresponding software (Access for database and ArcView for geographic data). ArcView also allows direct access to the data base information. Furthermore, the programs allow importing data from other sources and, to a certain degree, to convert data from other software packages including GIS and database programs. In some cases, information in spreadsheet and/or word processing format may be converted and reused too.

The core software also allows editing and manipulating the data as needed. Additionally, the information can be exported for use by others outside the MPO as needed.

3.6 Relationship to Existing Databases

Development of the TDMS was predicated on the availability and reuse of existing data. No original data was created or gathered for this project. The information contained in the TDMS is a compilation of information from various sources. As such, the TDMS data is the same as (a copy of) the original data. The original data resides within the corresponding data source. The source may be the MPO (for a few items), other Miami-Dade County Departments, or other independent agencies such as the Florida Department of Transportation (FDOT). All relevant databases residing at the MPO (including all the data from, and the Integrated Transportation Management System- ITMS - in its entirety) are contained within the TDMS.

The TDMS is not intended to replace the original source or to modify the development; updating or use of the information complied and managed by those sources. Instead, the TDMS is a tool that the MPO uses to centralize and have immediate access to all this information. The information allows the MPO to answer questions and respond to requests for information, as well as being able to utilize the information for their day-to-day transportation planning functions. By keeping the original data intact, while reusing it in the TDMS, the system is fully compatible with the various data sources. This compatibility will remain constant into the future as the databases are updated by the corresponding agencies and departments.

3.7 Expandability

The TDMS is easily expandable. The only limitation is the availability of storage space for the data. The computer hosting the system, however, was purchased with that potential limitation in mind.At project completion, the majority of the hard disk storage was still available to receive a

lot more data. Even with the addition of graphic image files, which are traditionally large and storage intensive, the available space would last months, if not years. However, should storage become a problem in the future, additional hard drives can be added to expand the storage capacity by a factor of two, three or more, if needed. From the practical standpoint, given the rapid current hardware advancements and cost trends, it may be more cost-effective to replace the computer than to upgrade it by adding more storage capacity. Hardware replacement, if chosen, will avail the MPO with the latest technology and improvement in processing speed at a reasonable cost.

System expandability can take the form of additional data or additional applications. More data elements can be added to each of the data categories. Historical data can also be supplemented as new, more recent data, is added to replace outdated information (e.g. traffic counts by year, past population trends, etc.). Additional data categories can be created (e.g. county properties, tourist destinations, etc.). Finally, other data-driven applications can be added to the system. The advantage of adding applications such as the planned Visual TIP, is that the data from those applications would be fully integrated and directly available to the users of the TDMS to further expand the capabilities of the system without interfering with the operation and functions of such applications. Selected samples of output from the TDMS are included in Appendix C.

4.0 SYSTEM DEVELOPMENT

The concept and specifications described above were combined to create a system capable of performing as required by the MPO. All the components were brought together as a cohesive, consistent and fully integrated package that is both powerful and easy to use.

4.1 Hardware

The main specifications for the primary computer hardware are listed below.

- Operating System: Windows 2000
- Processor/Speed: Pentium 4 / 1.5 Ghz
- Memory (RAM): 384 MB
- Storage: 80 GB
- Graphics Card: 64 MB
- CD ROM Drive: 48X (1)
- CD ROM Writer: 32X (1)
- Software: MS Office Pro XP
- Monitor 21 inches, 24 Aperture Grill Pitch

The Central Processing Unit (CPU) selected was a Dell Dimension 8100 Series model. Additional hardware that complements the various functions of the system includes a scanner, an LCD projector and a digital camera.

The computer was used during system development to ensure proper installation of all the peripheral hardware, software and data. This approach provided ample opportunity for testing the system in its entirety to further assure the MPO that the system was fully operational at project

completing when the system was turned over to the MPO.The hardware was also used for the continuous hands-on training of MPO personnel. The training, therefore, was done under the exact same setup that the system will have at project completion.

4.2 Software

This project included the acquisition of original licenses for the core software that comprise the system. These programs include a database package, a GIS package and an Internet mapping application as follows:

- Database Package: Microsoft Access 2000 (software bundled with computer)
- GIS Package: ESRI ArcView 8.1
- Internet Mapping Application: Alta4 ImageMapper 8.1

All the software was installed in the system computer and fully tested prior to delivering the computer/software system package to the MPO.

4.3 Input /Output

All the readily available data, in the appropriate format, has already been loaded into the system from multiple sources. The information resides in the computer's hard drive. Future data, new and/or updated, can be input through a variety of conventional media such as floppy disc, CDs, as well as through the computer's communications port. The port provides direct access to other computers at the MPO, the Miami-Dade Intranet and the Internet. Additionally, images can be imported into the computer from the scanner and the digital camera via USB ports.

Output from the system can be generated and stored back onto any of the same media mentioned above except onto the scanner (which is strictly an input peripheral device). Even the digital camera can be used for indirect output by taking pictures of output generated through the

computer screen. Additionally, paper output can be generated using the color and/or black and white printers and plotters already available at the MPO. The system software packages also have certain degree of flexibility with the format of input and output files. In some cases, the format of some files may be converted to another format.

5.0 IMPLEMENTATION

System implementation includes a series of tasks and actions undertaken during the system development and completion as well as MPO actions following acceptance of the product.

5.1 Testing

This project was undertaken using a concept similar to a "turnkey" project. The hardware and software, although "off-the-shelf" products, were specifically acquired and set up for the TDMS. The database loading, organization, templates, features and interfaces were all developed using the resident computer and software. Therefore, the product testing lasted the entire duration of the project development stage. The MPO staff had direct hands-on involvement in portions of the system development. Therefore, MPO staff participated in the system testing before delivery. Additionally, MPO staff hands-on training provided more testing opportunities for the MPO. A final battery of system tests was also completed during the final product development stage prior to delivery and then again when the system was delivered to the MPO offices. In summary, the system was thoroughly tested several times and is performing as expected in all aspects.

5.2 Location /Connectivity

The TDMS computer was installed at the MPO offices and is directly connected to the MPO Local Area Network (LAN). This LAN, in turn, is connected to the Miami-Dade Intranet network. For security purposes, the computer was set-up not to share the information in the hard drive. The purpose of this setup is to avoid accidental partial or full deletion of the system database. This setup can be easily changed at any time to allow access from other MPO LAN terminals and/or the intranet network if this was needed in the future. Additionally, access from other computers outside the county system may be possible. However, the desirability of such arrangements should be carefully considered by the MPO, and if implemented, very strict

security and firewall measures should be instituted. Allowing external access to the data is somewhat more complex to set-up and would likely involve other county departments including the county's Information Technology Department (ITD).

5.3 Access/Security

The data contained in the TDMS is all public data. There is no need to keep any portion of it confidential. System access, however, has been initially limited as described in the previous section. The purpose of this limited access is to prevent accidental deletion of files.

The computer setup preventing sharing of the data in the hard drive is a simple security procedure. Access to the data can be gained through the terminal itself using a windows password for each user. The Windows 2000 operating system allows different users to gain access to selected drives in the computer and/or the LAN. The effectives of such security measures, however, lies in the strict observance of conventional data security procedures such as: setting-up user names with individual passwords, keeping passwords secret, and users logging on and off when not at the computer, etc. The MPO should determine the degree of security that they will demand and enforce for the TDMS as well as other terminals on the LAN. Additionally, countywide security procedures may need to be observed and office-level computer access and security measure should be compatible with the county's.

5.4 Data Back-ups

No level of data access security can prevent hardware failure. Unfortunately, mechanical equipment can malfunction and hard drives are no exception. Hard drive failure without a complete and up-to-date data back-up can result in the loss of all or part of the data. Retrieval of data from failing hard drives is possible in some cases but it is usually difficult and/or expensive sometimes requiring special expertise, software and/or hardware. Backing-up data is essential

with any amount of data that is worth keeping in the first place. Data back-ups provide certain level of protection against hard drive failure and accidental data deletion, as back-ups allow restoring the data to an earlier (hopefully fairly recent) version of the information. Backing-up should be conventional practice for any computer user regardless of the purpose of the data and the MPO should be following their own back-up procedures even before the delivery of the TDMS. However, when the amount of data is large, back-ups can get more complex.

Large amounts of data are best backed-up automatically, on a regular basis (such as daily), or ideally at night when the system is not in use. Automatic back-ups require back-up software. The media for automatic back-ups can be on magnetic tape, (which is slow and tedious to retrieve when needed), or another hard drive (a physically separate piece of hardware). The second hard drive can be another internal drive in the same computer, an external drive connected to the TDMS computer or a shared drive in another computer at the MPO office (connected through the LAN).

For purposes of initial system setup at the MPO this study recommends regular (not less than weekly) manual back-ups onto re-writeable CDs or onto the hard drive of another MPO computer using the LAN connection. This method is consistent with current MPO back-up procedures. In the future, the MPO may want to simplify the back-ups by purchasing and installing automatic back-up software and an external hard drive for the TDMS computer. An external drive provides the added advantage of making the data easily portable in case it needs to be shared with other agencies beyond the reach of the MPO LAN and the county intranet network.

The TDMS was delivered with a data back-up in the form of re-writeable CDs. The consultant also kept a copy of the same back-up for further redundancy. These initial back-ups, of course,

will be outdated as soon as the data and setups are updated as part the normal use of the system by the MPO. Instructions for backing-up the data are part of the Training Manual.

5.5 Data Updates

The key to the continued use and effectiveness of the data in the system lies with the degree to which the data remains current. There is great value in having access to and using historical data for comparative purposes. However, historical data is not as useful if it cannot be compared to present conditions because current data is not available.

This project searched for the most recently available data and included it in the TDMS. Over time, much of this information will be outdated and will become historical data that can be used in that fashion when needed. Great care should be taken in order to keep the old data when new data is obtained. First, the cataloging of information by year, with readily identifiable labels is critical for quick and efficient use. Second, when importing and saving new data, the renaming of incoming files should be considered to avoid accidentally replacing (erasing) previous versions of the same information.

Finally, data upkeep, in a sense, is a full time job. The MPO purposefully relies on data updates from other departments and agencies, therefore, constant monitoring of updates by those parties is crucial. Typically, each agency has its own internal production schedule for its various functions. A lot of the data in the TDMS is updated annually by the corresponding group. One effective way of keeping track of the new data is for the MPO to develop an internal data update schedule. All data files should have a regular update schedule, which depending on the level of protocol desired by the MPO, would involve either informal phone calls, e-mail, or formal correspondence requests around the time when the data updates are completed by the source agency.

From the standpoint of the MPO, after understanding the frequency of update of that various data files, the MPO data update schedule would consist of lists of files that need to be updated each month. Therefore, every month, a number of file updates would be requested, received from the appropriate agencies and immediately uploaded onto the TDMS. Previous versions of the same files would then be automatically archived as historical data. This cycle would be repeated every year to ensure that data updates from each agency are secured at least once a year. Higher or lower frequencies may be appropriate for certain data files. A list of the data files and their agency source is included in Appendix B.

6.0 SYSTEM SUPPORT

This project included extensive hands-on training of MPO personnel. Over time, however, additional training may be needed to keep up with changes in technology and/or personnel. Also, specialized support may be necessary for major system updates, and/or troubleshooting of future problems caused by changes in the system and/or MPO needs.

6.1 Training

The training provided as part of this project was extensive. The training took two different forms: a) continuous hands-on training of MPO staff throughout the system development stage, and b) two half-day product orientation/hands-on demonstration sessions at project completion. The training provided the MPO staff with an overview of the system capabilities, the system features, and instruction in the use of the software packages that drive the system, the structure, the use, and procedures for updating the system's information. Additionally, a training manual was also developed to aid in the training of other MPO staff that may get involved with the TDMS in the future. The training manual, however, specifically addresses the features of the TDMS. The MPO may want to consider general training on Access and/or ArcView for other staff as needed. IDAS (the primary subconsultant on this project) is an authorized and certified trainer for ArcView and other ESRI products.

6.2 Routine Support

The level of training provided in this project was sufficient to allow the MPO to use the system within the parameters that it was created for. From time to time, however, the MPO may want to expand on the utilization and/or may run into special circumstances where technical assistance may be needed. The MPO may want to consider keeping the consultant team available to address

routine support issues that may surface occasionally. The best vehicle to effect this assistance is to extend and/or renew the current Technical Studies Program Support contract with the consultants.

6.3 Maintenance

System maintenance refers to both keeping the system running smoothly as well as major updates that may be needed from time to time. MPO staff is trained to handle most of the routine maintenance. However, major system overhauls, updates, or changes may be more effectively carried out by the consultant's team. This type of assistance may also be needed when other priorities prevent the MPO staff from performing the needed maintenance or when the amount of staff needed and/or the deadline are critical factors. An extension of the Technical Studies Program Support contract would also be the best vehicle to handle the occasional system maintenance needs that may develop in the future if the MPO needed assistance with these tasks.

7.0 OTHER DOCUMENTATION

In addition to the TDMS software application, this project included several levels of documentation of the work done and the tools needed to keep operating the system after completion and installation. The primary documentation generated by this study is described below.

7.1 Database Documentation

The most direct and effective way to provide documentation about the database is within the database itself. ArcView has a function called Metadata that allows the user to include relevant information about the data. This function allows both the data and the documentation to remain connected to each other. As the data is modified and/or updated, however, the metadata definition must be updated accordingly.

Another convenient feature included in the TDMS is a user-friendly data documentation summary accessible through the Graphic User Interface. The data documentation in this module is created by exporting an Internet-compatible (html) output file directly from ArcView. The address (location) of the file is then keyed into the GUI along with the corresponding maps and tables generated from the same data. Creation of this file must be done manually and requires the user to create it as a new file whenever new data is added to the system. Upon updating any data component in the system, the corresponding html file must also be updated replacing its previous version.The entire file is created directly from (a copy of) the aforementioned metadata definition in ArcView, therefore, there is no need to reenter the information and consequently, the definitions in both ArcView and the GUI remain identical.

7.2 Training Manual

The Training Manual is intended as a tool that the MPO can use to ensure that new staff can get familiar with the system, its operation, organization, and the routine tasks that are needed to continue using the system efficiently. The emphasis of the manual is on the TDMS itself. No attempt was made to include training directly related to either the database software (Access), nor the GIS software (ArcView) or the Internet Mapping Application (ImageMapper). Extensive documentation and training tools have been developed by the software developers and third parties for both Access and ArcView. Additionally, there are numerous training courses sponsored by both authorized dealers of these software packages as well as third parties. Finally, a full users manual for ImageMapper was delivered to the MPO with the TDM's software and hardware.

7.3 Executive Summary

The executive summary is a short, simplified, non-technical document intended to provide an overview of the project and its products, especially the TDMS application. The document will be used for wide distribution to interested parties including the various MPO committees. Both the Executive Summary and (this) the Final Report have been prepared in a Portable Document Format (PDF) format for the MPO to upload onto their web site to ensure wide availability and to simplify distribution.

7.4 PowerPoint Presentation

In addition to the technical documentation (the Final Report and the Training Manual) and the Executive Summary, a PowerPoint Presentation of the study was prepared. The presentation is intended for the MPO technical committees that have been following the development of the product. The MPO can also use the presentation for other interested parties including both

technical and non-technical groups. The presentation has been incorporated into the TDMS itself. The system includes several PowerPoint presentations related to transportation topics and data. The library of presentations represents a centralized location where the MPO can keep both previous and future transportation-related presentations ready to use as needed.

Appendix A

High Priority Transportation Data

Transportation Data Management System
High Priority Data Listing
Appendix A
June 18, 2001

DATABASE ELEMENTS		AREAS/DISTRICTS														PERIOD/TIME FRAME																	
		Political				Transportation				Census					Others	Daily							Specific Years					Projections				Financial		
C. INFRASTRUCTURE	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (___)
1. ROADS																																	
a. Network																																	
I. FDOT/State System (ncl. MDX,FIHS,US...)	1	1	1	2				2	1						2												1				1			
ii. County System	1	1	1	2				2	1						2												1				1			
b. Roadways Related Data																																	
I. Lane miles	1	1	1	2					1																		1				1			
ii. Centerline miles	1	1	1	2					1																		1				1	3		
iv. Functional classification	1	1	1	2																							1				1			
v. Capacity (by segment)	1	1	2	2					1						3												1				1			
viii. Bike lanes/paths	1	1	1	2	2				2						2												1				1			
3. Signs and Signals																																	
a. Type																																	
I. Traffic signal-on county computer network	1	1	1	2					2																		1							
ii. Traffic signal-not on net	1	1	1	2					2																		1							
b. Location	1	1	2	3					2																		1							
5. BIKE FACILITIES																																	
a. Bike Paths																																	
I. Miles	1	1	1						2						2 2												1				1	3		
iv. Location	1	2	3						3						2 3												1							
b. Bike Lanes (same) (same as ii-iv)	1																										1							
c. Off-road facilities/trails	1	2	3																								1							
7. INTERMODAL FACILITIES																																	
a. Location	1				1																						1				1			

DATABASE ELEMENTS		AREAS/DISTRICTS														PERIOD/TIME FRAME																	
		Political				Transportation				Census					Others	Daily							Specific Years					Projections				Financial		
D. SOCIOECONOMIC DATA	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis. Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (___)
1. AREA (Sq.miles)	1	1	1	2											3												1				1			
2. POPULATION																																		
a. Total	1	1	1	2											3								1	1	1	1	1	1	1	1	1			
3. EMPLOYMENT																																		
a. Total	1	1	1	2											3								1	1	1	1	1	1	1	1	1			
4. HOUSEHOLD																																		
a. Total	1	1	1	2											3								1	1	1	1	1	1	1	1	1			
5. INCOME																																		
a. Total	1	1	1	2											3								1	1	1	1	1	1	1	1	1			
6. VEHICLE REGISTRATION																																		
a. By Classification	1	1	1	2											3								1	1	1	1	1	1	1	1	1			
7. NUMBER OF LICENSED DRIVERS																																		
a. Total	1	1	1	2											3								1	1	1	1	1	1	1	1	1			
8. OTHER (Specify)																																		

DATABASE ELEMENTS		AREAS/DISTRICTS														PERIOD/TIME FRAME																	
		Political				Transportation				Census					Others	Daily							Specific Years					Projections				Financial		
E. TRAVEL MODE	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis. Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (____)
b. Roadway Capacity																																	
I. Total	1	1	1	2					1						3												1				1		
ii. By Facility	1	1	1	2					1						3												1				1		
c. Average Estimated Daily VMT																																	
I. Total	1	1	1	2					1						2							2	1	1	1	1	1	1	1	1	1		
d. Average Estimated Daily VHT																																	
I. Total	1	1	1	2					1						2							2	1	1	1	1	1	1	1	1	1		
e. Average Estimated Auto Speed																																	
I. Total	1	1	1	2					1						2				1			2	1	1	1	1	1	1	1	1	1		
f. Ave. Estimated Travel Time/Travel Distance																																	
I. Total	1	1	1	2					1						2				1			2	1	1	1	1	1	1	1	1	1		
l. Ave. Est. Travel Delay	1	1	1	2					1						2		2	2	1			2	1	1	1	1	1	1	1	1	1		
j. Average Daily Traffic (traffic counts)	1	1	1	2					1						2		2	2	1			1	1	1	1	1	1	1	1	1	1		
k. State & County Roads																																	
I. I-95	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
iv. Florida Turnpike (HEFT)	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
v. SR 112	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
vi. SR 826 (Palmetto Expressway)	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
vii. SR 836 (Dolphin Expressway)	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
ix. US1	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
x. 27th Avenue	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
xiii. Okechobee Road	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
xv. Flagler Street	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		
xviii Kendall Drive	1				1				1								2	2	1			1	1	1	1	1	1	2	2	2	2		

DATABASE ELEMENTS		AREAS/DISTRICTS															PERIOD/TIME FRAME																		
		Political				Transportation				Census					Others		Daily							Specific Years					Projections				Financial		
E. TRAVEL MODE (PUBLIC TRANSIT)	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis. Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (___)
a. METROBUS																																		
I. Number of routes	1	1	2	3											3								1	1	1	1	1							
ii. Mileage																																		
Total and Service	1	1	2	3											3		2	2	1			1	1	1	1	1	1							
By Route	1	1	2	3											3		2	2	1			1	1	1	1	1	1							
iii. No. of vehicles by classification	1	1																					1	1	1	1	1							
iv. Average Estimated Ridership																																		
Annual	1	1	2	3											3		2	2	1			1	1	1	1	1	1	2	2	2	2			
By Route	1	1	2	3											3		2	2	1			1	1	1	1	1	1	2	2	2	2			
v. Average Estimated Vehicle Miles																																		
Annual	1	1	2	3											3		2	2	1			1	1	1	1	1	1	2	2	2	2			
By Route	1	1	2	3											3		2	2	1			1	1	1	1	1	1	2	2	2	2			
x. Cost																																		
Total	1	1																					1	1	1	1	1	2	2	2	2	1		
Operating	1	1																					1	1	1	1	1					1		
Capital	1	1																					1	1	1	1	1					1		
Maintenance	1	1																					1	1	1	1	1					1		

DATABASE ELEMENTS		AREAS/DISTRICTS														PERIOD/TIME FRAME																	
		Political				Transportation				Census					Others	Daily							Specific Years					Projections				Financial		
E. TRAVEL MODE (PUBLIC TRANSIT)	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis. Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (___)
b. METRORAIL																																	
I. Number of routes	1	1																								1				2			
ii. Mileage																																	
Total and Service	1	1															2	2	1			1					1				2			
iv. Average Estimated Ridership																																	
Annual	1	1															2	2	1			1	1	1	1	1	1				2			
By Station	1	1																															
v. Average Estimated Vehicle Miles																																	
Annual	1	1															2	2	1			1											
By Route																																	
viii Average Speed	1	1															2	2	1								1						
ix. Average Passengers per mile	1	1															2	2	1								1						
x. Cost																																	
Total	1	1																					1	1	1	1	1	2	2	2	2			
Operating	1	1																					1	1	1	1	1	2	2	2	2			
Capital	1	1																					1	1	1	1	1	2	2	2	2			
Maintenance	1	1																					1	1	1	1	1	2	2	2	2			
c. METROMOVER																																	
I. Number of routes	1	1																									1						
ii. Mileage																																	
Total and Service	1	1															2	2	1			1					1				2		
iv. Average Estimated Ridership																																	
Annual	1	1															2	2	1			1	1	1	1	1	1				2		
By Station	1	1																															
v. Average Estimated Vehicle Miles																																	
Annual	1	1															2	2	1			1											
By Route																																	
viii Average Speed	1	1															2	2	1								1						
ix. Average Passengers per mile	1	1															2	2	1								1						
x. Cost																																	
Total	1	1																					1	1	1	1	1	2	2	2	2		
Operating	1	1																					1	1	1	1	1	2	2	2	2		
Capital	1	1																					1	1	1	1	1	2	2	2	2		
Maintenance	1	1																					1	1	1	1	1	2	2	2	2		

DATABASE ELEMENTS		AREAS/DISTRICTS														PERIOD/TIME FRAME																
		Political				Transportation				Census					Others	Daily							Specific Years					Projections				Financial		
E. TRAVEL MODE (PUBLIC TRANSIT)	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis. Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (___)
d. PARATRANSIT																																
l. Number of routes	1	1	2												3																	
ii. Mileage																																
Total and Service	1	1	2												3				1			1	1	1	1	1	1	2	2	2	2			
iv. Average Estimated Ridership																																
Annual	1	1	2												3				1			1	1	1	1	1	1	2	2	2	2			
v. Average Estimated Vehicle Miles																																
Annual	1	1	2												3				1			1	1	1	1	1	1	2	2	2	2			
vii. Fare System	1	1																														
ix. Average Passengers per mile	1	1																	2			2											
x. Cost																																
Total	1																						1	1	1	1	1	2	2	2	2			
Operating	1																						1	1	1	1	1	2	2	2	2			
Capital	1																						1	1	1	1	1	2	2	2	2			
Maintenance	1																						1	1	1	1	1	2	2	2	2			

DATABASE ELEMENTS	PRIORITY RATING	AREAS/DISTRICTS														PERIOD/TIME FRAME															
		Political				Transportation				Census					Others	Daily							Specific Years					Projections				Financial		
E. TRAVEL MODE (PUBLIC TRANSIT)		Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis. Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (___)
e. TRI-RAIL																																	
l. Number of routes	1								1						2												1						
ii. Mileage																																	
Total and Service	1								1						2				1			1	1	1	1	1	1				2			
iv. Average Estimated Ridership																																	
Annual	1								1						2				1			1	1	1	1	1	1				2			
By Station	1								1						2								2	2	2	2	2				2			
v. Average Estimated Vehicle Miles																																	
Annual	1								1						2				1			1	1	1	1	1	1				2			
viii Average Speed	1								1						2												1						
ix. Average Passengers per mile	1								1						2								1	1	1	1	1				2			
x. Cost																																	
Total	1								1						2								1	1	1	1	1	2	2	2	2			
Operating	1								1						2								1	1	1	1	1	2	2	2	2			
Capital	1								1						2								1	1	1	1	1	2	2	2	2			
Maintenance	1								1						2								1	1	1	1	1	2	2	2	2			
f. AMTRAK																																	
l. Number of routes	1								1						2												1						
ii. Mileage																																	
Total and Service	1								1						2				1				1	1	1	1	1				2			
iv. Average Estimated Ridership																																	
Annual	1								1						2				1			1	1	1	1	1	1				2			
By Station	1								1						2								2	2	2	2	2				2			
v. Average Estimated Vehicle Miles																																	
Annual	1								1						2				1			1	1	1	1	1	1				2			
viii Average Speed	1								1						2												1						
ix. Average Passengers per mile	1								1						2								1	1	1	1	1				2			

DATABASE ELEMENTS		AREAS/DISTRICTS															PERIOD/TIME FRAME																			
		Political					Transportation				Census						Others	Daily							Specific Years					Projections				Financial		
E. TRAVEL MODE (PUBLIC TRANSIT)	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis. Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (___)	Quarter (___)
g. JITNEYS																																		
I. Number of routes	1	1	2	3											3																			
ii. Mileage																																		
Total and Service	1	1	2	3											3		2	2	1			1												
By Route	1																2	2	1			1												
iv. Average Estimated Ridership																																		
Annual	1	1	2	3											3		2	2	1			1	1	1	1	1	1							
By Route	1	1	2	3											3		2	2	1			1	2	2	2	2	2							
v. Average Estimated Vehicle Miles																																		
Annual	1	1	2	3											3		2	2	1			1	1	1	1	1	1							
By Route	1	1	2	3											3		2	2	1			1	2	2	2	2	2							
vii. Fare System	1	1																								1								
ix. Average Passengers per mile	1	1																				1	1	1	1	1	1							

DATABASE ELEMENTS		AREAS/DISTRICTS														PERIOD/TIME FRAME																	
		Political				Transportation				Census					Others	Daily							Specific Years					Projections				Financial		
F. OTHER MODES	PRIORITY RATING	Countrywide	Commission Dist.	Municipality	Other Defined Subareas	TAZ	TAD	TAS	Transportation Corridors	Tracts	Enumeration	Blocks	SMSA	MSA	Proximity Analysis Region, etc.	Specific Times	Off-Peak	Peak	TOTAL DAILY	WEEKLY	MONTHLY	YEARLY	1980	1985	1990	1995	2000	2005	2010	2015	2020	Current FY	Past FY (____)	Quarter (____)
2 AIR																																	
a. Passenger																																	
I. Volumes	1	1													2		2	2	1			1	1	1	1	1	1	2	2	2	2			
ii. Ave. No. of trips (arrivals/departures)	1	1													2		2	2	1			1	1	1	1	1	1							
b. Cargo																																	
I. Volumes	1	1													2		2	2	1			1	1	1	1	1	1	2	2	2	2			
ii. Ave. No. of trips (arrivals/departures)	1	1													2		2	2	1			1	1	1	1	1	1							
c. Major/Primary Infrastructure Elements (Cap.)																																	
I. Fields	1	1													2												1							
ii. Runways (No., lenghts)	1	1													2												1							
iii. Terminals	1	1													2												1							
iv. Gates	1	1													2												1							
3. BYCICLE																																	
c. Estimated miles traveled	1	1	2						2						2				1			1	1	1	1	1	1	2	2	2	2			
6 VANPOOL																																	
a. No. of Vanpools	1	1	2												3				1			1	1	1	1	1	1							
b. Mileage																																	
I. Annual Total	1	1	2												3				1			1	1	1	1	1	1							
c. Ridership																																	
I. Annual Total	1	1	2												3				1			1	1	1	1	1	1							
d. Cost	1	1	2												3				2			1	1	1	1	1	1							
e. Fare System	1	1	2												3												1							

Appendix B

Data Sources

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
		INFRASTRUCTURE			
1	1	Ahighways	GIS Shp file	Length of highways, functional Classification, zip code in which particular stretch located	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
3	3	staterds	GIS Shp file	Section, name of road, Begin/End mile post, Sr No, etc	FDOT {Carlos Gonzalez -IDAS/ Ph:(305)665-8303}
4	4	Localnam	GIS Shp file	Section, name of road, Begin/End mile post	FDOT {Carlos Gonzalez -IDAS/ Ph:(305)665-8303}
5	5	functionalclassification	GIS Shp file	Section, functional classification	FDOT {Carlos Gonzalez -IDAS/ Ph:(305)665-8303}
6	6	Trafficcount	GIS Shp file	Traffic Count Station nos.	FDOT {Carlos Gonzalez -IDAS/ Ph:(305)665-8303}
7	7	lsignals	GIS Shp file	Type of Control, Type of signal & Asset ID of Signals	Eloy Lee - PW Miami Dade / Ph:(305)592-8925 xtn. 243
8	8	Lsigs	GIS Shp file	Intersection, Maintenance Zone, Asset ID of Signals (gis map does not match with E. Lee)	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
9	9	Paths	GIS Shp file	Name, Length & Location of bike paths off Road	James Manzella - Bike Pedestrian Prog. Miami Dade / Ph:(305)375-1647
10	10	Bikelane	GIS Shp file	Name, Length of dedicated bike lanes on Road	James Manzella - Bike Pedestrian Prog. Miami Dade / Ph:(305)375-1647
11	11	B-o-b	GIS Shp file	Name of bus routes having bike racks	James Manzella - Bike Pedestrian Prog. Miami Dade / Ph:(305)375-1647
		SOCIOECONOMIC DATA			
12	1	1999 AUTOS & EMPLOYMENT BY 1990 TAZ FINAL_Mmoore	Excel File	(1999) Vehicles in family, Employment by Census Tract/(1990 TAZ)	Michael Moore - MPO / Ph.(305)375-1833
13	2	1999 Dataset By 1990 TAZ's_Mmoore	Excel File	DU, etc (1990 TAZ)	Michael Moore - MPO / Ph.(305)375-1833
14	3	1999 DATASET BY 2000 TAZ'S_MMoore	Excel File	DU, etc (2000 TAZ)	Michael Moore - MPO / Ph.(305)375-1833

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
15	4	2000 LIST OF SCHOOLS 2_Mmoore	Excel File	Name of School and Enrollment for year 2000 by 2000 TAZ	Michael Moore - MPO / Ph.(305)375-1833
16	5	2015 AUTOS AND EMPLOYMENT_MMoore	Excel File	Vehicles in family, Employment by Census Tract/(2000 TAZ)	Michael Moore - MPO / Ph.(305)375-1833
17	6	2015 SCHOOLS LIFESTYLES SCHOOL.YYA)_MMoore	Excel File	Year 2015 School Enrollment (2000 TAZ)	Michael Moore - MPO / Ph.(305)375-1833
18	7	2025 Autos And Employment_MMoore	Excel File	(2025) Vehicles in family, Employment by Census Tract/(2000 TAZ)	Michael Moore - MPO / Ph.(305)375-1833
19	8	2025 SCHOOLS LIFESTYLES (SCHOOL.YYA)_MMoore	Excel File	Year 2025 School Enrollment (2000 TAZ)	Michael Moore - MPO / Ph.(305)375-1833
20	9	FBLIFESTYLESRV3_MMoore	Excel File	Children in household	Michael Moore - MPO / Ph.(305)375-1833
21	10	FINAL 2015 POP AND HOUSING FSUTMS DATASET_Mmoore	Excel File	Population, DU year - 2015, TAZ 2000	Michael Moore - MPO / Ph.(305)375-1833
22	11	FINAL 2025 G Qand Emp_MMoore	Excel File	Year 2025 GQ and Employment TAZ (2000)	Michael Moore - MPO / Ph.(305)375-1833

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
23	12	FINAL 2025 POP AND HOUSING FSUTMS DATASET_MMoore	Excel File	Population, DU year - 2025, TAZ 2000	Michael Moore - MPO / Ph.(305)375-1833
24	13	Final FSUTMS 1999 Base Year Dataset Autos employment and Economic Ranking_Mmoore	Excel File	No. of cars, income, etc. TAZ 2000	Michael Moore - MPO / Ph.(305)375-1833
25	14	Final FSUTMS 1999 Base Year Dataset Population Housing School Enrollment Hotel Motel Units and Occupancy_Mmoore	Excel File	Polpulation, School Enrollment TAZ 2000	Michael Moore - MPO / Ph.(305)375-1833
26	15	LIFESTYLE 2025 BASE YEAR 031201(ZDATA1A.YYA)_Mmoore	Excel File	Year 2025 Vehicles in family, Childern in Household TAZ 2000	Michael Moore - MPO / Ph.(305)375-1833
27	16	LIFESTYLE 2015 BASE YEAR (ZDATA1A.YYA)_Mmoore	Excel File	Year 2015 Vehicles in family, Children in Household TAZ 2000	Michael Moore - MPO / Ph.(305)375-1833
28	17	LIFESTYLES FINAL BY 1990 TAZ_Mmoore	Excel File	No. of Children, Workers in household TAZ 1990	Michael Moore - MPO / Ph.(305)375-1833
29	18	LIFESTYLES FINAL BY 2000 TAZ_Mmoore	Excel File	No. of Children, Workers in household TAZ 2000	Michael Moore - MPO / Ph.(305)375-1833
30	19	Ptract	GIS Shp file	Census Tract	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
31	20	FINAL 1999 POP AND HOUSING FSUTMS ROUNDED DATASET	Excel File	Population, DU year - 1999, TAZ 2000	Angel A Rivera - DP&Z Miami Dade / Ph:(305)375-2845
32	21	FINAL FSUTMS 1999 BASE YEAR DATASET AUTOS EMPLOYMENT AND ECONOMIC RANKING	Excel File	Year 1999 No. of cars, income, etc. TAZ 2000	Angel A Rivera - DP&Z Miami Dade / Ph:(305)375-2845
		TRAVEL MODE			
33	2	aadt	GIS Shp file	AADT, Capacity, Capacity 24hr, Pk vol, Vmt, Vc ratio, vht, los, Section, Begin/End Mile post, Seasonal Factor, etc.	FDOT {Carlos Gonzalez -IDAS/ Ph:(305)665-8303}
34		volume	Data base file	Traffic Counts (15 min)	Martha Santoyo - Miami Dade Public Works Department/ Ph:(305)375-2777
35		loclkup	Data base file	Look up for 15 min Traffic Count station nos.	Martha Santoyo - Miami Dade Public Works Department/ Ph:(305)375-2777
36		location	Data base file	Description of Traffic Count Stations.	Martha Santoyo - Miami Dade Public Works Department/ Ph:(305)375-2777
37	1	Lmrailst	GIS Shp file	Metro Rail Station Name & Address	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
38	2	Lbusstop	GIS Shp file	Location, Route, Address of Bus Stop	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
39	3	Atrirail	GIS Shp file	Route	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
40	4	Amrail	GIS Shp file	Metro Rail Location and Length	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
41	5	Ammover	GIS Shp file	Metro Mover Location and Length	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
42	6	Abusrout	GIS Shp file	Bus route number, length	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
43	7	Transit Report	Hard Copy	Metro - Bus, Rail, Mover; Ridership and Cost	Elaine Ramirez - Miami DadeTransit/ Ph:(305)375-4327
44	8	elaine	Excel File	Metro - Bus, Rail, Mover; Ridership and Cost (System Wide)	Elaine Ramirez - Miami DadeTransit/ Ph:(305)375-4327

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
		OTHER MODES			
45	1	Dade County Aviation System Plan Technical Report	Hard Copy	Passenger, Cargo, etc	Sunil Hermann - Aviation Department/ Ph:(305)876-7090
46	2	Airportfacilities	GIS Shp file	Name of Airport, Runways, terminals, gates, length of runways, annual vol	FDOT {Carlos Gonzalez -IDAS/ Ph:(305)665-8303}
47	3	Van Pool Data	Word File	No. of vanpools, passenger trips saved, passenger miles saved	Jesus Guerra - MPO / Ph:(305)375-2069
		OTHER NECESSARY DATA			
48	1	taz2000	GIS Shp file	TAZ (2000)	Frank Baumann - DP&Z Miami Dade / Ph:(305)375-2845
49	2	Pzipcode	GIS Shp file	Zip Code, Area	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
50	3	Ptaz 1992	GIS Shp file	TAZ (1992)	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
51	4	Ptad 1992	GIS Shp file	TAD (1992)	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
52	5	Pmunicwt	GIS Shp file	Municipal Boundaries	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
53	6	Pdadebnd	GIS Shp file	Dade Boundary	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
		OTHER DATA (Not in Scope)			
54	1	Ptmhoa	GIS Shp file	Team Metro Home owners association name & address	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
55	2	Pstszon	GIS Shp file	Special Transportation Services Zone	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
56	3	Prdimpct	GIS Shp file	Road Impact Fee Zone	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
57	4	Phrsacsc	GIS Shp file	Critical Area and Social Concern Boundaries	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
58	5	Pestwdho	GIS Shp file	Eastward Ho	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
59	6	Pempzcen	GIS Shp file	Empowerment Zone w/ Census Tract	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
60	7	Pempzbnd	GIS Shp file	Empowerment Zone	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
61	8	Pcommiss	GIS Shp file	Name of Commissioner	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
62	9	Pallneig	GIS Shp file	Major Neighborhood Boundaries	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
63	10	Ltcomste	GIS Shp file	Telecommunication Site	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
64	11	Lschools	GIS Shp file	Public School Address & Location, Zipcode	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
65	12	Lschlpvt	GIS Shp file	Private School Address & Location, Zipcode, etc	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
66	13	Llibrary	GIS Shp file	Name , Address, Municipality, etc of Library	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
67	14	Lhrshosp	GIS Shp file	Hospital Name, Address, Phone no., etc by city, zipcode	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
68	15	Lhrsdycr	GIS Shp file	Phone no., Address of Day Care Center	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
69	16	Lfirest	GIS Shp file	Name, Address, Municipality, etc of Fire Station	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642
70	17	Lcollege	GIS Shp file	Name, Address of College	Miguel Cordero- MPO/ Ph:(305)375-4507 xtn.2642

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
71	18	Maxspeed	GIS Shp file	Section Begin/End mile post	FDOT {Carlos Gonzalez -IDAS/ Ph:(305)665-8303}
		DATA From Integrated Transportation Management System (To be used as required)			
72	1	Florida Intrastate Highway System	ITMS Program - CMS	Fihs Type, Net length	ITMS
73	2	daderoad	GIS Shp file	Traffic Count Station nos (County and State), St name., Length	ITMS
74	3	imsairpoly	GIS Shp file	Location of Airport	ITMS
75	4	imsi_citybus	GIS Shp file	Out of state bus terminals, Address	ITMS
76	5	imsrail	GIS Shp file	Length of railway line, Ownership	ITMS

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
77	6	imstrirailstn	GIS Shp file	Location of trirail station	ITMS
78	7	Pcommiss	GIS Shp file	Commission districts	ITMS
79	8	Pmunicwt	GIS Shp file	Municipal Boundaries	ITMS
80	9	Ptaz 1992	GIS Shp file	TAZ (1992)	ITMS
81	10	Composite (Undivided Rdwy)	ITMS Program - PMS	Number of lanes on the State Roadway	ITMS
82	11	Right Side of Rdwy	ITMS Program - PMS	Number of lanes on the State Roadway on the rightside of the road (based on south to north or west to east direction)	ITMS
83	12	Left Side of Rdwy	ITMS Program - PMS	Number of lanes on the State Roadway on the leftside of the road (based on south to north or west to east direction)	ITMS

List of Data Sources for Transportation Data Management System

		File Name	Format	Content	Origin
84	13	ptabusrout	GIS Shp file	Bus route location, length	ITMS
85	14	ptlbusstop	GIS Shp file	Bus stop location, address	ITMS
86	15	ptammover	GIS Shp file	Location of Metro mover and length	ITMS
87	16	ptlmmovrst	GIS Shp file	Metro Mover Station name and location	ITMS
88	17	ptamrail	GIS Shp file	Metro Rail Location and Length	ITMS
89	18	ptlmrailst	GIS Shp file	Metro Rail Station Name & Address	ITMS

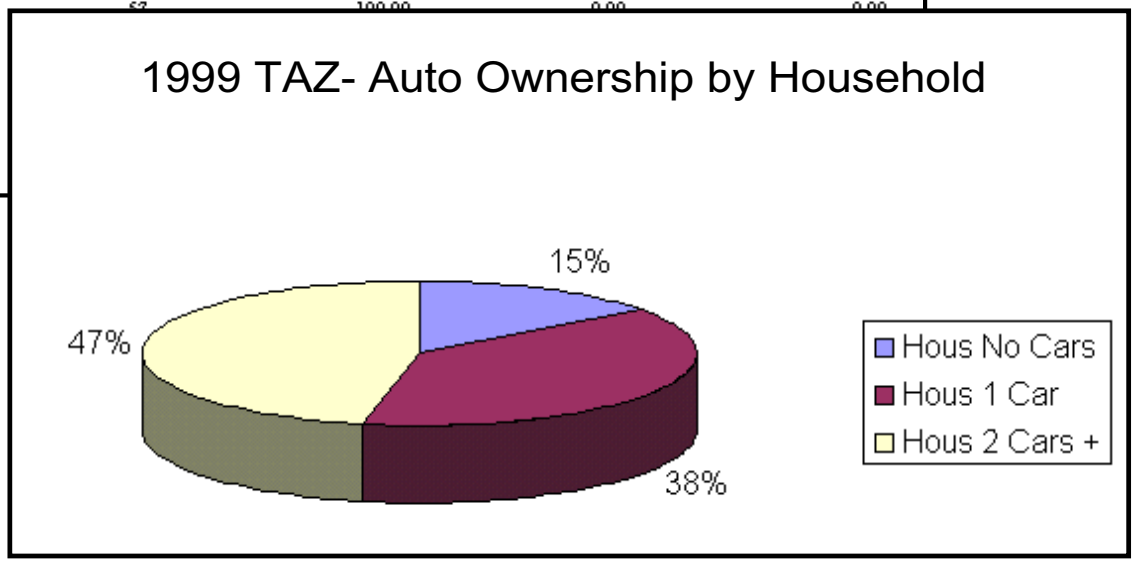
Appendix C

Selected Sample Output

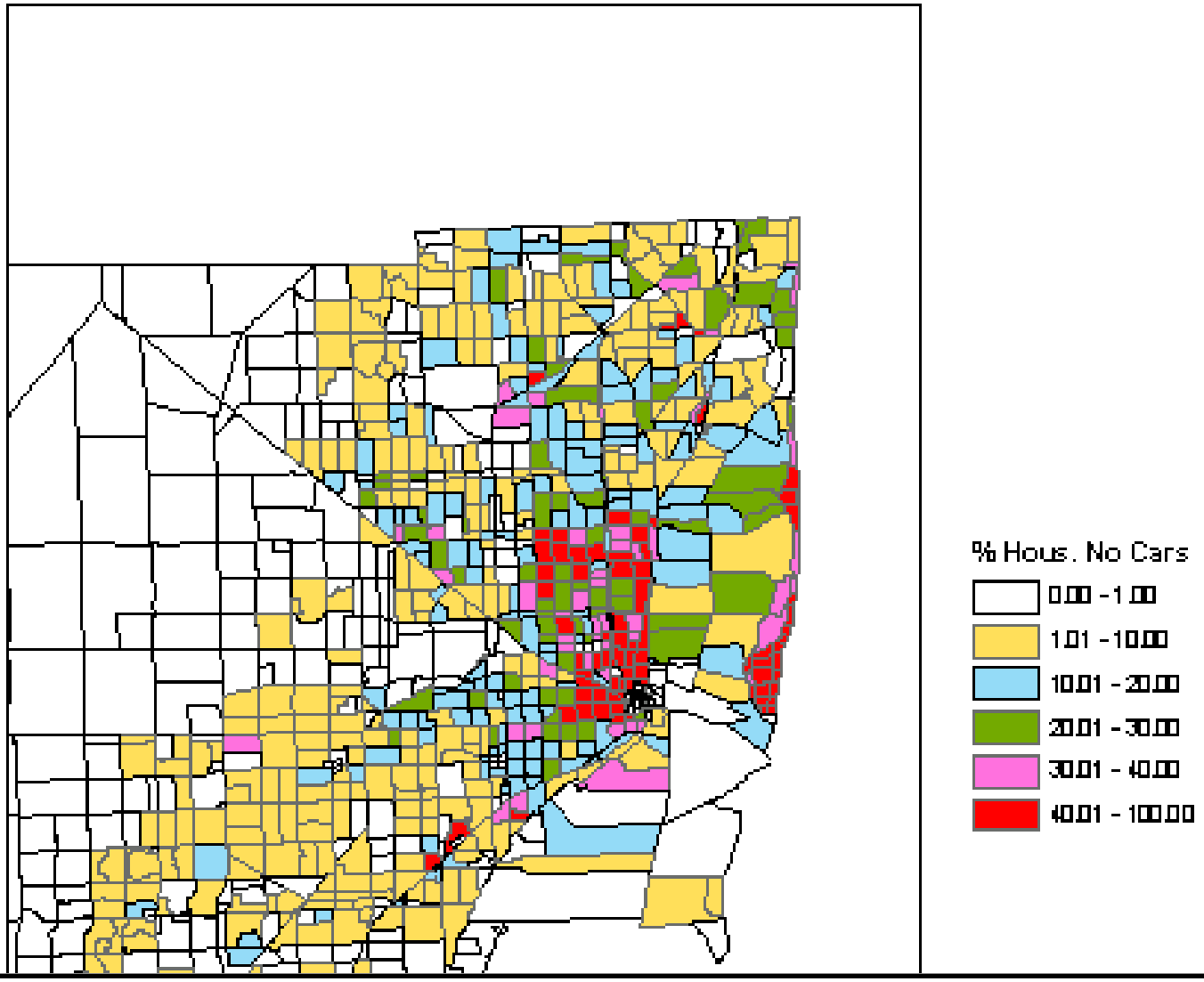
1999 Auto Ownership by TAZ

5/21/2002

TAZ	Total Household	% No Cars	% 1 Car	% 2+ Cars
312	7	100.00	0.00	0.00
355	7	100.00	0.00	0.00
600	9	100.00	0.00	0.00
658	20	100.00	0.00	0.00
652	[illegible]	[illegible]	[illegible]	[illegible]
665				
630				
4				
596				
579				



1999 TAZ- % of Households without Cars



Web Map- Bicycle Routes & Paths

David Plummer & Associates
TRANSPORTATION•CIVIL•STRUCTURAL•ENVIRONMENTAL