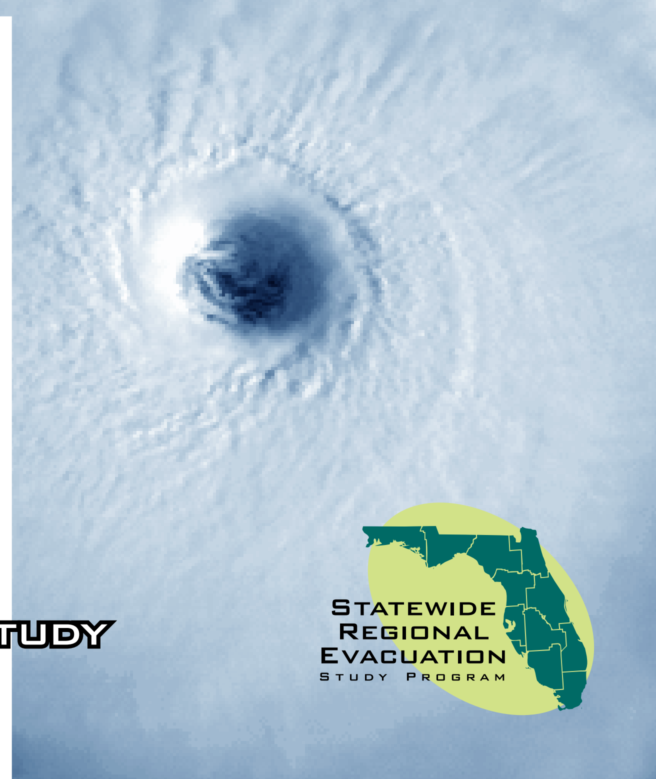
Florida Statewide Regional Evacuation Study Program

Methodology and Support Documentation

Volume 8

Florida Division of Emergency Management

All Florida Regional Planning Councils



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CHAPTER I
INTRODUCTION

This volume contains the detailed methodology used in developing various components of the Statewide Regional Evacuation Study Program (SRESP). The intent of this Volume is to provide methodologies not found elsewhere in the Study. For example, the methodology for Shelter Analysis can be found in Volume One, the Technical Data Report in Chapter 5: Regional Shelter Analysis. It is recognized that the components of the study, sheltering analysis, transportation analysis, etc. have an important impact on local evacuation strategies. As such, the methodologies are provided.

The development of the methodologies utilized in the Study required coordination and input from all eleven regional planning councils in Florida, along with the Division of Emergency Management, Department of Transportation, Department of Community Affairs, and local county emergency management teams. At the statewide level, SRESP Work Group Meetings were typically held on a monthly basis to discuss the development of the various methodologies and receive feedback and input from the State agencies and RPCs. At the local and regional levels, input was received from local county emergency management, the regional planning council, local transportation planning agencies and groups, as well as other interested agencies. This volume contains the detailed methodologies for the following SRESP components:

- Evacuation Transportation Model Methodology (Chapter II)
- Demographic And Land Use Analysis Methodology (Chapter III)
- 2007-2010 SRESP Surge Inundation Tool Methodology (Chapter IV)
- Geodatabase Design and Methodology (Chapter V)

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CHAPTER II
EVACUATION MODEL TECHNICAL DOCUMENT

A. Introduction

A transportation evacuation model was developed as part of the Statewide Regional Evacuation Study Program (SRESP) to analyze evacuation trips under a variety of evacuation conditions and to report clearance times. This model serves as the backbone for all transportation analyses developed for this study and is the tool used to produce the data reported in Volumes 4 and 5 of this study.

Wilbur Smith Associates (WSA) developed the evacuation model for the Northeast Florida Regional Council and the Florida Division of Emergency Management. This document discusses information relevant to understanding and executing the evacuation model. This documentation provides information on the final production version of the evacuation model as well as the TIME interface used to operate it. The evacuation model is developed in Cube with a custom built GIS based graphic user interface.

The first portion of this document discusses the data that are used in the model. The following sections discuss model initialization, trip generation, trip distribution, segmentation, background traffic, and trip assignment. The final section provides a user's guide on working with the evacuation model using the TIME interface.

Background to Transportation Modeling

A traditional travel demand model is typically organized into four successive steps. Each step is responsible for handling a distinct aspect of the travel demand modeling activity. It is for this reason that these models are usually referred to as four-step models. The first step of the model is called trip generation. Trip generation is the step during which the model determines how many trips will be made by individuals in the modeled area. The second step of the model is known as trip distribution. It is during this step of the model that the model determines the destination of each trip in the modeled area. The third step of the model is mode choice. During mode choice, the model divides the total trips in the modeled area among the various modes of travel available in the model (such as auto, bus, rail, etc.). Finally, the fourth step of the model is highway assignment. The highway assignment step of the model is responsible for determining which segments of roadway in the modeled area each trip travels along to reach its destination.

The purpose of highway assignment is primarily to determine how much traffic is traveling along a particular stretch of road during the analysis periods. The traffic that has been assigned to the model's highway network is often referred to as the model volume of a given highway link. Traditional four step models are typically designed to provide these model volumes for a 24 hour period. Such volumes are known as daily assignments.

Many models have more recently begun to employ a technique known as time-of-day assignment. Time-of-day models divide a 24 hour day into smaller periods typically corresponding to the morning and evening peak periods (a three hour period encompassing the morning or evening rush hours) and an off-peak period. The time-of-day model may be further disaggregated to distinguish between a midday off-peak period (from the morning peak period to the evening peak period) and an overnight period (from the evening peak period to the morning peak period). These assignments are known as time-of-day assignments. Time-of-day assignments for each of the modeled time periods may be aggregated to provide a daily assignment volume.

Assignment volumes can be analyzed to provide useful information on forecasted travel patterns and areas of likely congestion. Along with volumes, other statistics that are typically derived from highway assignments include vehicle-miles-traveled, vehicle-hours-traveled, congested travel times and speeds, and level-of-service.

The Unique Character of an Evacuation

Traditional four-step models are designed to provide useful information to transportation planners. As such, they tend to represent travel behavior on a "typical" day. These models typically assume that a certain number of people get up in the morning and go to work each day. They assume that people will go shopping, eat at restaurants, and visit with friends each day. They assume that children will go to school each day. Evacuation events significantly deviate from this typical behavior.

During an evacuation event, it is assumed that the ordinary trip making behavior of the residents in the modeled area is disrupted. Instead of going to work or shopping at the mall, individuals spend their time preparing to either weather the storm at home or evacuate. Trips that are made and are not for the purposes of an evacuation may generally be shorter trips closer to home. The most significant kind of trip that is made during an evacuation event is the evacuation trip itself.

There are several distinct characteristics of evacuation trips that differentiate an evacuation model from a traditional four-step model:

1. Most evacuation trips begin within a very well defined window of opportunity as opposed to occurring naturally throughout the day. This window typically begins when an order to evacuate has been given;
2. Origins for evacuation trips are highly concentrated corresponding to areas threatened by storm surge flooding;
3. Destinations for evacuation trips are spread throughout the region, State, and beyond;
4. Items 2 and 3 above result in a relatively unidirectional flow of trips away from the threatened area and toward areas of safety;
5. A larger proportion of evacuation trips will exit the county or region than is typically assumed in a traditional four-step model; and,
6. Roadway segments that allow for inter-county or inter-regional travel are relatively few.

As a result of the aforementioned items, an evacuation event can be stated as a phenomenon where a large number of vehicles coming from the same place are leaving at the same time, going in the same direction, and taking the same roads. This increases the likelihood of experiencing severe congestion along the highway system. This is particularly true at critical points along the network such as bridges and freeway interchanges.

Furthermore, the most valuable statistic pertaining to an evacuation is the amount of time it takes evacuees to get to a place where they are no longer in danger. Since the effects of congestion on the travel times of evacuees fluctuates as the amount of traffic increases and decreases, it becomes vital to be able to measure the progress of an evacuation over time.

It is for these reasons that a model specific to the purpose of measuring evacuations has been developed for the State of Florida. The following sections of this report document the development and features of the SRESP evacuation model.

B. Geodatabase

Starting with Cube 5.0, the Cube software has been able to use data stored in a geodatabase as inputs to transportation models. This makes it possible to view and edit model data in GIS. Every scenario has its own dedicated geodatabse. Data changed for a given scenario does not impact any other scenario. The evacuation model stores three key inputs in a geodatabase:

- *Traffic Evacuation Zones* – sub-county geographies that contain data concerning the population living there;
- *Highway Network* – a transportation system database that contains data on every road included in the model; and,
- *Evacuation Shelters* – a database containing the locations and capacities of each public shelter used in Florida to house evacuees seeking a safe haven from a storm.

Data were stored for three separate analysis years: 2006, 2010, and 2015. The 2006 data were used to develop the base model and were not used to estimate evacuation clearance times for this study.

Small Area Data

The development of zone data for this model was an exhaustive exercise accomplished through the cooperation of the Regional Planning Councils (RPCs) and counties of the State of Florida. WSA worked with public sector planning staff at all levels to compile and organize a comprehensive database of zone data. This section discusses the type of data included in the Traffic Evacuation Zone (TEZ) database and how these data were developed, what the TEZ system is and how individual zones were created, and the relationship of the model-wide TEZ database that was developed to the subset of the TEZs that were used for each region's implementation of the evacuation model.

Data were provided to WSA through the SRESP by the eleven Regional Planning Councils (RPC) located throughout the state. These data (labeled as "small area data") contain the demographic information crucial to modeling evacuation traffic. These data contain population and dwelling unit information that will identify where the individuals in the region reside. The planning assumptions developed from the behavioral analysis conducted for this study are applied to these demographic data by the SRESP Evacuation Model. This results in a set of evacuation trips being generated by the evacuation model.

The zone data are organized into a hierarchy of three tiers:

1. *Small Area Data*: This tier represents the level at which data were collected by the RPCs. This can either be MPO Traffic Analysis Zones or Census block groups depending on the preference of the RPCs. The RPCs were encouraged to use MPO Traffic Analysis Zones whenever possible. In some cases, an RPC collected the data at the parcel level and later aggregated it to the small area data level. The model input database does not maintain data at this level of detail; however, the small area data were aggregated without splits into the next tier of organization. An equivalency table has been maintained, making it possible for the RPCs to make adjustments to their small area data and update the model input file with ease. Data were developed for the following years: 2006, 2010, and 2015.

2. *Traffic Evacuation Zone (TEZ):* This tier represents the level at which the model is first able to recognize data. Given the vast amount of small area data, it was necessary to aggregate these data into a level of geography that would make sense at a statewide scale. Though each TEZ may contain data from multiple small area data units, each small area data unit belongs to only one TEZ. Trip generation and distribution occurs at this level. The TEZs are smaller along the coast and larger inland where the need to evacuate is almost non-existent. **The zone data input file is maintained at the TEZ level of detail.**

3. *Evacuation Assignment Zone (EAZ):* Since this model makes use of Cube AVENUE's dynamic traffic assignment (DTA) capabilities, the burden of computing has to be taken into consideration. DTA is much more computationally intensive than static assignment techniques. One of the key factors impacting computer processing needs for DTA is the number of zones used in the assignment. In order to allow the model to run effectively, TEZs are aggregated into EAZs. EAZ aggregation occurs automatically within the model stream and is guided by an attribute in the TEZ database.

Traffic Evacuation Zone (TEZ)

Once the small area data had been submitted, WSA reviewed the small area geographies. Small area geographies needed to be aggregated into larger units known as Traffic Evacuation Zones (TEZ). These TEZs form the basic unit of analysis in the evacuation model similar to how traffic analysis zones form the basic unit of analysis in a standard travel demand model. The TEZ system was developed so that the small area geographies will nest completely within one TEZ or another. This eliminated any potential for split data and ensured that data in the TEZ system can always be updated with relative ease. An equivalency table has been maintained so that the relationships between the small area data and the TEZ system do not disappear.

To the extent possible, this effort was automated in order to speed up the process of aggregating small area data into the TEZ structure. Some manual manipulation was required in order to ensure that the configuration of the zones conformed as much as possible to the highway network that is used to run the evacuation model. Also of critical concern was the need to conform to the boundaries of evacuation zones as defined by each county.

After the TEZ system was developed, WSA and the RPCs worked together to identify areas in the evacuation model where a greater amount of geographic disaggregation of the data would be beneficial. These TEZs were then split to accommodate the needed level of detail. Candidates for these splits were located mostly in coastal areas. All TEZs are at a minimum comprised of one entire unit of small area geography, either a census block group or MPO Traffic Analysis Zone. No unit of small area geography was split to make smaller TEZs. **Figure II-1** shows the TEZ system.

The final TEZ system for the evacuation model has 9,456 numbered zones ranging from 1 to 17,328. With only 9,456 zones being numbered in the TEZ system, this leaves an additional 7,872 zone numbers reserved for dummy zones. The zone numbering is consecutive in each county in Florida. TEZs corresponding to areas outside of Florida are the size of an entire county. TEZs in areas within Florida are smaller than any individual county. Dummy zone ranges have been built into each county in Florida. These ranges are described in **Table II-1**. With so many dummy zones available, the model will be able to accommodate a significant amount of expansion should the SRESP decide at some point in the future to increase the level of detail for the TEZ system.

Data were developed for three analysis years: 2006, 2010, and 2015. The model automatically references the correct data based on the analysis year selected by the user when the scenario is set up. All data are based off of mid-census estimates and future year projections based off of Census 2000 data. Census 2010 data were not available at the time that the evacuation model was developed.

Attributes of the TEZ System

The TEZ system is maintained as a feature class within the model's geodatabase. This feature class contains attribute data that the model uses to perform trip generation and zone aggregation. These attributes are defined in **Appendix A**.

Figure II-1: Map of SRESP Evacuation Model Traffic Evacuation Zones

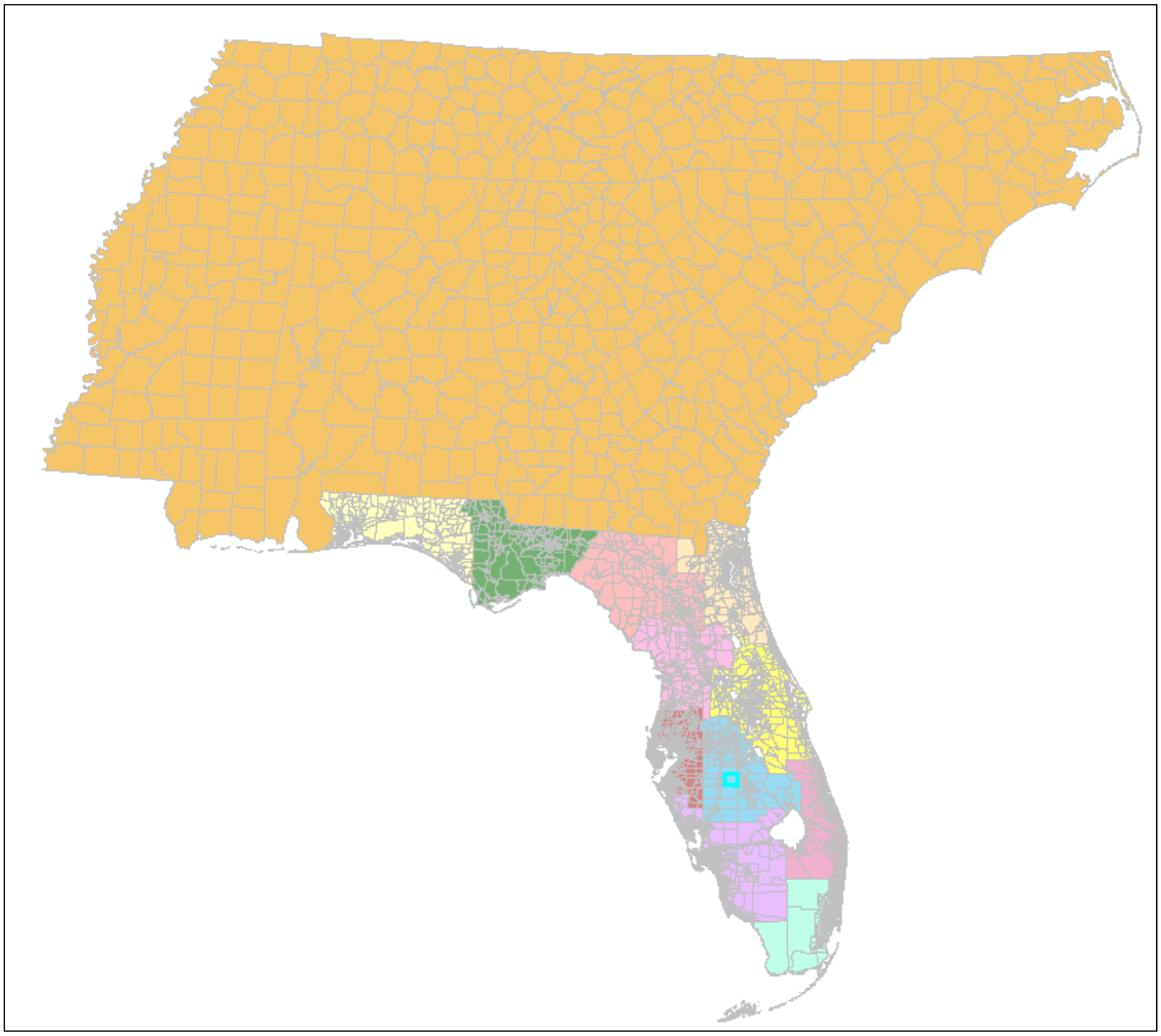


Table II-1: County Summary of Dummy TEZ

County	Model County Code	Region	Model Region Code	Active TEZ Range	Dummy TEZ Range	Number of Available Dummy TEZ
Alachua	21	North Central Florida	4	12700-12812	12813-13048	236
Baker	32	Northeast Florida	5	11200-11223	11224-11299	76
Bay	56	West Florida	10	15522-15671, 15673-15706	15672, 15707-15805	100
Bradford	22	North Central Florida	4	13049-13064	13065-13163	99
Brevard	15	East Central Florida	3	5000-5299	5300-5398	99
Broward	39	South Florida	6	1-379	380-476	97
Calhoun	1	Apalachee	1	14621-14631	14632-14730	99
Charlotte	42	Southwest Florida	7	2215-2346, 2348-2390	2347, 2391-2490	101
Citrus	63	Withlacoochee	11	10474-10528	10529-10627	99
Clay	33	Northeast Florida	5	12300-12433	12434-12499	66
Collier	43	Southwest Florida	7	1960-2115	2116-2214	99
Columbia	23	North Central Florida	4	13270-13299	13300-13398	99
DeSoto	10	Central Florida	2	10135-10146	10147-10245	99
Dixie	24	North Central Florida	4	13506-13515	13516-13614	99
Duval	34	Northeast Florida	5	11400-11917	11918-11999	82
Escambia	57	West Florida	10	16426-16657	16658-16699	42
Flagler	35	Northeast Florida	5	12500-12560	12561-12699	139
Franklin	2	Apalachee	1	14400-14409	14410-14508	99
Gadsden	3	Apalachee	1	14970-15000	15001-15099	99
Gilchrist	25	North Central Florida	4	13399-13406	13407-13505	99
Glades	44	Southwest Florida	7	2611-2618	2619-2999	381
Gulf	4	Apalachee	1	14509-14521	14522-14620	99
Hamilton	26	North Central Florida	4	13843-13851	13852-13950	99
Hardee	11	Central Florida	2	10021-10035	10036-10134	99
Hendry	45	Southwest Florida	7	2491-2511	2512-2610	99
Hernando	64	Withlacoochee	11	10246-10316	10317-10473	157
Highlands	12	Central Florida	2	9883-9921	9922-10020	99

County	Model County Code	Region	Model Region Code	Active TEZ Range	Dummy TEZ Range	Number of Available Dummy TEZ
Hillsborough	48	Tampa Bay	8	3300-3804	3805-3899	95
Holmes	58	West Florida	10	15296-15309	15310-15408	99
Indian River	52	Treasure Coast	9	7000-7116	7117-7199	83
Jackson	5	Apalachee	1	14836-14870	14871-14969	99
Jefferson	6	Apalachee	1	14181-14190	14191-14289	99
Lafayette	27	North Central Florida	4	13615-13620	13621-13719	99
Lake	16	East Central Florida	3	6783-6890	6891-6999	109
Lee	46	Southwest Florida	7	1524-1860	1861-1959	99
Leon	7	Apalachee	1	15100-15196	15197-15295	99
Levy	65	Withlacoochee	11	10628-10653	10654-10752	99
Liberty	8	Apalachee	1	14731-14736	14737-14835	99
Madison	28	North Central Florida	4	13951-13965	13966-14064	99
Manatee	49	Tampa Bay	8	3900-4231	4232-4299	68
Marion	66	Withlacoochee	11	10912-11062	11063-11199	137
Martin	53	Treasure Coast	9	7400-7495	7496-7499	4
Miami-Dade	40	South Florida	6	477-1108	1109-1207	99
Monroe, Key West	68	South Florida	6	1208-1219	None	0
Monroe, Lower Keys	69	South Florida	6	1220-1225	None	0
Monroe, Mainland	41	South Florida	6	1246-1247	None	0
Monroe, Middle Keys	70	South Florida	6	1226-1231	None	0
Monroe, Upper Keys	71	South Florida	6	1232-1245	None	0
Nassau	36	Northeast Florida	5	12000-12097	12098-12099	2
Okaloosa	59	West Florida	10	15965-16142	16143-16240	98
Okeechobee	13	Central Florida	2	9762-9783	9784-9882	99
Orange	17	East Central Florida	3	6177-6492	6493-6591	99
Osceola	18	East Central Florida	3	5980-6077	6078-6176	99

County	Model County Code	Region	Model Region Code	Active TEZ Range	Dummy TEZ Range	Number of Available Dummy TEZ
Palm Beach	54	Treasure Coast	9	7500-7881	7882-9399	1518
Pasco	50	Tampa Bay	8	3000-3027, 3029-3205	3028, 3206-3299	95
Pinellas	51	Tampa Bay	8	4300-4931	4932-4999	68
Polk	14	Central Florida	2	9400-9662	9663-9761	99
Putnam	37	Northeast Florida	5	11300-11339	11340-11399	60
Santa Rosa	60	West Florida	10	16241-16326	16327-16425	99
Sarasota	47	Southwest Florida	7	1248-1523	None	0
Seminole	19	East Central Florida	3	6592-6683	6684-6782	99
St Johns	38	Northeast Florida	5	12100-12251	12252-12299	48
St Lucie	55	Treasure Coast	9	7200-7201, 7203-7357	7202, 7358-7399	43
Sumter	67	Withlacoochee	11	10753-10812	10813-10911	99
Suwannee	29	North Central Florida	4	13720-13743	13744-13842	99
Taylor	30	North Central Florida	4	14065-14081	14082-14180	99
Union	31	North Central Florida	4	13164-13170	13171-13269	99
Volusia	20	East Central Florida	3	5399-5880	5881-5979	99
Wakulla	9	Apalachee	1	14290-14300	14301-14399	99
Walton	61	West Florida	10	15806-15865	15866-15964	99
Washington	62	West Florida	10	15409-15422	15423-15521	99
Baldwin, AL	72	Out of State	10	17249-17278	None	0
Camden, GA	74	Out of State	5	16719	None	0
Glynn, GA	75	Out of State	5	16762	None	0
Mobile, AL	73	Out of State	10	17279-17328	None	0
All Other Counties	76	Out of State	12	16700-16718, 16720-16761, 16763-16859, 16861-16906, 16908-17248	16860, 16907	2
					Total Dummy TEZ:	7867

Network Data

This section outlines the method of developing the highway network database for the Statewide Regional Evacuation Study Program (SRESP): Evacuation Model. This section discusses the data used as sources to develop the highway network database, the changes made to the network to accommodate evacuation modeling, the designation of speeds and capacities, and specific attributes that will be used in the model network.

A dataset covering the highway system for the State of Florida was required to ensure consistency in data definitions and coding conventions. A statewide database allows the evacuation model to maintain consistent highway representation from region to region. This improves the reasonableness of modeling results between regions by making sure that roadway characteristics throughout Florida are consistently defined and represented within the highway network.

The network database is maintained as a feature class within the model's geodatabase. The attributes associated with the network database are described in **Appendix A**. The network contains data for year 2006, 2010, and 2015 conditions. In order to edit the network database, it is necessary to work with the network data in the Cube environment.

Various datasets were used to develop this highway network database as follows:

1. **Florida Statewide Model Network** – The 2005 base year statewide model was used as basis for developing the evacuation model highway network. The statewide model was obtained from the Florida Department of Transportation (FDOT) Systems Planning Central Office. This network was developed for the most recent version of the Florida Statewide Model under development as of the writing of this document. This network was developed using a variety of sources that include, but are not limited to:

   - Previous version of the statewide model's network;
   - Florida Turnpike's Statewide Model network;
   - TeleAtlas database for Florida; and,
   - Metropolitan Planning Organization (MPO) highway data.

2. **Evacuation Routes** – Evacuation routes in each Regional Planning Council (RPC) areas were obtained from the RPCs themselves. The RPCs relied on their constituent counties to provide them with information on which roads were to be included as evacuation routes. These routes will be designated in the highway network dataset using a separate data field.

3. **Florida Highway Data Software (FHD)** – The 2006 Florida Highway Data software was obtained from FDOT. This software is used to view and query data extracted from the Roadway Characteristics Inventory (RCI) which includes link number of lanes, facility types, speed limits, etc. This information was critical for updating the 2005 dataset to 2006 conditions. This was vital for accommodating the 2006 base year designated by the Statewide Regional Evacuation Study Program (SRESP).

4. **FDOT Quality/Level of Service Handbook** – The 2002 FDOT Quality/Level of Service Manual (QLOS) and the 2007 LOS Issue Papers (2002 FDOT QLOS addendum) were

obtained from the FDOT Systems Planning website. The QLOS handbook and the LOS tables were used to establish roadway capacities for evacuation purposes. These capacities are used during the assignment step of the model in order to provide reasonable congestion conditions that will impact the evacuation traffic.

5. **Microsoft and Google aerials and maps** - were used to identify and clarify roadway alignments. Whenever questions concerning the existence of particular facilities, their characteristics, or their alignments aerials were referenced. Aerials provide clear information on existing roadway conditions. Depending on the segment being reviewed, it is often possible to determine the number of lanes on a particular segment and whether or not a particular segment is paved.

Changes to the Statewide Network

The highway network database that was used to create the foundation of the highway network data base for the evacuation model was developed by referencing a large variety of data sources to ensure the most complete and accurate data set possible. **Figure II-2** shows an image of the evacuation model's highway network. Due to the primary purpose of that data base some modifications to the data were necessary in order to make the data usable for evacuation modeling purposes. Some of the characteristics of the original database that had to be addressed are listed below:

- **2005 Base Year** – The original database was coded for a 2005 base year. Since the SRESP base year is 2006 it was necessary to update the data to 2006 conditions;

- **Geographic Extent** – The Statewide Model highway network came with roadway data for the entire continental United States. The network detail was progressively more detailed as the network approached Florida. Since it was not necessary to include so much network in the evacuation model, the database was trimmed down to retain on the network in Florida and the following states: Georgia, Alabama, Mississippi, South Carolina, North Carolina, and Tennessee.

- **Travel Demand Forecasting** – The original database was designed with typical travel demand forecasting purposes in mind. The focus for the statewide model was inter-city travel primarily through rural areas that are not covered by an MPO model. This meant that a number of facilities that might be vital for evacuation modeling but are of negligible concern for normal trip making activities were not present in the network. This problem is more acute in rural coastal areas were low levels of localized traffic are beyond the scope of a statewide travel demand forecasting model. Additional facilities had to be added to the network to accommodate evacuation traffic behavior;

- **Daily Trip Activity** – The original database was designed to represent a statewide highway network operating in a "typical" fashion over a 24-hour period. This means that attributes in the original database are optimized to function for a model responsible for yielding daily trip volumes. Many attributes from the original data set were removed and new ones were added specifically tailored for evacuation modeling purposes;

- **Evacuation Routes -** The original statewide model highway network database included most of the evacuation network identified by the counties. The evacuation roadway networks that were provided by the RPCs were overlaid on the highway network database and checked for any missing links. Maps depicting the highway network and the evacuation routes were distributed to all RPCs for their review. Based on this review the missing evacuation routes were coded into the highway network database. The facility data attributes which define the characteristics of a specific roadway were determined based on the characteristics of neighboring facilities in the network and similar facilities throughout the database. Some examples of these changes to the highway network database are discussed below.

  Example: Magnolia Drive between SR 20 (Apalachee Parkway) and SR 61 (Monroe Street) in Tallahassee was not included in the existing statewide model. This road is included as an evacuation route by the Apalachee Regional Planning Council. A new approximately 2.0 mile two lane link was coded connecting Monroe Street and Apalachee Parkway. Appropriate area types and facility types were designated to this roadway

  Example: Manasota Key Road in Charlotte and Sarasota County connecting the beach front properties was not included in the existing statewide model. This road is designated as an evacuation route by Southwest Florida Regional Planning Council. A new approximately 8 mile 2-lane link was coded. Appropriate facility and area types were assigned.

  Example: Hudson Avenue connecting Little Road and SR 52 in Pasco County is currently a 2-lane facility and is not included in the existing statewide model. This road is designated as an evacuation route by Tampa Bay Regional Planning Council. An 8-mile two-lane roadway with appropriate facility and area type was included in the evacuation model;

- **One-Way Links -** Though potentially problematic in typical travel demand forecasting models, evacuation models using dynamic traffic assignment are far less forgiving of roads that are incorrectly designated with regard to being one-way facilities. Not only is the status of a particular segment (i.e. whether or not it is a one-way facility) crucial, it is just as important to ensure that the road is headed in the correct direction. The highway network database was extensively reviewed for the correct coding of one-way links. Downtown areas and dense network areas were checked for one-way link coding. Microsoft and Google maps and aerials were used to identify the one-way links.

  Example: North Armenia Avenue from Swann Avenue to Martin Luther King Road in Tampa is currently a one-way pair. In the existing statewide model this road is represented as a one-way northbound only link. This link was adjusted to a two way link and the facility type was modified accordingly;

- **Number of Lanes -** The 2006 FHD software was used to verify the highway network database number of lanes for the state roads, US highways, and major county roads. For other roads Microsoft and Google aerial maps were used. For most of the roadway links, the highway network database has the appropriate number of lanes. The number of lanes was adjusted where appropriate to reflect the 2006 conditions.

  Example: SR 90 (SW 7th and SW 8th Streets) from SR 9 (SW 27th Ave) to SR 5 (Brickell

Avenue) in Miami is a one-way pair and is coded as four lanes in the existing statewide model. The number of lanes were crosschecked with the 2006 FHD software and recoded as a six lane facility.

- **Area Types and Facility Types -** Along with the number of lanes, attributes describing the area type and facility type of a roadway segment are instrumental in identifying the appropriate speed and capacity to use for that link. Facility types identify the purpose of a particular segment and are loosely related to a roadway segment's functional classification. The facility types determine whether a given stretch of road is an expressway, an arterial, a collector, or some other more specialized type of facility such as a ramp or a high-occupancy-vehicle lane. Area types distinguish the surrounding land use for a roadway segment. Such land uses include central-business-districts, residential, and rural.

  The area type and facility type attributes for each roadway segment were verified for their consistency with existing conditions. The area types were consistent in the highway network database model. The facility type attributes were appropriate for most of the roadway links with a few expectations. The roadway attributes were modified appropriately when a facility type abruptly changed from one two-digit type to other (example: from a collector to an arterial); and,

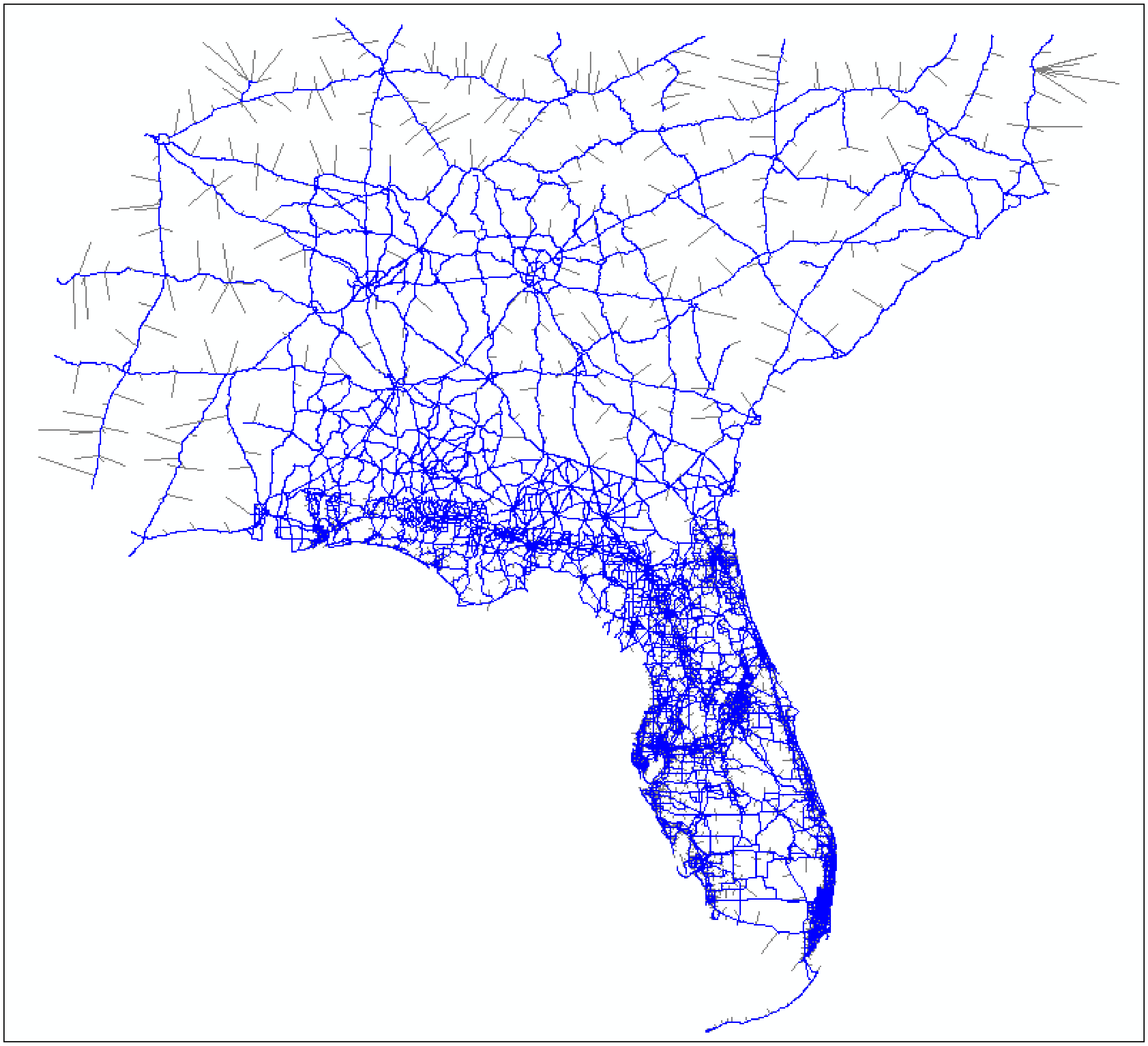
- **Other Changes to the Network -** The network attributes were modified to the specific needs of evacuation modeling and reporting purposes. The evacuation routes designated by the RPC were flagged for reporting purposes. The County name attribute and the RPC number attributes were checked and modified accordingly.

Capacities

Network capacities for the evacuation model are based on facility type and area type. The network facility type and the area type classification were retained from the existing statewide model highway network database.

FDOT's 2002 Quality/Level of Service (QLOS) generalized level of service volume tables and the 2007 LOS Issue Papers (2002 FDOT QLOS addendum) were used for estimating the link capacity for each combination of facility type and area type. The generalized level of service volume tables were generated from conceptual planning software which is based on the 2000 edition of the Highway Capacity Manual (HCM). The conceptual planning software uses three types of characteristics: roadway, traffic, and control (signalization) to calculate the LOS volumes for each roadway class. The roadway variables include area type, number of through lanes, roadway class, left turn lanes, median type, etc. The traffic variables include planning analysis hour factor (K), directional distribution factor (D), peak hour factor (PHF), etc. The control variable include signal spacing's, arrival type, cycle length, effective green ratio (g/C), etc. Using statewide default values for each of these roadway characteristics, the generalized LOS volume tables were developed from the conceptual planning software.

Figure II-2: Evacuation Model Network Database



The peak hour volume represents the most critical period for traffic operations and has the highest capacity requirements. Many urban routes are filled to capacity during each peak hour, and variation is therefore severely constrained. The peak hour directional volumes at LOS E, closely represents the maximum volume (capacity) that can be accommodated through a given roadway. The directionality of a roadway is hard to establish and generally the peak direction reverses during the morning and evening peak. Therefore, Florida's 2002 Peak Hour Two-Way Directional Volumes table was used with a 50/50 directional distribution to assign roadway capacities for a given facility and area type.

In some cases the Peak Hour Two-Way LOS tables do not show the maximum services volumes at the LOS E. For example, the four-lane Class I arterial service volumes are only shown from LOS A to LOS D, This indicates that the maximum volume thresholds (capacity) are reached at LOS D and these volumes represent the capacity of the roadway.

The capacities that are used in the SRESP evacuation model have been developed to allow for reasonable modeling of traffic flow under extreme conditions. Unlike typical travel demand models where the purpose of capacity is to represent average or typical operating conditions on a stretch of road, an evacuation model needs to represent the maximum possible conditions that a stretch of road can handle before the flow of traffic is disrupted. The capacity is a measure of how many vehicles can flow past a particular point over a fixed period of time. The SRESP evacuation model uses hourly lane capacities reflecting Level-of-Service E conditions from the Florida Department of Transportation (FDOT) Quality/Level-of-Service (Q/LOS) Handbook. Because the FDOT Q/LOS Handbook represents capacities under average operating conditions and in order to represent maximum possible utilization of the highway network under extreme traffic flow conditions where many travelers are attempting to simultaneously leave an area as quickly as possible, these capacities are increased by 20% for freeways and 10% for all other facilities. This assumes some utilization of paved shoulders as evacuees attempt to maximize all available capacity and optimization of signal green times.

A lookup table was created with facility type, area type, number of lanes, and capacities. The capacity attribute in the network were automatically assigned for any given link with a specific facility type, area type and number of lanes during the network preparation process.

Capacities for all facilities in the evacuation model were developed with the same methodology ***with the exception of U.S. 1 in Monroe County***. Due to the unique nature of evacuation analysis in the Florida Keys and a specific history of policy and methodology concerning evacuation modeling in this area, capacities for U.S. 1 did not follow the standard methodology used elsewhere in the SRESP evacuation model. The capacities used for this portion of U.S. 1 are consistent with the capacities defined in a Florida Department of Transportation Memorandum dated June 18, 2010. A copy of this memorandum is available in **Appendix B**.

Speeds

Speeds are typically used in travel demand models to establish the travel times needed to get from one point in the network to another. The evacuation model needs to use speeds in a slightly more sophisticated manner in order to determine how many vehicles are passing through a given link at any moment. The existing highway network database link speeds were verified for their reasonableness and their suitability for evacuation modeling purpose. The existing database speed is tied to the facility and area type of the link and these are updated through a lookup table during the network processing stage. The speed values of the existing database are reasonable and therefore retained in for evacuation modeling.

Roadway Attributes

The roadway attributes contain the highway characteristics for each link in the highway network. The attributes used in the evacuation model are described in **Appendix A**. **Tables II-2** and **II-3** give the standard values for facility types and area types respectively.

The model network database contains facility type, area type, and number of lanes data for three analysis years 2006, 2010, and 2015. When the model is running, the model will reference the correct data for the analysis year. If the value of FTYPE_06, FTYPE_10, or FTYPE_15 is set to 0 for a given highway link, then that highway link will be omitted from the scenario for year 2006, 2010, or 2015 respectively.

The existing Florida Statewide Urban Transportation Modeling Structure (FSUTMS) standards that define link speeds and capacities in the speed/capacity file based on combinations of area type, facility type, and number of lanes, were retained for the evacuation model. In order to provide for greater variation in link speeds and to better reflect capacity values recommended in the FDOT Level of Service (LOS) Manual, two-digit codes for area types and facility types were used. Capacities have been subsequently updated to be consistent with the latest version of the Highway Capacity Manual for Year 2000.

Reverse Lanes Operation

Additional changes were made in order to accommodate reverse lane operation plan activation in an evacuation scenario. Most of the facilities that are subject to a reverse lane operation scenario are coded as a pair of one-way links. In order to accommodate the correct behavior for the plan, additional attributes were added to the network in order to allow for the correct calculation of capacity in the reverse lane direction. The exact configuration of reverse lane facilities reflects the contra-flow plans established by the State. Currently, seven such plans are complete or in development. They are:

- I-10 – From Jacksonville to I-75;
- I-75 – From Tampa to Wildwood;
- SR 528 (Beachline Expressway) – From Brevard County to Orlando;
- Florida Turnpike – From Lantana to Ocoee;
- I-4 – From Tampa to Kissimmee;
- I-75 (Alligator Alley) – From Naples to Fort Lauderdale; and,
- I-75 (Alligator Alley) – From Fort Lauderdale to Naples.

Figure II-3 shows the location of each reverse lane operation plan in Florida.

In consultation with staff from the Florida Turnpike Enterprise, WSA set the capacity increase due to reverse lane operations at 66%. During a reverse lane operation scenario, the capacity of the reverse lane facility is increased by an additional 66% in the direction of the evacuation while the capacity of the facility in the direction running against the evacuation is reduced to zero. This capacity adjustment is consistent with tests done by Florida Turnpike Enterprise staff when attempting to develop their own reverse lane operation plan for the Florida Turnpike.

In accordance with the Florida Department of Transportation policies which state that reverse lane operations are only in effect during daylight hours, when a reverse lane operation scenario is activated in the evacuation model these capacity adjustments are only in effect for the first twelve hours of the evacuation event. This is consistent with the evacuation model's base assumption that the evacuation begins at daybreak of the first morning of the evacuation event. At the end of this twelve hour period, the capacities in the direction of the evacuation are reduced to their normal (non-reverse lane operation) levels while the capacities in the direction against the flow of the evacuation remain at zero. This helps to simulate the time it takes to convert the reverse lane flows back to normal two-way operations. The capacities in the direction against the flow of evacuation return to their normal levels at daybreak on the second morning of the evacuation event.

Table II-2: Two-Digit Facility Type

Facility	Description
1X - Freeways and Expressways	
11	Urban Freeway Group 1 (cities of 500,000 or more)
12	Other Freeway (not in Group 1)
15	Collector / Distributor Freeway Lanes / Facilities
16	Controlled Access Expressways
17	Controlled Access Parkways
2X - Divided Arterials	
21	Divided Arterial Unsignalized (55 mph)
22	Divided Arterial Unsignalized (45 mph)
23	Divided Arterial Class I
24	Divided Arterial Class II
25	Divided Arterial Class III / IV
3X - Undivided Arterials	
31	Undivided Arterial Unsignalized with Turn Bays
32	Undivided Arterial Class I with Turn Bays
33	Undivided Arterial Class II with Turn Bays
34	Undivided Arterial Class III / IV with Turn Bays
35	Undivided Arterial Unsignalized without Turn Bays
36	Undivided Arterial Class I without Turn Bays
37	Undivided Arterial Class II without Turn Bays
38	Undivided Arterial Class III / IV without Turn Bays
4X – Collectors	
41	Major Local Divided Roadway
42	Major Local Undivided Roadway with Turn Bays
43	Major Local Undivided Roadway without Turn Bays
44	Other Local Divided Roadway
45	Other Local Undivided Roadway with Turn Bays
46	Other Local Divided Roadway without Turn Bays
47	Low Speed Local Collector
48	Very Low Speed Local Collector
49	Truck Restricted Facilities
5X - Centroid Connectors	
51	Basic Centroid Connector
52	External Station Centroid Connector
53	Dummy Zone Centroid Connectors

Table II-2: Two-Digit Facility Type (continued)

Facility	Description
6X - One-Way Facilities	
61	One-Way Facilities Unsignalized
62	One-Way Facilities Class I
63	One-Way Facilities Class II
64	One-Way Facilities Class III / IV
65	Frontage Road Unsignalized
66	Frontage Road Class I
67	Frontage Road Class II
68	Frontage Road Class III / IV
7X – Ramps	
71	Freeway On / Off Ramp
72	Freeway On / Off Loop Ramp
73	Other On / Off Ramp
74	Other On / Off Loop Ramp
75	Freeway-Freeway Ramp
8X - HOV Facilities	
81	Freeway Group 1 HOV Lane (Barrier Separated)
82	Other Freeway HOV Lane (Barrier Separated)
83	Freeway Group 1 HOV Lane (Non-Barrier Separated)
84	Other Freeway HOV Lane (Non-Barrier Separated)
85	Non Freeway HOV Lane
86	AM&PM Peak HOV Ramp
87	AM Peak Only HOV Ramp
88	PM Peak Only HOV Ramp
89	All Day HOV Ramp
9X - Toll Facilities	
91	Freeway Group 1 Toll Facility
92	Other Freeway Toll Facility
93	Expressway / Parkway Toll Facility
94	Divided Arterial Toll Facility
95	Undivided Arterial Toll Facility
98	Acceleration / Deceleration Lanes - Toll Facility
99	Toll Plaza - Toll Facility

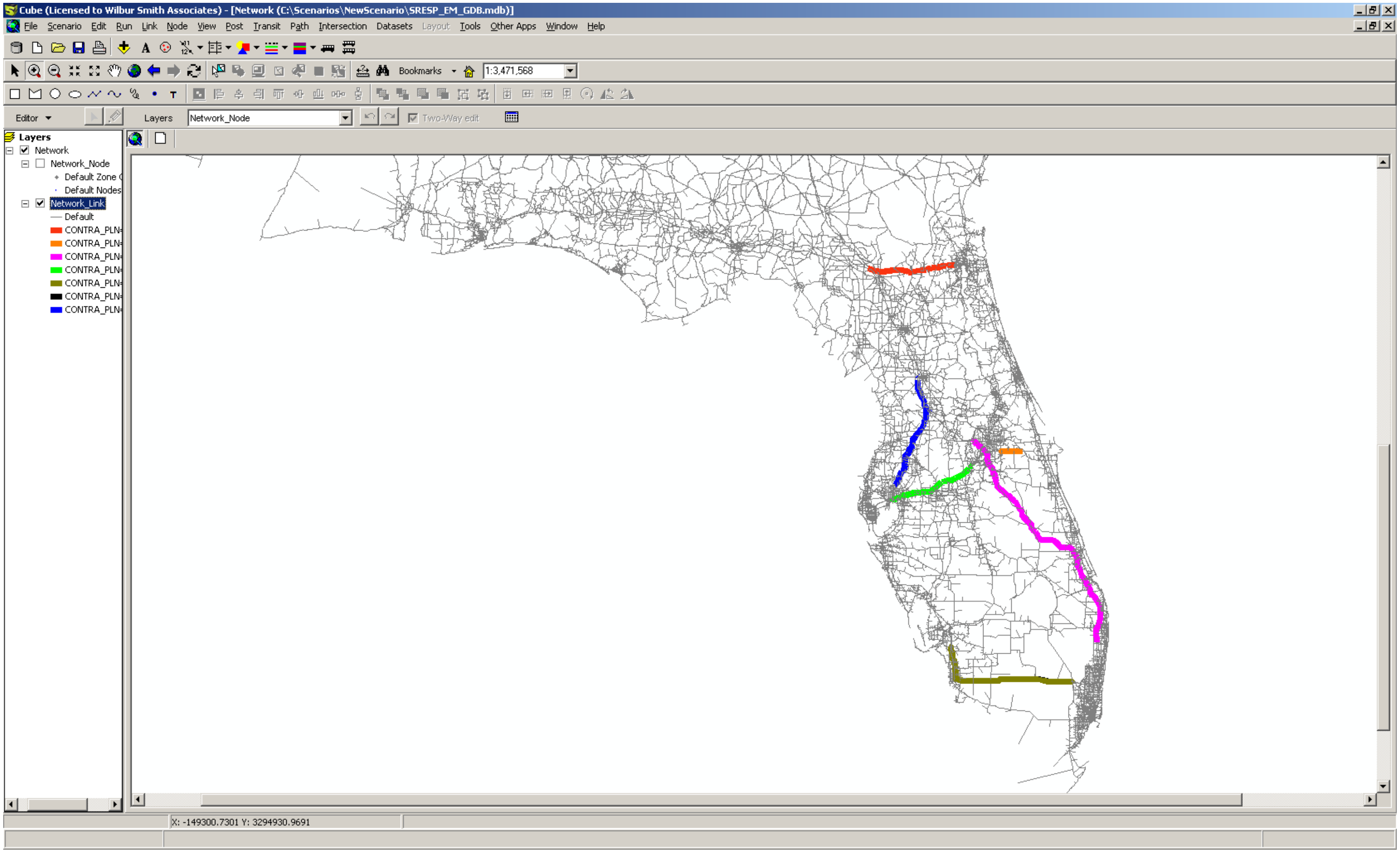
Source: Florida Model Task Force. See Appendix B or more detailed definitions of facility types.

Table II-3: Two-Digit Area Type

Area Type	Description
1X - Central Business Districts	
11	Urbanized Area (over 500,000) Primary City Central Business District
12	Urbanized Area (under 500,000) Central Business District
13	Other Urbanized Area Central Business District and Small City Downtown
14	Non-Urbanized Area Small City Downtown
2X - Central Business District Fringe Areas	
21	All CBD Fringe Areas
3X - Other Urbanized Areas	
31	Developed Portions of Urbanized Areas
32	Undeveloped Portions of Urbanized Areas
33	Transitioning Areas/Urban Areas over 5,000 Population
34	Residential Beach Area
4X - Outlying Business Districts	
41	Major Outlying Business Districts OBD
42	Other Outlying Business Districts OBD
43	Beach Outlying Business Districts OBD
5X - Rural Areas	
51	Developed Rural Areas/Small Cities under 5,000 Population
52	Undeveloped Rural Areas

Source: Florida Department Model Task Force. See Appendix C for more detailed definitions of area types.

Figure II-3: Reverse Lane Operations Plans in Florida



C. General Model Flow

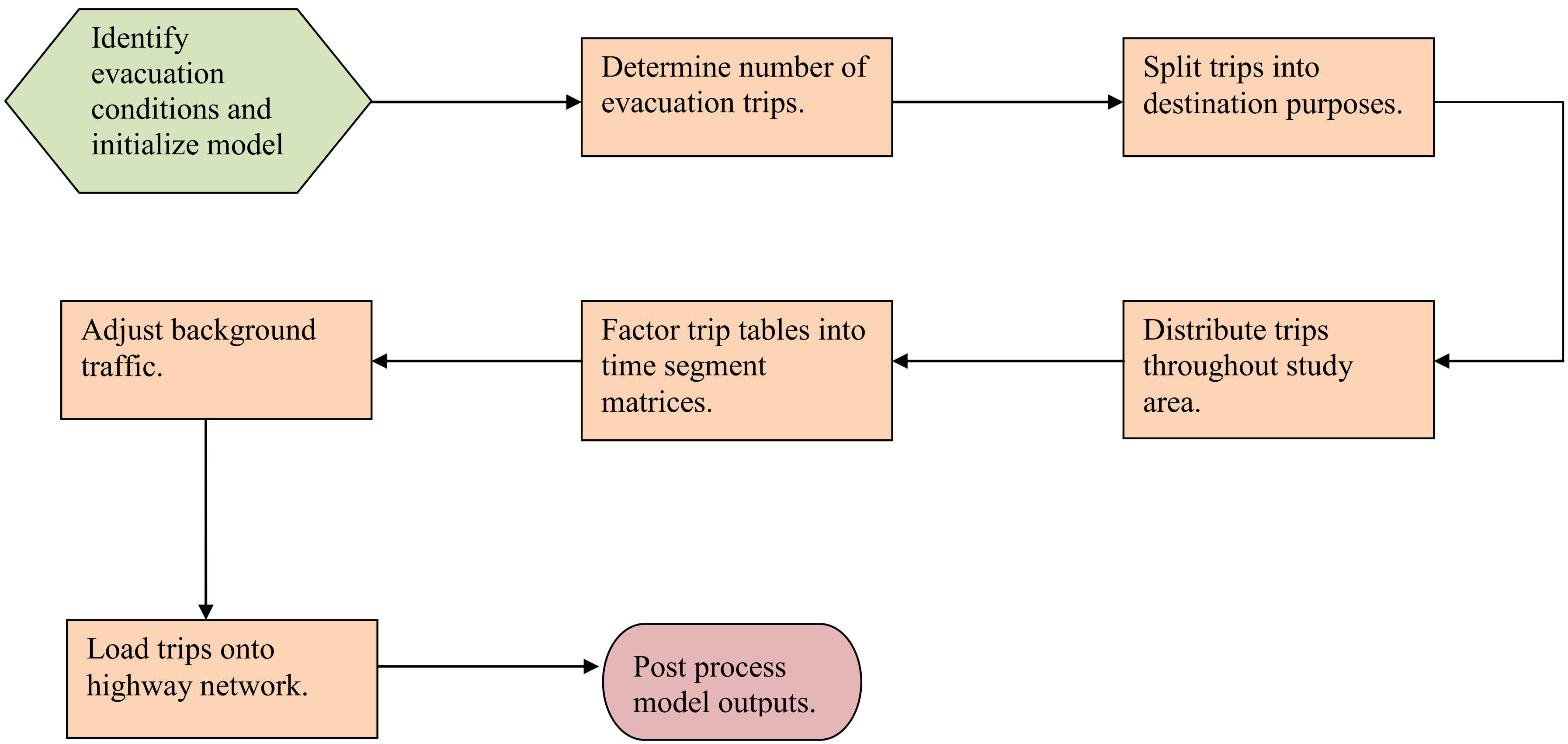
The sequence of processes which occur while a model is running can be thought of as a stream with successive inputs being introduced into a set of programs. These programs then generate outputs that are then used as inputs into other programs. This sequence continues until the model has finished executing. If this sequence can be thought of as a stream, then the manner in which data are processed can be thought of as the model flow.

The model flow for the evacuation model is somewhat similar to the model flow for traditional Four-Step travel demand models. Of the four steps that are common to traditional models, only trip generation, trip distribution, and trip assignment are used. These steps are further subdivided into a total of eight modeling steps. This ensures that the proper sequence of events occurs within the model to develop accurate and useful forecasts of evacuation traffic throughout Florida.

The following eight steps are represented graphically in the flowchart in **Figure II-4**:

1. Identify evacuation conditions and initialize model;
2. Determine number of evacuation trips;
3. Split trips into destination purposes;
4. Distribute trips throughout study area;
5. Factor trip tables into time segment matrices;
6. Adjust background traffic;
7. Load trips onto highway network; and,
8. Post process model outputs.

Figure II-4: General Model Flow



D. Initializing the Model

At the beginning of the model flow, the model needs to determine the hazard conditions representing the particular scenario that is being analyzed. This allows the model to accurately identify the areas that are subject to evacuation and to determine the intensity of the evacuation event. This process then establishes the appropriate rates that are used to determine the number of evacuation trips that are generated.

When the model run first begins, data pertaining to the characteristics of the evacuation scenario are fed into the model stream and read by the model. These data are input by the model user when the scenario is first prepared in the model user interface. Information such as storm strength, the counties that will be evacuated, and the type of scenario can all be input by the model user when the scenario is first created. These data can also be modified if a particular scenario needs to be altered for some reason.

The user can input scenario parameters in one of three places:

- Control File – a file named Control.DBF found in the scenario folder
- Catalog Keys – Cube catalog keys specifically defined for this model
- Miscellaneous Files – a small set of scenario specific input files

Each of these is discussed in more detail below. With the exception of the turn penalties file, each of these parameters can be modified using the Transportation Interface for Modeling Evacuations (TIME) developed for this model. Should a modeler attempt to run the evacuation model without using TIME, it will be necessary to locate and edit these files separately.

Storm Conditions

The model framework is designed to handle storm intensity as described by five standard storm categories. While having some association with the Saffir-Simpson Hurricane Scale, these intensities are designed to make reference to the anticipated level of storm surge that could be expected from a particular storm. These categories have a direct relationship to the evacuation zones that would be ordered to evacuate:

- Level A
- Level B
- Level C
- Level D
- Level E

As a requirement of this study, all regions were required to run evacuation scenarios that covered all five of these categories. For those counties that define fewer than five evacuation zones, a set of equivalencies were developed by the county and RPC. As a result, for each scenario the model correctly accounts for the threatened population.

The conditions of a particular storm event have a direct impact on the amount of evacuation traffic that is ultimately loaded onto the model's highway network. As part of the Statewide Regional Evacuation Study Program (SRESP), an extensive survey of individual's stated and observed preferences for evacuation behavior has been conducted. A set of rates have been derived from this survey that identifies the number of evacuation trips that are likely to be generated depending on the strength of a particular storm and the location where individual households are located throughout the affected areas.

Scenario Type

The evacuation model is designed to accommodate both a "100% response" scenario and a "planning assumptions" scenario. These two types of scenarios are described below:

- **100% Response** – This type of scenario can be used to analyze evacuation scenarios for growth management purposes. This scenario type assumes 100 percent compliance with an order to evacuate in the areas ordered to evacuate for site-built homes and 100 percent compliance throughout the entire county for mobile and manufactured homes. There is also an assumption that evacuations emanating from areas not ordered to evacuate (shadow evacuations) will be in accordance with the planning assumptions developed by the SRESP.

- **Planning Assumptions** – This type of scenario can be used to assist emergency management by providing an estimate of a clearance time that can be used when considering when to order an evacuation. This scenario type is based on the evacuation participation rates developed from the behavioral analysis portion of the SRESP and as such is considered to represent the most likely response to an impending storm by local residents of the impacted area. Planning assumption scenarios implicitly assume that some individuals who are ordered to evacuate will not and that some individuals who are not ordered to evacuate will. The specific rates used for each county's planning assumptions are documented in **Volume 5** of the SRESP report.

Control File (Control.DBF)

The creation of a scenario can entail the selection of a number of specific parameters that may change not only from scenario to scenario, but also from county to county within the same scenario. In order to minimize the number of catalog keys used in the evacuation model and enhance the flexibility and comprehensiveness of scenario specific parameters, a control file was developed. This control file is structured in the form of a look-up table that allows the user to modify specific values for parameters by county between scenarios. This table can be interacted with by opening the file in any software that can read a DBF file, including Cube Base. The file is located in the scenario folder for each scenario. The attributes and a description of each follow below. This information is also included in the data dictionary found in **Appendix A**:

- **CNTY** – County code number representing a county in Florida. The values are specifically assigned for the purposes of this model. The values are reported in **Appendix C** of this report.

- **EVAC** – This attribute determines whether or not an evacuation has been issued in this county.

  - 1 – An evacuation order is in effect, the nature of which is determined by the other attributes in the control file.

  - 0 – No evacuation order is in effect. If this value is zero, evacuation trips will *NOT* originate from this county.

- **PCT100RP** – This attribute determines whether or not to implement a 100% response scenario in the county.

  - 1 – 100% of individuals living in site-built homes in a zone corresponding to the evacuation event level will evacuate. 100% of individuals living in mobile homes regardless of where in the county they live will evacuate. Some percentage of individuals corresponding to the participation rates developed from the SRESP behavioral response survey living in site-built homes but outside of the affected evacuation zones will evacuate as "shadow" evacuation.

  - 0 – Some percentage of individuals whether in site-built or mobile homes, either within or outside of the evacuation zone will evacuate in a manner consistent with the participation rates developed from the SRESP behavioral response survey.

- **STRMCAT** – This attribute identifies the intensity of the evacuation event.
  - 1 – Level A
  - 2 – Level B
  - 3 – Level C
  - 4 – Level D
  - 5 – Level E

- **RESPONSE** – This attribute identifies which evacuation response curve will be applied to this county.

  - 1 – 6 hour curve
  - 2 – 9 hour curve
  - 3 – 12 hour curve
  - 4 – 18 hour curve
  - 5 – 24 hour curve
  - 6 – 36 hour curve

- **NOGO** – This attribute is used to determine whether or not the county is a suitable destination for out-of-county evacuation trips. This attribute can be used to test scenarios where evacuation traffic is carefully directed away from some parts of the state toward other parts. This will affect only evacuation traffic originating in a county within the RPC boundary area. Evacuation traffic originating in other counties will proceed according to their natural distributions without regard to this NOGO attribute.

  - 1 – Out-of-county evacuation trips may *NOT* be destined for this county
  - 0 – Out-of-county evacuation trips may be destined for this county

- **TRINCL** – This attribute is used to determine whether or not to include tourist population in the evacuation.
    - 1 – Tourists will be included in the evacuation population
    - 0 – Tourists will not be included in the evacuation population
- **TROVRD** – This attribute is used to override the default tourist occupancies in the TEZ database.
    - 1 – Override default tourist occupancy data
    - 0 – Use default zone specific tourist occupancy rates include in the TEZ database
- **TRRTE** – This attribute represents the percent occupancy of tourist dwelling units to use as an override. Unlike the default data which may be zone specific, this value is countywide. The values range from 0 to 100 in increments of 5.
- **PHASE** – Indicates when an evacuation should begin in a given county.
    - 1 – Evacuation begins in hour 1
    - 2 – Evacuation begins in hour 3
    - 3 – Evacuation begins in hour 6
    - 4 – Evacuation begins in hour 9
    - 5 – Evacuation begins in hour 12
    - 6 – Evacuation begins in hour 15
    - 7 – Evacuation begins in hour 18
    - 8 – Evacuation begins in hour 21
    - 9 – Evacuation begins in hour 24
    - 10 – Evacuation begins in hour 27

Catalog Keys

Cube models make use of a set of universal variables that can be designed by the user and coded into the model. These particular variables are known as catalog keys and give the user the ability to develop parameters that can change from scenario to scenario. Below are the names and description of each key:

- **YEAR** – This key is a two digit number representing the final two digits in a four digit year designation. For example, 06 would represent the year 2006. This key corresponds to the year that the scenario is taking place and is used to select the correct TEZ and network data. There are three options:
    - 06
    - 10
    - 15

- **EVACRGN** – This key is a number representing the region for which the model is being used. This is meant to reflect the regional version of each model and is not meant to be altered by the model user. The value is based on a numeric code assigned to each region for the purpose of this model. The values of these codes are identified in **Table II-4**.

- **TEZ** – This key is a number identifying the maximum TEZ number in the model. This should remain static.

- **EAZ** – This key is a number identifying the maximum Evacuation Assignment Zone (EAZ) number in the model. This value should not be changed by the user. The number of EAZ for each regional assignment model is listed in **Table II-4**.

- **UNIVERSITY** – This key is a number representing the number of students in residence at university group quarters according to which term is in session. This feature is not fully functional in the prototype but will be in the production version of the model. There are three values to this key:

    - 2 – Fall/Spring Session (100% in residence)
    - 1 – Summer Session (50% in residence)
    - 0 – Out of Session (0% in residence)

- **SFOLDER** – This key is a character string describing a file path for a folder in which scenario specific inputs and outputs are located for any given scenario.

- **GDB** – This is the name of a geodatabase containing scenario specific inputs and found in the folder described in the SFOLDER path.

- **GENREP** – This indicates whether the model should run all the way through assignment or only through trip generation.

    - 0 – Run full model
    - 1 – Run trip generation only

- **ANIMATE** – Indicates whether or not to create the packet log file so that packet animations can be created. If packet log files are created, they will be stored in the *SRESP_EM\Base* folder of the hard drive where the model is installed. All packet log files are identically named. This will cause new packet log files to overwrite pre-existing packet log files. The file is named EVACLOG.LOG. If the user wishes to save these files for multiple scenarios, the user must copy the existing EVACLOG.LOG file and save it elsewhere on their hard drive. Due to the size of the packet log file, it is recommended that this file be created only for smaller scenarios. Attempting to create a packet log file for a large scenario may result in the model crashing at the very end.

    - 30 – Create packet log file
    - 99 – Do not create packet log files.

Table II-4: EVACRGN and EAZ Values

Region	EVACRGN	EAZ
Apalachee	1	298
Central	2	831
East Central	3	923
North Central	4	809
Northeast	5	637
South	6	777
Southwest	7	990
Tampa Bay	8	613
Treasure Coast	9	777
West	10	576
Withlacoochee	11	541

Miscellaneous Parameter Inputs

The following files contain additional parameters that can be used to set up a scenario. Both of these files can be found in the scenario folder.

- **CNTRFLW.DBF** – This file allows the user to determine which reverse lane operations plans are in effect for a given scenario. The model assumes that all reverse lane operations are only in effect for the first 12 hours of the evacuation event. This file is described in **Appendix A**.
- **TURNS.PEN** – This is a standard CUBE turn penalty file. It allows the user to either penalize or prohibit specific movements in the model network. The format of this file is described in detail in the CUBE User's document.

E. Trip Generation - Number of Evacuating Trips

After the model has finished initializing it will begin to calculate the number of evacuation trips that are generated. Estimating an appropriate number of trips is essential to ensuring that the behavior expressed on the highway network during trip assignment is reflective of likely conditions during a real world evacuation event.

Use of Rates

The planning assumptions developed by the behavioral analysis are stored in a master rates file that is referenced by the model in order to determine the number of evacuation trips that a particular scenario can be expected to generate. This is particularly true of the "Planning Assumptions" scenarios since these will base their trip making characteristics on the results of the planning assumptions. The "100% Response" scenarios automatically override the planning assumption rates with values of 100 percent to reflect universal compliance with an order to evacuate for all mobile homes in the county and all site built homes in the evacuation zone.

The exact rates that will be applied will be determined by the scenario type, storm category, and the counties that will be ordered to evacuate. These conditions are set by the model user in the model user interface when a scenario is first created and is processed by the model during the initialization step of the model. All of the rates used in the model are stored in the **TripRatesMaster.dbf**.

Production Ends

The evacuation model conducts a trip generation based on a set of participation rates developed by the SRESP. These participation rates were developed from an analysis of behavioral data collected as part of a survey conducted for this study. The rates are applied to the small area data in order to determine how many trips are evacuating. These calculations are performed at the TEZ level. The process is as follows:

1. Total dwelling units are multiplied by the percent occupancy to establish a number of occupied dwelling units.

2. The number of occupied dwelling units is multiplied by the percent of households in each evacuation zone to establish a number of occupied dwelling units in each evacuation zone.

3. For each evacuation zone, the number of occupied dwelling units in that evacuation zone is multiplied by the evacuation participation rate corresponding to the intensity of the event to establish the number of households that actually evacuate.

4. The number of evacuating households is multiplied by the auto ownership rate to establish the number of available vehicles for the evacuation.

5. The number of available vehicles is multiplied by the vehicle use rate in order to establish what percentage of available vehicles is actually used during an evacuation. This is the total number of evacuation vehicle trips.

These total evacuation trips are further split into four purposes: Friends & Family, Public Shelter, Hotel/Motel, and Other. Each of these purposes is further divided based on whether the trip is destined to remain in-county or go out-of-county.

Attraction Ends

The other end of an evacuation trip, the attraction end, is calculated using a much more simplified methodology. Both public shelter and hotel/motel trips have clearly specified numbers of available destinations. Public shelters have clearly defined capacities. Since the trips in the model are being generated in terms of vehicle trips, a factor is used to convert the shelter capacities into an equivalent number of vehicles that could be expected to arrive at a specific shelter. A review of the behavioral data indicates average auto occupancy of 1.85 persons per vehicle headed toward a shelter:

Maximum vehicles to shelter = Open shelter capacity / 1.85 persons per vehicle

Hotels and motels both have a clearly defined set of available rooms for housing guests. In terms of the evacuation model each one of these rooms will be designated as a viable destination of an evacuation trip sheltering in a hotel or motel so long as the hotel or motel is not in an area ordered to evacuate.

Trips destined to shelter with friends and family or in other unspecified destinations require a somewhat special treatment. Since it is not possible to determine the exact location of each friend or family member that an evacuating household may choose to shelter with, the model will need to assume that there is a relatively even distribution of attraction ends among friends and family. Therefore, every household in the model will be designated as a single attraction for these trips so long as the home is not in an area ordered to evacuate.

Trips destined for other destinations not specified by the behavioral analysis include those evacuees sheltering in churches, work places, lodges, and other locations not recognized as a public shelter by the SRESP. Since it will not be possible to determine what exactly these locations are a similar process to that used for calculating friends and family attractions is employed. Every household in the model will generate one attraction for those trips headed to "other" shelter. This ensures that these trips are evenly distributed around the area with some clumping occurring in highly residential areas. Since churches are the typical "other" shelter that individuals evacuate to and since churches tend to locate in areas with high residential populations this results in reasonable destination locations for these evacuees.

Trip attractions are balanced at a regional level based on distribution percentages derived from the behavioral survey. These percentages identify what percent of out-of-county trips originating from each region will travel to each other region and out-of-state. Since one attraction is created for each dwelling unit and open shelter space in the model, this results in an extremely high number of attractions. If attractions were then balanced normally throughout the model, zones with very large numbers of attractions would dominate the model's trip distribution.

While not necessarily a problem in and of itself, a disparity of zone scale throughout the model particularly in regard to zones outside of Florida would result in too many trips leaving Florida. By balancing the trips on a regional level, trips can be easier spread to zones with similar scales of data. Within a region, attractions are still balanced similar to how attractions are balanced in standard travel demand models. The regional distribution factors derived from the behavioral survey are shown in **Table II-5**. Within a region, attractions are still balanced similar to how attractions are balanced in standard travel demand models. This also applies to in-county evacuation trips.

Table II-5: Percentage of Out-of-County Trips Travelling between Regions during an Evacuation

		To:											
	Region	Apalachee	Central Florida	East Central Florida	North Central Florida	Northeast Florida	South Florida	Southwest Florida	Tampa Bay	Treasure Coast	West Florida	Withlacoochee	Out of State
From:	Apalachee	31.19%	0.13%	1.10%	2.28%	2.11%	0.00%	0.13%	0.72%	0.30%	3.50%	0.76%	57.80%
	Central Florida	5.91%	9.82%	13.00%	4.41%	4.69%	0.00%	4.19%	5.91%	5.41%	0.73%	1.73%	44.20%
	East Central Florida	2.53%	1.71%	27.11%	5.41%	5.88%	1.53%	2.65%	6.70%	0.76%	1.41%	3.12%	41.20%
	North Central Florida	5.23%	0.73%	3.63%	15.17%	6.26%	0.31%	0.33%	3.09%	0.23%	1.26%	1.99%	61.80%
	Northeast Florida	3.72%	0.75%	4.21%	6.59%	10.33%	0.59%	0.59%	1.79%	0.16%	1.89%	1.99%	67.40%
	South Florida	1.99%	3.37%	20.91%	2.07%	3.37%	24.51%	5.75%	2.07%	8.96%	0.54%	3.06%	23.40%
	Southwest Florida	1.39%	5.23%	15.94%	3.91%	3.28%	4.60%	11.03%	8.38%	3.15%	0.76%	5.36%	37.00%
	Tampa Bay	3.21%	3.73%	14.12%	2.81%	4.48%	2.18%	1.32%	15.67%	2.01%	0.52%	7.35%	42.60%
	Treasure Coast	2.77%	1.52%	22.84%	3.04%	4.36%	4.49%	3.96%	9.37%	11.48%	0.20%	1.98%	34.00%
	West Florida	6.25%	0.24%	2.10%	0.90%	3.49%	0.42%	0.07%	0.31%	0.31%	8.68%	0.80%	76.40%
	Withlacoochee	2.39%	1.66%	12.35%	7.37%	3.27%	0.99%	0.67%	6.54%	0.47%	1.25%	15.00%	48.00%

Splitting Trips into Destination Purposes

Once the number of evacuation trips has been determined it is necessary to divide the trips into various trip purposes. These purposes are based on the type of destination that an evacuee is headed to and the relative location of that destination. There are four types of destinations and two relative locations for a total of eight trip purposes. The eight purposes are listed below:

- Friends & Family – In County
- Public Shelter – In County
- Hotel/Motel – In County
- Other – In County
- Friends & Family – Out of County
- Public Shelter – Out of County
- Hotel/Motel – Out of County
- Other – Out of County

Determining Trip Purposes

The same behavioral analysis that establishes the evacuation and vehicle use rates used to determine the number of evacuation trips that are being generated by the model is also a source of data for determining the various destinations that these evacuation trips are headed to. Similar to the other two rates just mentioned, the planning assumptions developed for the SRESP also include rates that identify what percentage of the evacuees are destined for Friends & Family, Public Shelter, Hotel/Motel, and Other. The assumptions also provide rates on how many trips remain in the evacuating county and how many leave the county. These rates are also stored in the **TripRatesMaster.dbf** file.

F. Trip Distribution

After the model has determined how many evacuation trips there will be in a given scenario, split those trips into purposes, and balanced the trip ends for those purposes, the model then performs a trip distribution. The trip distribution step in the model connects each production end to a unique attraction end. The end result is a trip table containing origins and destinations for each trip in the model. Typically, origin zones are referred to by the letter I and destination zones are referred to by the letter J. An Origin-Destination matrix, also known as an OD matrix, is one of the principal inputs into trip assignment. This matrix tells the model where each trip is coming from and to where it is going.

Overall Distribution

Trips are distributed using a standard gravity model. Since there are currently insufficient data to accurately correlate specific evacuation origins to specific evacuation destinations, the model must make use of generalized assumptions for trip distribution. The data from the behavioral survey only captured destination data in the roughest terms. Respondents were only asked to identify destinations if they were evacuating out-of-county. If they responded positively, the survey only asked the respondents which city they evacuated to and nothing more specific.

Early attempts during model development to develop trip length frequency distribution curves resulted in highly normalized curves that tended to distribute higher percentages of evacuees to under populated areas of the state.

In response to this, the model uses a flat friction factor for the gravity model and instead relies heavily on regional attraction balancing during trip generation to guide the trip distribution. In order to accomplish this, a trip distribution model is run for each region during the model run. This ensures that trips produced for each county are directed to their appropriate destinations as dictated by the distribution percentages derived from the behavioral response survey. In this way, trips are distributed among the various regions according to survey data and are distributed within regions according to where the highest population levels are. While this process is not particularly dynamic, the relatively short horizons that the model is designed to address along with the expected frequency of future data collection efforts means that this method is ideally suited for distributing trips in a logical manner.

Figure II-5 shows the trip length frequency distribution of out-of-county friends and family trips leaving the Tampa Bay during an evacuation. **Figure II-6** shows the total distances traveled by friends and family trips leaving the Tampa Bay region during an evacuation.

Skims

Unlike conventional models where networks are skimmed based on travel times, it is assumed that during an evacuation event, all sense of travel time is obscured by the intense congestion conditions that will be experienced by the evacuee. Consequently, the networks are skimmed based on distance. Distance based skims are more likely to provide an accurate consideration of choice of destination as travelers are more likely to base their trips on proximity to destination.

Once the skims have been developed they are split into two separate files. One file is for in-county evacuations and only retains meaningful skims for zone pairs representing intra-county movements. The other file is for out-of-county evacuations and only retains meaningful skims for zone pairs representing inter-county movements. In each file, the undesirable movements are coded with a specific value by the model in order to exclude those movements from consideration in the gravity model.

Matrix Manipulation

Because the trip distribution model loops on itself once for each region, the model will produce 12 evacuation trip tables (the twelfth region corresponds to areas outside of Florida). The model will then combine these trip tables into a single trip table. This trip table represents all evacuation trips in the model regardless of origin and destination.

Once the trip tables are combined, the model will need to compress the matrices in order to make them suitable for trip assignment. It is at this point that the model aggregates zone pairs from the TEZ scale to the EAZ scale mentioned previously in this document under the section on zone data. The result is that a 17,328 x 17,328 matrix is compressed into a much smaller matrix ranging from approximately 200 x 200 to 1,000 x 1,000 depending on the region. This creates a data set that the computer will be much better able to process during trip assignment.

Two additional matrix compressions are performed. One shows county to county flows. The other shows region to region flows. Neither of these matrices is used during the modeling process, but the data are made available for analysis purposes. The region to region flows are ultimately based on the distribution percentages derived from the behavioral survey. As such, they should have a direct correlation to observed behavior as reported by the behavioral response survey conducted by the SRESP. The county to county flows are based on population levels per TEZ within each region.

Figure II-5: Out-of-County Friends and Family Trip Length Frequency Distribution for Tampa Bay

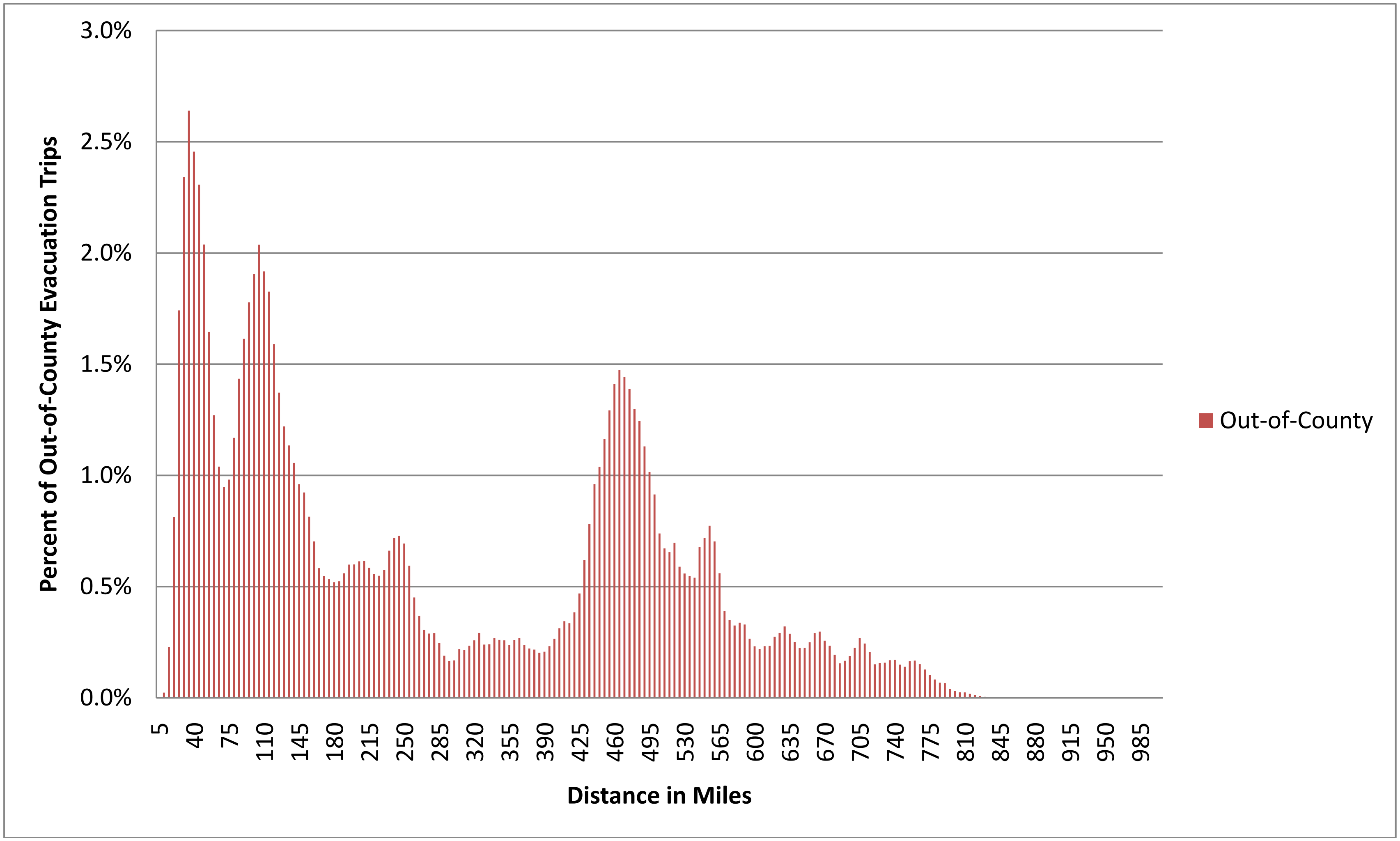
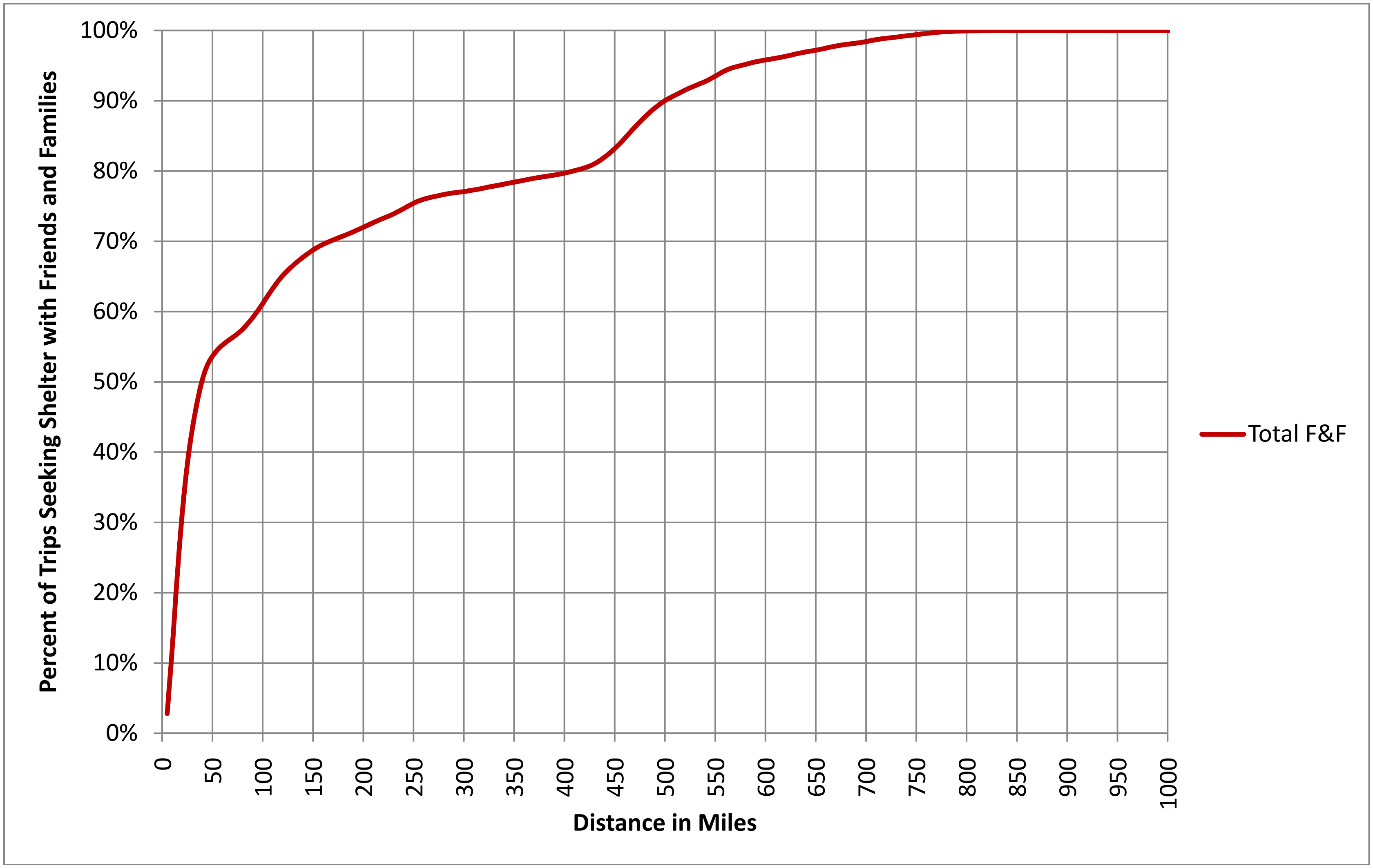


Figure II-6: Total Distance Traveled of Evacuating Tampa Bay Friends and Family Trips



Rounding

After the matrices have been combined and compressed, the model proceeds to round the trip data in the matrix file. The reason for this is that Cube AVENUE has to generate a minimum of one packet for each matrix cell that contains at least some trip data, even if these data amount to less than one trip. This is possible since Cube uses floating point math to perform its calculations. Decimal values are common. Since this would result in a number of extremely small trip values being treated as complete trips, the numbers are rounded to the nearest whole number. This reduces the data burden on the computer and allows the assignment to function more efficiently. This also allows the model to simulate individual trips during the assignment at a one vehicle to one packet ratio, a ratio ideally suited for the purposes of evacuation modeling, and avoids the illogical phenomenon of tracking fractional trips through the network (such as a packet representing 0.25 trips).

Time Segmentation

The final step of the model prior to initiating the trip assignment sequence is to segment the trip table into discreet time periods. Both the trip generation and trip distribution steps of the model develop data at an event-wide scale. These trips need to be segmented according to when during the event they begin travelling on the road. To accomplish this, a set of factors representing various response curves are used by the model.

The time segments are broken down into half hour intervals. Since the model covers a period of 96 hours, this comes out to a total of 192 segments. The longest curve included in the model represents 36 hours. Therefore, at most, trips will be populated for 72 separate matrices corresponding to 72 half-hour time segments.

Phasing

The evacuation model has been developed to accommodate inter-county phased evacuation in order to test scenarios in which different counties are ordered to evacuate at different times. If no phased evacuation is desired, the model treats all counties as if they are evacuating in Phase 1 and does not create any other phases. If a phased evacuation is desired, the model user can indicate so by designating a phase number for each county in the model user interface. There are ten available phase numbers so that each county can be included in its own phase. These phases are described in **Table II-6**.

The model executes phasing by taking the selected evacuation response curve used for a particular scenario and off-setting it by an amount of time selected by the model user.
For example, if the model user wants to test a two tiered evacuation in South Florida, the user may decide that Monroe County (the Florida Keys) should be ordered to evacuate 24 hours before Miami-Dade County. The model user would then place the Florida Keys in Phase 1 and Miami-Dade County in Phase 9. This would result in Miami-Dade County evacuation trips not beginning until 24 hours after the Florida Keys have begun their evacuation.

Table II-6: Available Phases

Code	Description
1	Evacuation begins in hour 1
2	Evacuation begins in hour 3
3	Evacuation begins in hour 6
4	Evacuation begins in hour 9
5	Evacuation begins in hour 12
6	Evacuation begins in hour 15
7	Evacuation begins in hour 18
8	Evacuation begins in hour 21
9	Evacuation begins in hour 24
10	Evacuation begins in hour 27

Response Curves

As part of the behavioral analysis a set of evacuation response curves have been developed. These curves represent the percentage of the evacuation trips that have begun their evacuation over time. These curves are used to load evacuation trips onto the highway network over time so that the compounding effects of a congested evacuation may be more clearly analyzed. Based on a review of the available response curves and discussions with the SRESP, the following two assumptions are held to be true for every scenario:

1. All evacuation scenarios begin the modeling period at a point in time consistent with when an order to evacuate has been given; and,
2. Ten percent of all evacuation trips have vacated the area prior to when an order to evacuate has been given and are already considered to have cleared the network. (For the 36 hour response curve, this is assumed to be only five percent due to the protracted nature of the response).

These two assumptions are further supported by the following four assumptions that will need to be held true due to current limitations in the data and technology for conducting evacuation models:

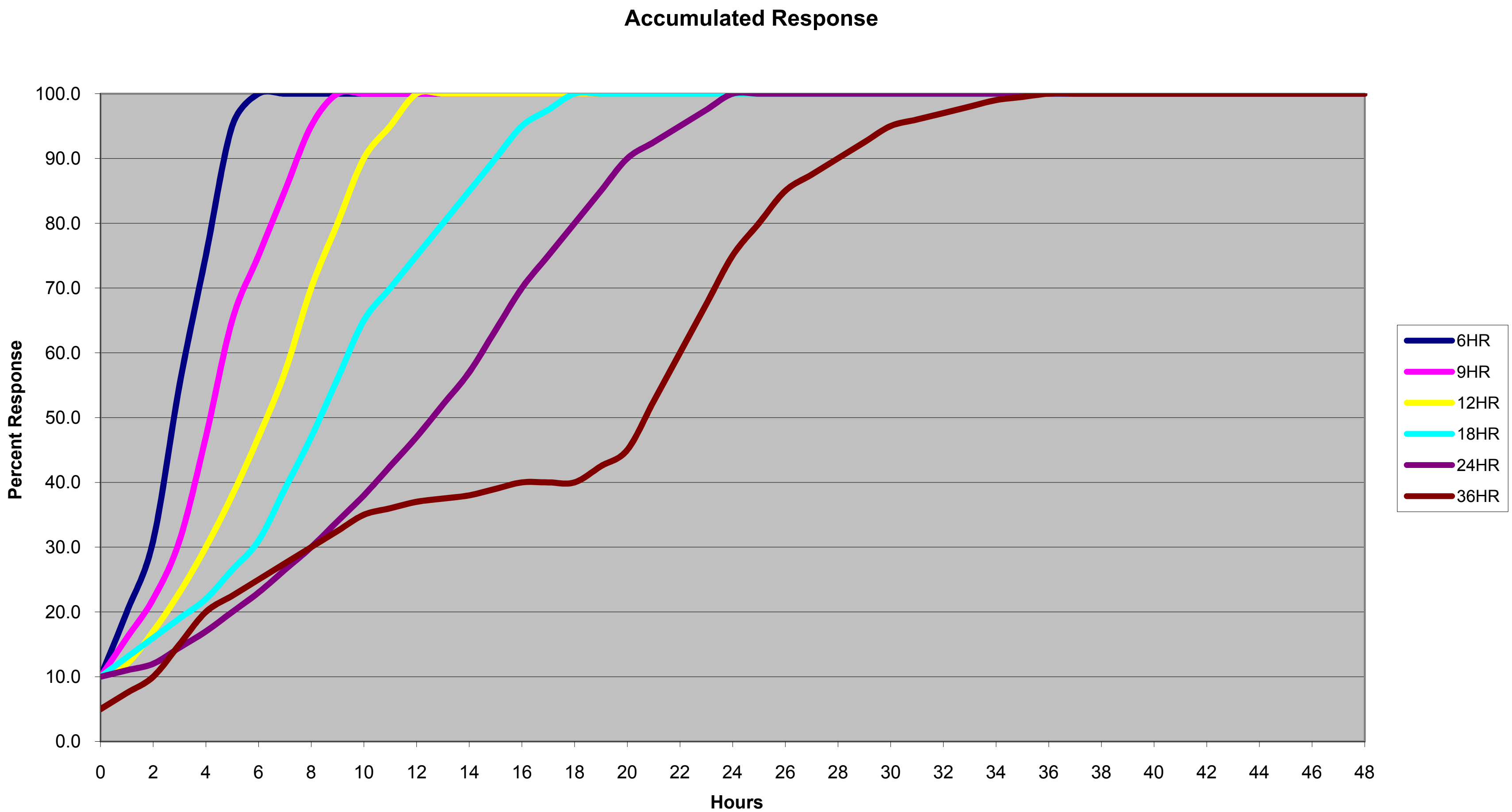
1. Evacuation orders are issued at 7:00 AM;
2. Evacuation orders are issued on a Monday morning;
3. Evacuations occur during a standard work
4. Trips evacuating prior to an evacuation order left the previous evening;
5. All evacuation trips begin from the evacuee's home; and,
6. The response curves take into account all preparation time leading up to an evacuation such as the time it takes to:
    a. Gather together family members;
    b. Collect personal belongings; and,
    c. And secure the homestead.

The model user can select from six reasonable response curves. These curves are shown in **Figure II-7** and are listed below:

1. 6 hour response
2. 9 hour response
3. 12 hour response
4. 18 hour response
5. 24 hour response
6. 36 hour response

Once the time segmentation is complete, the model begins the process of making adjustments to the highway network related to background traffic and start the highway assignment.

Figure II-7: SRESP Evacuation Model Response Curves



G. Highway Assignment

The purpose of highway assignment is primarily to determine how much traffic is traveling along a particular stretch of road during the analysis periods. The traffic that has been assigned to the model's highway network is often referred to as the model volume of a given highway link. Traditional four step models are typically designed to provide these model volumes for a 24 hour period. Such volumes are known as daily assignments.

Many models have more recently begun to employ a technique known as time-of-day assignment. Time-of-day models divide a 24 hour day into smaller periods typically corresponding to the morning and evening peak periods (a three hour period encompassing the morning or evening rush hours) and an off-peak period. The time-of-day model may be further disaggregated to distinguish between a midday off-peak period (from the morning peak period to the evening peak period) and an overnight period (from the evening peak period to the morning peak period). These assignments are known as time-of-day assignments. Time-of-day assignments for each of the modeled time periods may be aggregated to provide a daily assignment volume.

Assignment volumes can be analyzed to provide useful information on forecasted travel patterns and areas of likely congestion. Along with volumes, other statistics that are typically derived from highway assignments include vehicle-miles-traveled, vehicle-hours-traveled, congested travel times and speeds, and level-of-service.

The Unique Character of an Evacuation

Traditional four-step models are designed to provide useful information to transportation planners. As such, they tend to represent travel behavior on a "typical" day. These models typically assume that a certain number of people get up in the morning and go to work each day. They assume that people will go shopping, eat at restaurants, and visit with friends each day. They assume that children will go to school each day. Evacuation events significantly deviate from this typical behavior.

During an evacuation event, it is assumed that the ordinary trip making behavior of the residents in the modeled area is disrupted. Instead of going to work or shopping at the mall, individuals spend their time preparing to either weather the storm at home or evacuate. Trips that are made and are not for the purposes of an evacuation may generally be shorter trips closer to home. The most significant kind of trip that is made during an evacuation event is the evacuation trip itself.

There are several distinct characteristics of evacuation trips that differentiate an evacuation model from a traditional four-step model:

1. Most evacuation trips begin within a very well defined window of opportunity as opposed to occurring naturally throughout the day. This window typically begins when an order to evacuate has been given;
2. Origins for evacuation trips are highly concentrated corresponding to areas threatened by storm surge flooding;
3. Destinations for evacuation trips are spread throughout the region, State, and beyond;

4. Items 2 and 3 above result in a relatively unidirectional flow of trips away from the threatened area and toward areas of safety;
5. A larger proportion of evacuation trips will exit the county or region than is typically assumed in a traditional four-step model; and,
6. Roadway segments that allow for inter-county or inter-regional travel are relatively few.

As a result of the aforementioned items, an evacuation event can be stated as a phenomenon where a large number of vehicles coming from the same place are leaving at the same time, going in the same direction, and taking the same roads. This increases the likelihood of experiencing severe congestion along the highway system. This is particularly true at critical points along the network such as bridges and freeway interchanges.

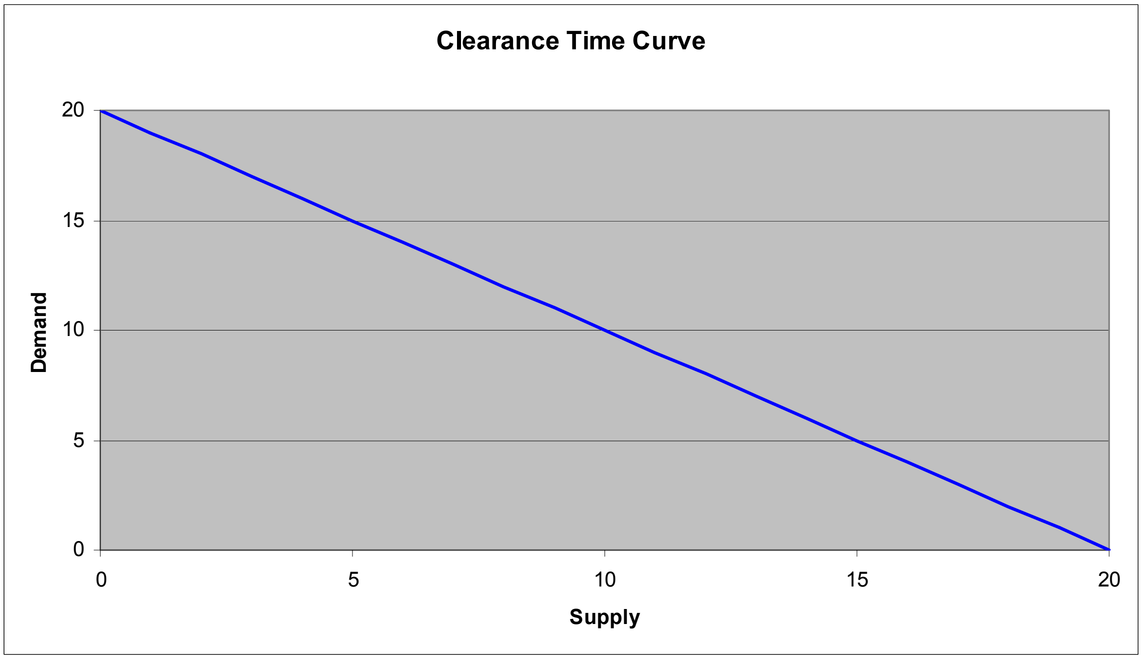
Furthermore, the most valuable statistic pertaining to an evacuation is the amount of time it takes evacuees to get to a place where they are no longer in danger. Since the effects of congestion on the travel times of evacuees fluctuates as the amount of traffic increases and decreases, it becomes vital to be able to measure the progress of an evacuation over time.

Capacity during Assignment

The key focus when conducting a transportation analysis of an evacuation event is the evacuation traffic itself. A lot of effort is spent developing an accurate assessment of the nature of this evacuation traffic. Rigorous surveys are conducted to identify how the population of a given area will react under certain conditions. These data are further analyzed in order to determine the likelihood of evacuees traveling to specific destinations. Locations of population are compared against intensive studies of coastal topography to determine who lives in an area likely to be inundated during a storm event. All of this information is used to determine who would be evacuating in a given scenario, how long it takes for them to begin their evacuation, where they are coming from, and where they are going to go. This is the demand element of analyzing an evacuation event. Once the evacuation demand has been established, it is then necessary to determine the length of time that it takes for the evacuees to reach safety. This measure is often identified as a clearance time. The clearance time is the critical piece of information sought after an evacuation transportation analysis.

The clearance time is a function of supply and demand. The demand element has just been described in the preceding paragraph. The supply element is the ability of the transportation system to handle a certain amount of traffic. This is known as network capacity. The higher the network capacity, the more traffic a transportation system can handle. The more traffic a transportation system can handle, the faster that traffic will move through the system. The faster that traffic moves through the system, the sooner the evacuees will reach safety. This can be summarized as follows: as supply increases and demand decreases the clearance times get shorter. Conversely, as supply decreases and demand increases the clearance times get longer. This is depicted below in **Figure II-8**.

Figure II-8: Clearance Time Curve



Typically, supply is determined by the nature of the transportation system. A transportation system is made up of all facilities used to move trips through an area. This can include not only roads, but also rail lines, canals, airways, etc. The SRESP evacuation model is only looking at the road system (also known as a highway network). The capacity of a road system is a function of the quantity and quality of the lane miles in the system.

Each segment of road may be classified according to particular characteristics such as the designed purpose of the road, the type of land-use surrounding the segment, the presence of traffic signals, and so forth. These characteristics are typically represented by a set of network attributes used in travel demand models in the State of Florida such as facility type and area type.

In general, roadway capacity is static in any particular scenario. When modeling travel demand for typical transportation planning purposes, roadway capacities are only altered in order to measure the impacts of a shift in supply to the forecast traffic. For example, lane widening, road closures, new road construction, and new freeway interchanges can all have dramatic impacts on traffic and are typically the focus of modeling transportation alternatives. Therefore, an analyst could determine what the relative impacts are for a region whether a road is widened or not. Such analyses typically look at planning horizons measured in decades and may consider projects that are completely hypothetical. Since transportation analyses for evacuation events are conducted with much more immediate horizons in mind and because these analyses are concerned with evacuation behavior on existing system conditions, the roadway capacity due to infrastructure is considered to be fundamentally static.

There is, however, another factor that impacts the capacity of a roadway system. This other factor is the cumulative effects of traffic consuming capacity as it travels along the highway network. The more traffic that enters the network, the less capacity there is available for new traffic to use. Eventually, enough capacity could be consumed that it would restrict the ability of traffic to flow through the network. It is this factor affecting the roadway capacity that an analysis of evacuation traffic is most concerned with.

Background Traffic

The traffic that consumes the roadway capacity of a transportation system during an evacuation can be divided into two groups. The first group is the evacuation traffic itself. Once the evacuation demand is determined, this information is converted into a number of vehicles evacuating over time. These evacuation trips are then placed on a representation of the highway network by a model. The model determines the speed at which these trips can move and proceeds to move the evacuation trips accordingly. The result is a set of clearance times. The process by which evacuation demand is developed and modeled for the purposes of this study are detailed in the other working papers developed as a part of this series.

The second group of traffic is known as background traffic. Background traffic, as its name implies, is not the primary focus of an evacuation transportation analysis and is accounted for primarily to impede the movement of evacuation trips through the network. These trips represent individuals going about their daily business mostly unconcerned with the evacuation event. For the most part, background traffic represents trips that are relatively insensitive to an order to evacuate and are thus said to be occurring in the "background." Even though background traffic is relatively insensitive to evacuation orders, it is important to account for background traffic since it can have a dramatic impact on available roadway capacity. This in turn can severely affect evacuation clearance times.

One method that could be used to model background traffic would be to develop a separate set of trip tables that would reflect the background traffic trips. These trip tables would be loaded onto the network simultaneously with the evacuation traffic. While many individuals would consider this method ideal, there are significant obstacles that prohibit the implementation of this particular method, as identified below.

1. *Reasonableness of Trip Tables*: In order for this method to be effective, a set of reasonable trip tables would have to be generated. This would mean calculating typical daily travel demand throughout Florida. In theory, this could be accomplished using the Florida Statewide Model (FLSWM). Early decisions made in this study by the SRESP study group resulted in preferring demographic geography used by Florida's Regional Planning Councils (RPCs) to the FLSWM zone system. This created a significant disassociation of the evacuation model data from the FLSWM data. Furthermore, for the purposes of the evacuation model, it was necessary to disaggregate the zone data as much as was possible in order to be accurate in identifying threatened population. This resulted in making any association between the FLSWM trip tables and the evacuation model rather speculative.

2. *Volume of trips*: The sheer volume of trips that would have to be modeled would be enormous. The most intense evacuation scenario tested on the evacuation model during development considered a level E (the most severe) evacuation event with a 100%

participation rate for individuals in Hillsborough, Manatee, Pasco, and Pinellas Counties. The model estimated more than three quarters of a million evacuation trips for the event. Even though the amount of background traffic could be factored down in counties where an evacuation order was given, one would have to assume that travel behavior was more or less business as usual in non-evacuating counties. The FLSWM model estimates roughly 34.3 million automobile trips daily for year 2005 conditions for all of Florida. Depending on the region being modeled, very large portions of these 34.3 million trips would have to be modeled explicitly. This would depend on the geographic scope of the model for a given region. Furthermore, the evacuation model covers a 96 hour period. In practice, this could result with models attempting to use dynamic traffic assignment (DTA) to simulate tens of millions of trips.

3. *Geographic scope*: It is the intention of this analysis to be able to assess the impacts of evacuation traffic at an interregional level. As such, the evacuation model will need to be able to conduct DTA over extremely large geographic regions. The largest modeling area used in the evacuation model extends from Key West to St. Augustine and from Clearwater to Daytona. This encompasses three of the state's most traffic intensive areas: Tampa Bay, South Florida, and the greater Orlando area. Models like this could easily have over a thousand zones and close to 100K links. While numbers such as these have been typical for static metropolitan travel demand models for quite some time now, this pushes the limit of what is possible with DTA in a desktop computing environment. One of the stated objectives in developing the evacuation model was to create a tool that could be housed and executed at the RPCs with minimal additional expense.

4. *Computing limitations*: The model test that was mentioned above in item 2 ultimately took 48 hours to run. Initial tests could not even be completed given limitations inherent in the software and hardware at the time the tests were performed. Since then, the software developer has been highly responsive in upgrading their product. The model is now able to handle the conditions mentioned in item two. Though the software can now handle these conditions, explicitly modeling background traffic could multiply the amount of data that the model would have to process by more than a factor of 10. This would far exceed the enhanced capabilities of the software. Furthermore, this intense data situation begins to confront serious hardware and software limitations found at the desktop environment. While the computer industry as a whole is making significant progress that may render these concerns moot in the next couple of years, for the time being, they remain prohibitive obstacles in the way of explicitly modeling background traffic. In order to do so, the model would have to be severely restricted in scope so as to only account for one to three counties at a time at most. This has repeatedly been pointed out throughout the study by virtually all stakeholders as an inadequately small scale over which to conduct a transportation analysis of an evacuation event.

It is for these reasons that background traffic could not be modeled explicitly. Though accounting for background traffic poses many technical challenges, the need to reflect the impact of background traffic is too vital to disregard the phenomenon of background traffic altogether. Another method that could provide a suitable representation of the impacts of background traffic had to be developed.

Methodology used to Account for Background Traffic

There are two dynamics at work when evacuation traffic and background traffic interact with one another. The first is the effect of background traffic displacing evacuation traffic as background traffic attempts to use the same roads as the evacuation traffic. The second is the effect of evacuation traffic displacing background traffic. As vehicles move along the network and try to get onto certain roads they leave less room for other vehicles to use those same roads. As background traffic builds up there is less room for evacuation traffic to move, and vice versa. While the effect that evacuation traffic has on background traffic may be of some interest to those who are concerned with disruptions in daily trip making behavior during an evacuation event, for the purposes of this study we are much more interested in the effect that background traffic has on evacuation clearance times.

The effect that background traffic has on evacuation traffic can be stated in terms of available capacity. The more background traffic there is on a segment of road, the less capacity is available for evacuation traffic to use. Following this logic, it becomes apparent that by causing the available capacity to fluctuate throughout the evacuation event, one is able to sufficiently account for the impact of background traffic. Therefore, the evacuation model uses a technique to fluctuate available network capacities throughout the evacuation event to represent the greater or lesser presence of background traffic consistent with observed daily behavior.

Background Traffic Curves

In order to properly represent background traffic, it was necessary to have an understanding of how traffic generally behaves over a 24 hour period. To accomplish this, data from the *Florida Traffic Information* DVD available from the Florida Department of Transportation was used. A sample of traffic count locations was taken from throughout the state with the intention of establishing suitable cross sections of hourly traffic behavior for various functional classes. Once these data were collected, sets of average peaking characteristics were developed for each functional class. These peaking characteristics represent how traffic builds up and then dissipates over time on a particular segment of road relative to the peak volume experienced by that segment of road. These are shown in **Figure II-9**, where the horizontal axis depicts the hour of the day and the vertical axis depicts the percentage of daily traffic.

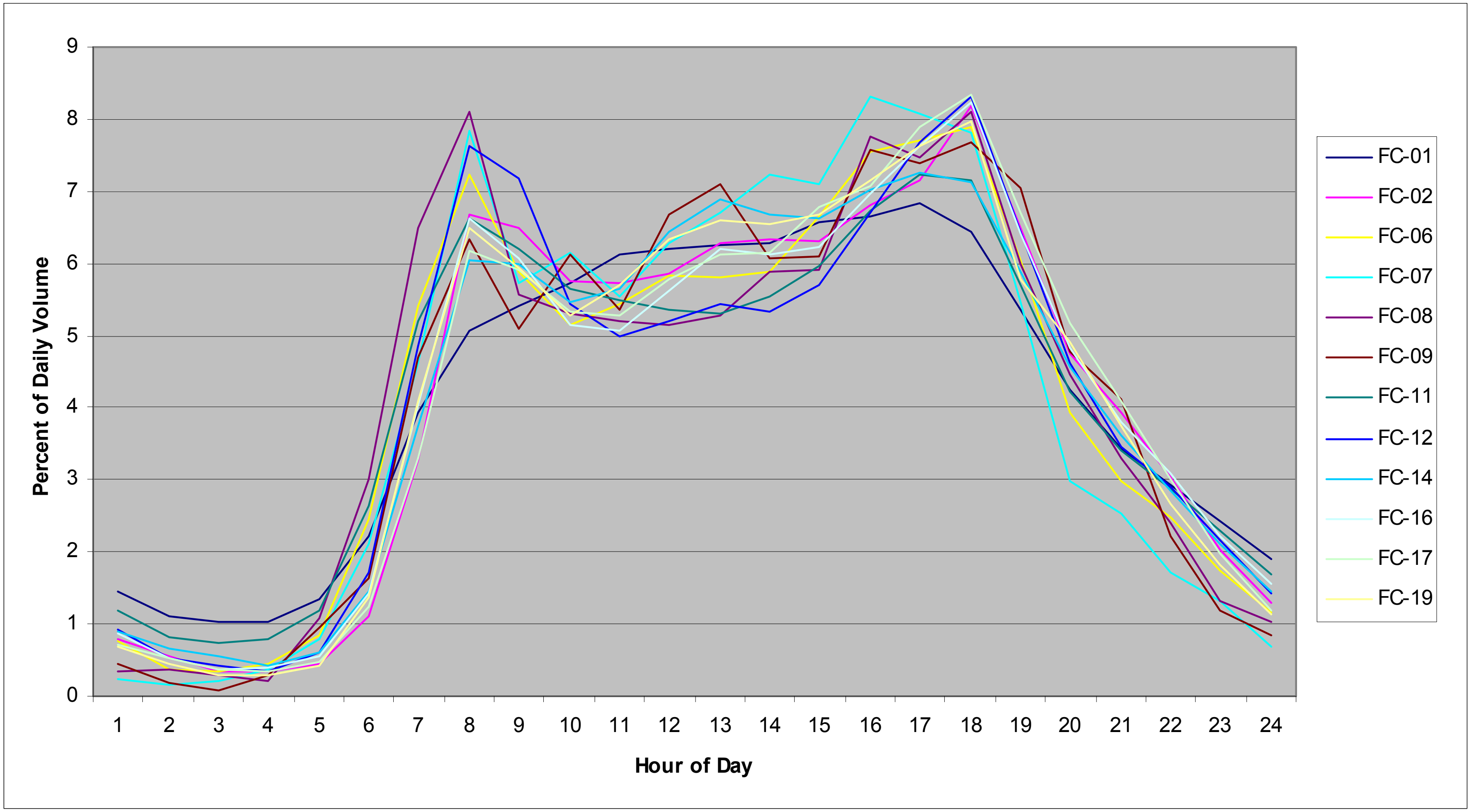
After these peaking characteristics were developed they were used to create curves that reflected the amount of capacity available on a given road segment assuming that peak volume was a certain percentage of available capacity. For example, a curve would demonstrate how much capacity was available throughout the day if peak volume represented 100 percent of capacity. This curve can be shown in **Figure II-10**, where the horizontal axis shows the hour of the day and the vertical axis shows the percentage of available capacity.

As illustrated between the two figures, there is an inverse relationship between the chart shown in **Figure II-9** and the chart in **Figure II-10**. Under the 100 percent assumption for background traffic, the hours containing the highest daily traffic (peak volume) in **Figure II-9** corresponds to the hours of least available capacity (zero percent) in **Figure II-10**. The highest capacity availability occurs over the nighttime hours while the lowest capacity availability occurs at rush hour.

Since we must use averages to approximate peaking characteristics for functional classes regardless of where a particular facility is located, it is not reasonable to assume that the 100 percent of capacity assumption is reasonable for all cases. Therefore, multiple curves were developed that represent different capacity consumption assumptions. **Figure II-11** illustrates a set of curves that assumes that peak volume consumes only 75 percent of capacity. As shown in the figure, there is generally a higher amount of available capacity throughout the day. As with **Figure II-10**, the horizontal axis depicts the hour of the day and the vertical axis shows the percentage of available capacity.

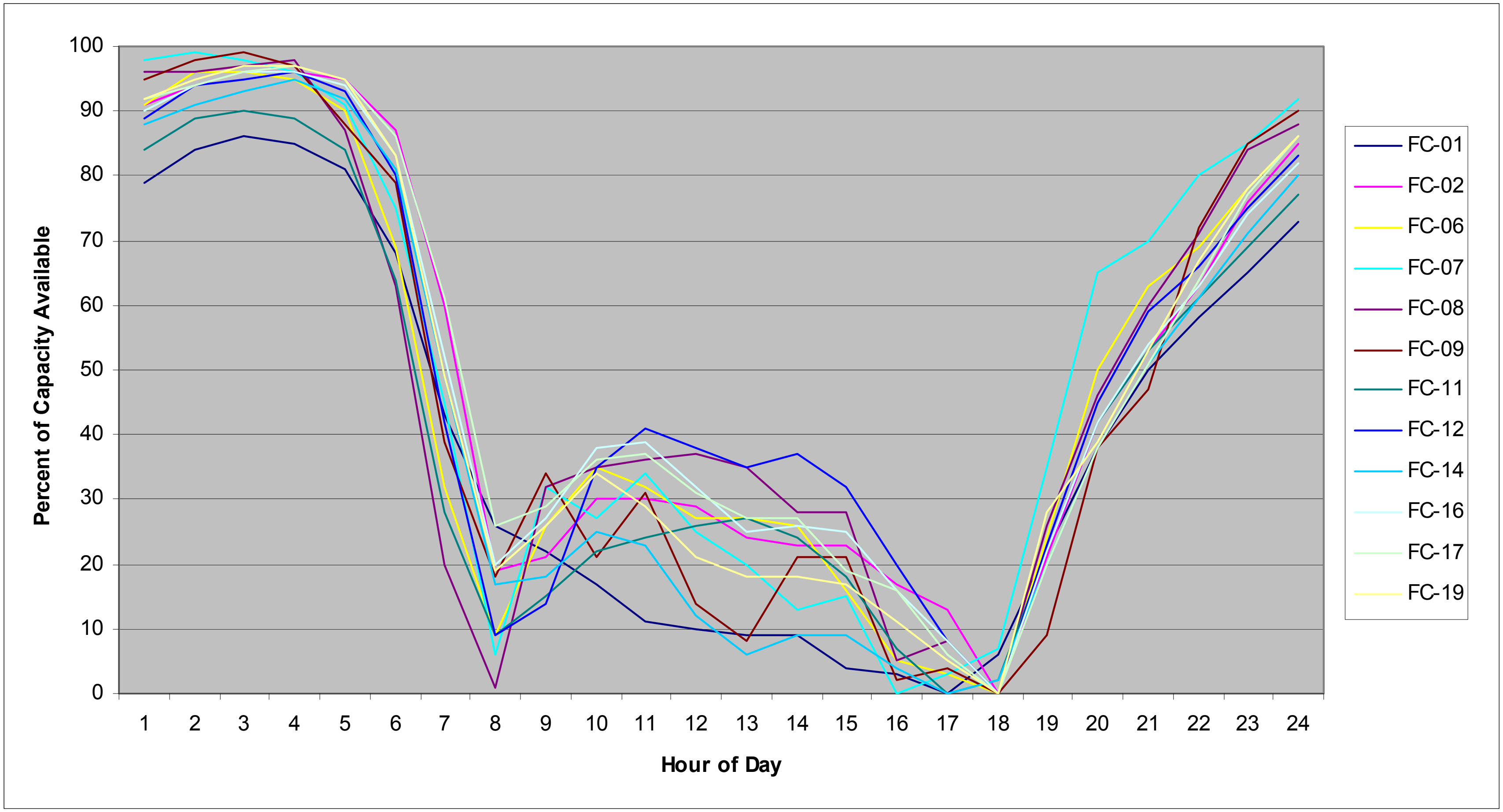
By comparing **Figure II-11** to **Figure II-10**, one will notice that the peaking phenomenon becomes more subdued as the curves tend to even out throughout the mid-day period. This would be reflective of a steady stream of traffic throughout the day. This phenomenon is ideally suited to reflecting a condition in which background traffic is competing with evacuation traffic. Instead of merely reducing the background traffic in total, the peaking characteristics are made less pronounced. This would reflect a situation in which background traffic vehicles do not completely force out the evacuation trips from the network, but rather begin trading movement opportunities with evacuees. For example, the curve in **Figure II-11** assumes that the background traffic vehicles would yield to approximately one evacuation vehicle for every three background traffic vehicles at an intersection during rush hour whereas the curve in **Figure II-10** would assume that background traffic would never yield to evacuation traffic during rush hour. This is clearly illogical since even without extraordinary traffic management efforts during an evacuation standard traffic control devices such as traffic lights and stop signs would compel drivers to yield to one another.

Figure II-9: Average Peaking Characteristics by Functional Class



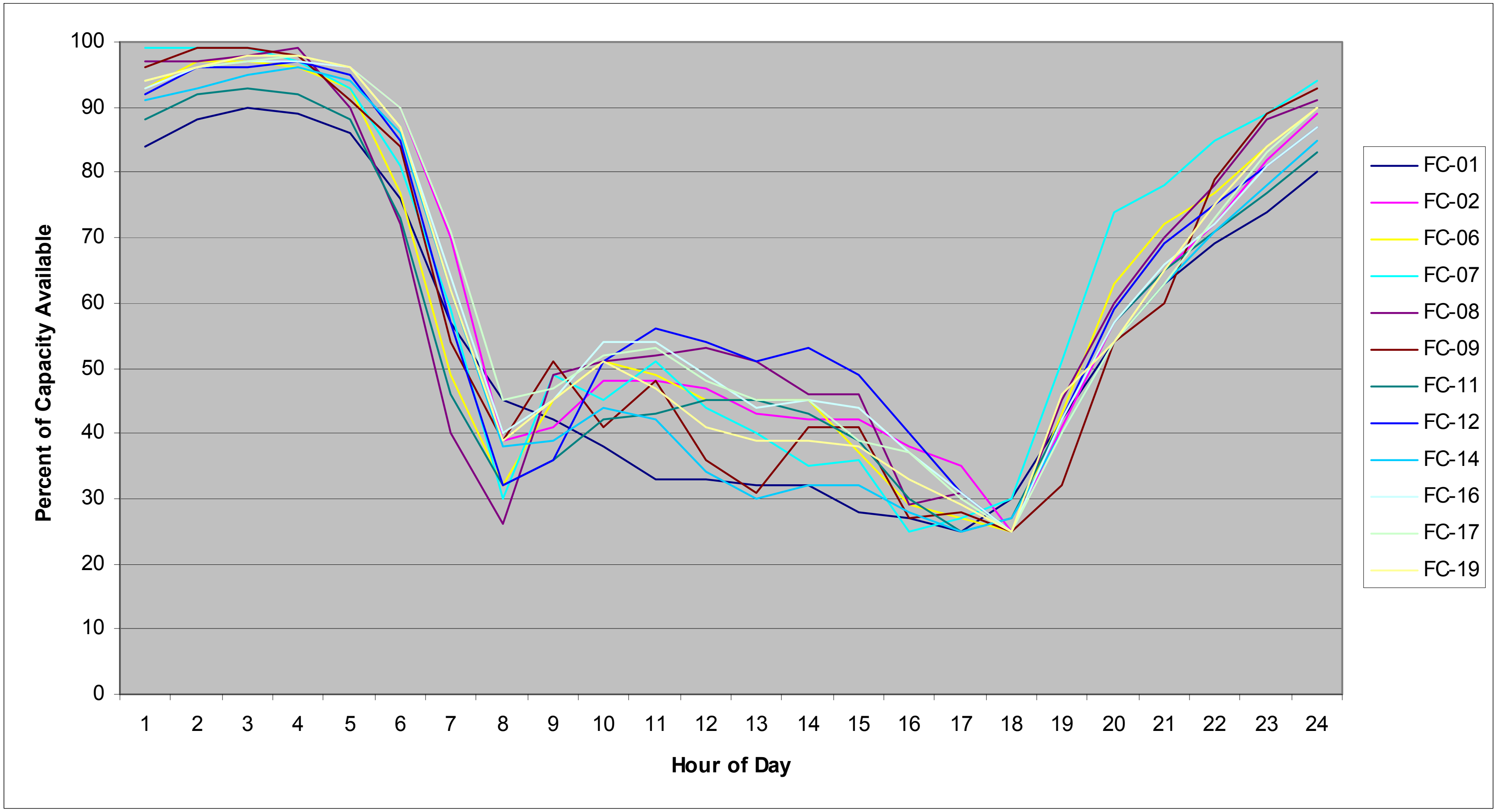
Source: *Florida Traffic Information DVD,* Florida Department of Transportation, 2006.

Figure II-10: Available Capacity at Peak Volume = 100% of Capacity



Source: *Florida Traffic Information DVD,* Florida Department of Transportation, 2006.

Figure II-11: Available Capacity at Peak Volume = 75% of Capacity



Source: *Florida Traffic Information DVD,* Florida Department of Transportation, 2006.

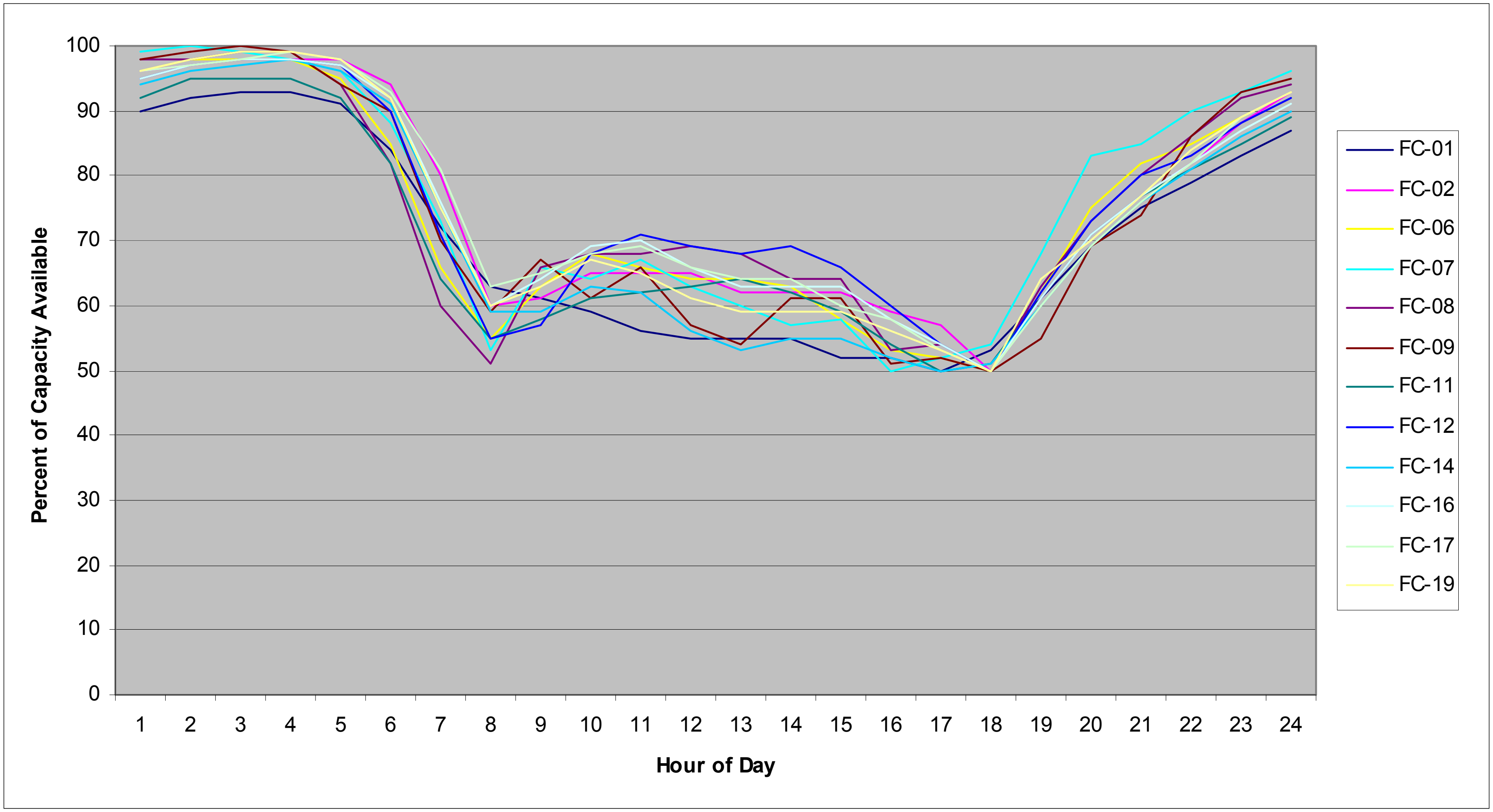
One can assume that in a typical traffic situation, evacuation trips can expect at least a one-to-one parity with background traffic concerning the use of a road. Because of this, a curve was developed that reflects peak volume at 50 percent of capacity. This reflects that even in the worst case situations, that evacuation traffic and background traffic are trading movements at a one-to-one ratio. For every background traffic vehicle that moves onto a road, one evacuation traffic vehicle can move onto the same road. This is the assumption that was used for background traffic in counties that are not under an order to evacuate and assumes that the residents of these counties are generally going about their daily business and are making only minor changes to their trip making behavior in response to the incoming evacuation traffic. This curve is shown in **Figure II-12**. The horizontal axis depicts the hour of the day and the vertical axis shows the percentage of available capacity.

As was mentioned earlier, though it cannot be assumed that background traffic in non-evacuating counties can be reduced significantly, this cannot be said for evacuating counties. In evacuating counties, many of the areas that serve as origins and destinations for daily trip making activities may be under an order to evacuate thus eliminating those trip ends (and their associated trips) from consideration. Also, many residents in evacuating counties are more inclined to reduce their level of trip making activity, making shorter and fewer trips. Thus, a background traffic curve that assumes that peak volume is only 20 percent of capacity was developed to reflect this reduced level of activity. This is shown in **Figure II-13**. The horizontal axis depicts the hour of the day and the vertical axis shows the percentage of available capacity.

Model Application

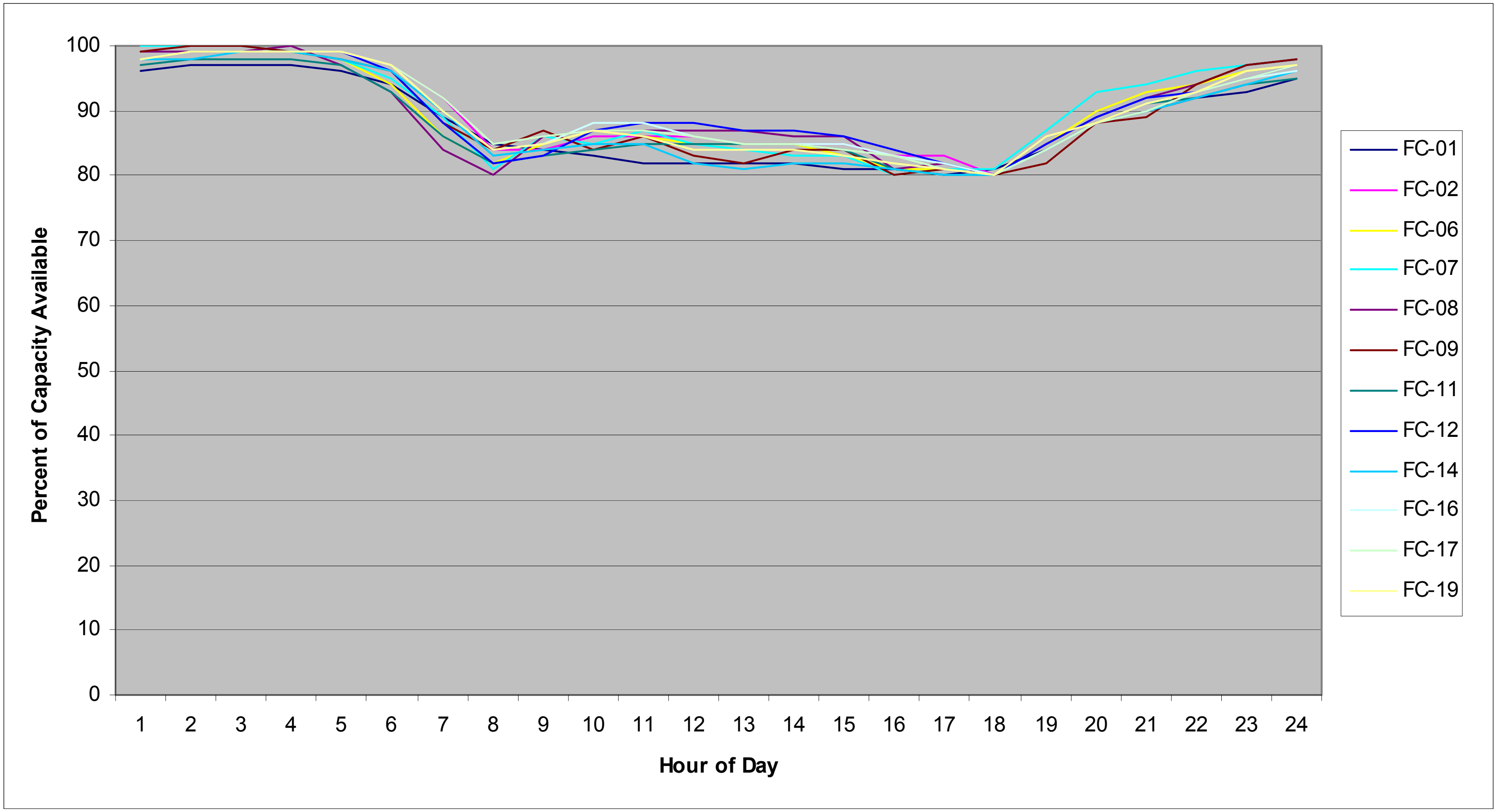
The curves depicted in **Figure II-12** and **Figure II-13** were used to develop a set of factors for each functional class of road. Each link in the model's highway network is then associated with a specific functional class depending on the purpose, design, and context of that facility. The model makes use of a feature in Cube AVENUE known as DYNAMIC C. DYNAMIC C allows the model to adjust the capacities of the roads over time while the model is running. The factors are placed into a table that the model can reference and are cycled over a 96 hour period. As the model runs and the evacuation trips are moved throughout the network, more or less capacity becomes available depending on the type of road, the hour of the day, and which county the road is located in by applying the background traffic factors to the capacities of the roadway segments. The model assumes that the evacuation begins at 7:00 AM on a typical weekday.

Figure II-12: Available Capacity at Peak Volume = 50% of Capacity – Non-Evacuating Counties



Source: *Florida Traffic Information DVD,* Florida Department of Transportation, 2006.

Figure II-13: Available Capacity at Peak Volume = 20% of Capacity – Evacuating Coastal Counties



Source: *Florida Traffic Information DVD,* Florida Department of Transportation, 2006.

Dynamic Traffic Assignment

An assignment technique that is beginning to be applied within transportation planning models is Dynamic Traffic Assignment (DTA). DTA works by assigning a certain number of vehicles to the highway network in a given interval of time. The model then tracks the progress of these trips through the network over the interval. Another set of vehicles is assigned during the following time interval. The model then tracks the progress of these trips through the network along with the progress of the trips loaded in the previous time interval. As vehicles begin to arrive at the same segments of roadway, they interact with one another to create congestion. When vehicles that were loaded to the network in subsequent intervals of time arrive at the congested links, they contribute to the congestion as well. This results in a slowing down of the traffic and eventually spill-backs and queuing delays.

It is this time dependent feature of DTA that makes it well suited to evacuation modeling. By dynamically adjusting the travel times and speeds of the vehicles moving through the network as they respond to congestion the model is able to do the following:

1. The evacuation model is able to estimate the critical clearance time statistics needed for this study;
2. The model takes into account the impact of compounded congestion from multiple congestion points;
3. The model is able to adjust the routing of traffic throughout the network as a function of congestion as it occurs throughout the evacuation; and,
4. The model is capable of adjusting its capacities from time segment to time segment, making it possible to represent such phenomena as reverse lane operations.

It is because of these features that DTA is the assignment technique used to model evacuation traffic for the SRESP. The DTA software that is used is known as Avenue and is part of the Cube suite of transportation modeling software used throughout the State of Florida. **Figures II-14** through **II-17** depict snapshots of a dynamic assignment at hour long intervals from the evacuation model prototype. The colored links in the images represent the queuing delay along the links at differing levels of intensity with green links having some minimal delay and red links have much more intense delay. Notice how the delay queues build up and spill back onto previous links over time and then later clear out.

The model assigns a two volume sets. The first set contains only those trips that are destined to stay in the same county as where the trips originate. The second set contains only those trips that are destined for a county other than the one in which the trips originate.

Parameters of the Evacuation Assignment

The DTA for the evacuation model makes use of certain parameters which dictate how the assignment will function. These parameters will be established during prototype development and remain consistent throughout model implementation so that each region is calculating evacuation traffic and clearance times in the same way. The parameters that will be established are:

- **Capacity -** One of the key variables in computing congestion and queuing in the assignment is capacity. Capacity determines how many vehicles can pass over a given highway link within a given interval of time. The SRESP evacuation model will use hourly lane capacities derived from the Florida Department of Transportation Quality/Level-of-Service Handbook. These capacities are initially set to represent Level-of-Service E conditions. These capacities are then further increased by an additional 20 percent for freeway links and 10 percent for non-freeway links. These increases in capacity are meant to reflect high volume usage, optimal green timing of signals, and the use of shoulder and emergency lanes.

- **Storage -** Another key variable in computing congestion and queuing in the assignment is storage. Storage determines how many vehicles can remain standing on a length of road at any moment in time. As the assignment proceeds, the model will move a number of vehicles along a link during a time interval equal to its capacity. Once the capacity threshold has been surpassed, the remainder of the trips will have to wait on the link until the next time interval. If the number of trips that have to wait exceeds the storage of the link, then the remainder of those trips will need to wait on the preceding link. As the model becomes more congested this storage effect cascades along the set of preceding links. This creates a backing up phenomenon as the excess vehicles "spill-back" onto the previous link.

  The evacuation model assumes that storage is set to 250 vehicles per lane per mile. This assumes approximately 21 feet of space are "occupied" by any given vehicle. Given the mix of vehicles on a roadway network (including compacts, SUVs, trailers, and trucks) this spacing appears to be reasonable for stand-still traffic.

- **Time Intervals -** In order to properly implement a DTA model, the assignment process needs to be segmented according to a set of time intervals. As the model runs, it calculates what is occurring during each interval of time. Vehicles will enter and exit the network during specific time intervals. It is by analyzing the activity occurring in the model in any given time interval that the model can derive statistics concerning clearance times.

  Time intervals can be set to any reasonable resolution, although some may be too large or too small to be practical for this evacuation model. In order to accommodate the demands of the study, the time interval resolution is set to one-half hour. One-half hour intervals provide sufficient detail to satisfy the planning needs of both emergency management and growth management concerns. The model calculates vehicle assignments over 192 such intervals for a total of 96 hours. This is sufficient to capture all evacuation activity during an event. This allows for sufficient time for the evacuation traffic to clear at both the county and regional level.

- **Reverse Lane Operations -** The State of Florida has recently published a series of reverse lane evacuation plans for major corridors throughout the state. The intention of these plans is to fully maximize the available capacity on a freeway by using all lanes to move evacuees away from danger. An example would be to use the west bound lanes of I-4 to move traffic to the east away from Tampa. The development of a reverse lane plan requires a detailed analysis of the traffic operations involved in implementing such a strategy and is well beyond the scope of this study; however, the evacuation model is able to account for the impacts of reverse lane operations for general evacuation planning purposes related to emergency management and growth management.

The model will emulate reverse lane operations by simultaneously increasing the capacity and storage of links headed away from the threatened area and eliminating the capacity of links headed toward the threatened area. The capacity of links headed away from the threatened area will increase by 66 percent, which is consistent with capacity increases used by Florida's Turnpike Enterprise. Past experience of reverse lane operations have shown that capacities do not double, as is commonly assumed, but increase by a lower percentage of about two thirds.

A preset number of reverse lane operations will be coded into the highway network. These reverse lane operations will correspond to the published plans developed by the Florida Department of Transportation. The model network will make use of the following attributes to manage the reverse lane operations:

- CONTRA_PLN – This attribute identifies to which reverse lane evacuation plan a highway link belongs. Links with a 0 in this attribute do not belong to any such plan. Links corresponding to both directions of a given facility are coded with identical CONTRA_PLN values; and,

- CONTRA_LNS – This attribute identifies whether or not lanes are available during reverse lane operations. Links corresponding to the direction headed away from a threatened area should be coded with a positive number. Links corresponding to the direction headed toward the threatened area should be coded with a negative number.

Sub-Area Extraction

Because it was not possible to conduct a DTA over a statewide extent, the model automatically extracts a multi-county sub-area from the statewide database. This sub-area is used to assign evacuation trips onto the network. As part of the sub-area extraction process, the evacuation trip table is compressed into an alternative zone system known as the Evacuation Assignment Zones. Though the multiple TEZs are aggregated into fewer EAZs, the model retains all of the original access points to the highway network.

Assigned volumes are stored in the **LOADED.NET** file. This file is described in **Appendix A**.

Figure II-14: Queuing Delay Five Hours into an Evacuation from a Dynamic Assignment Model

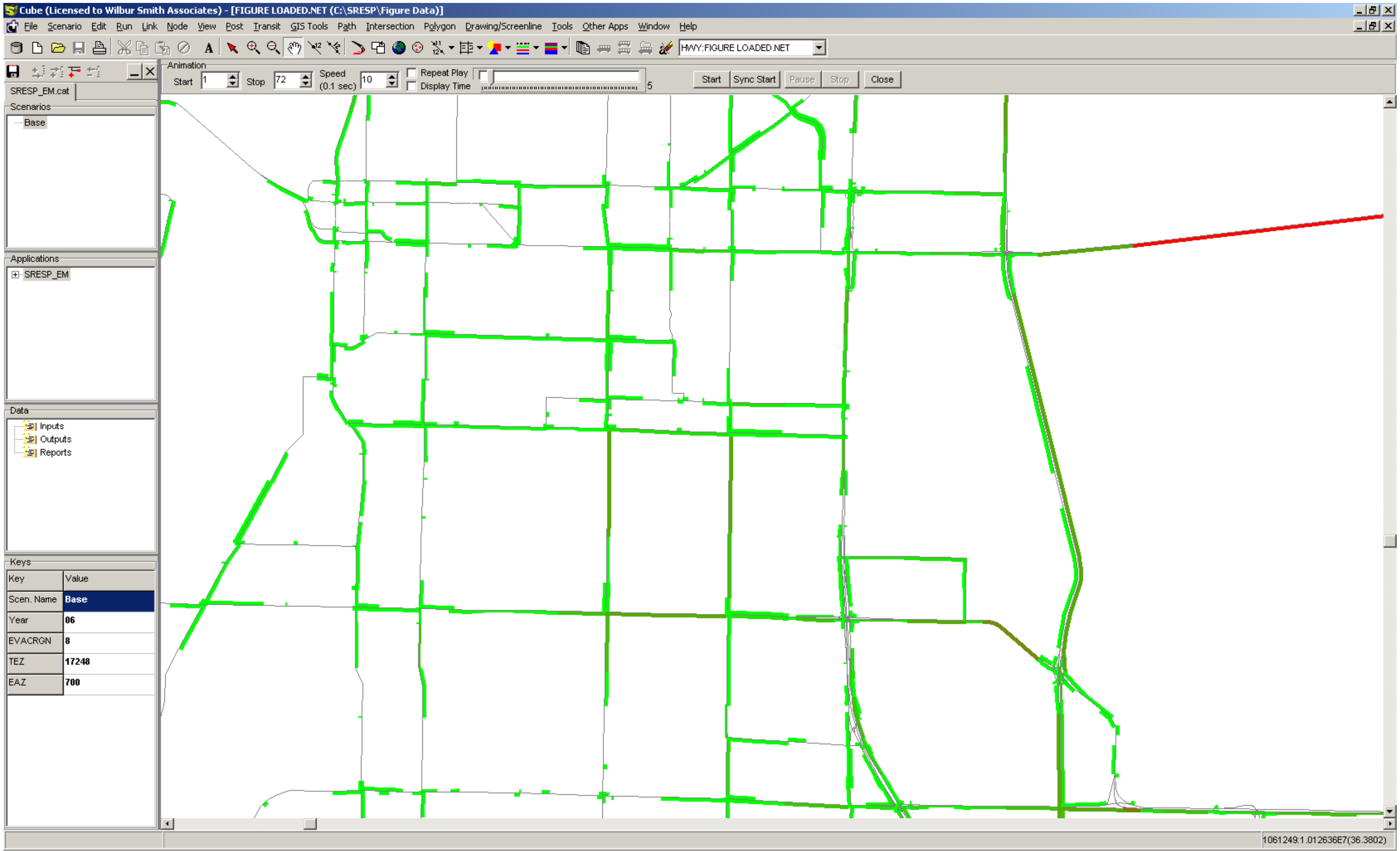


Figure II-15: Queuing Delay Ten Hours into an Evacuation from a Dynamic Assignment Model

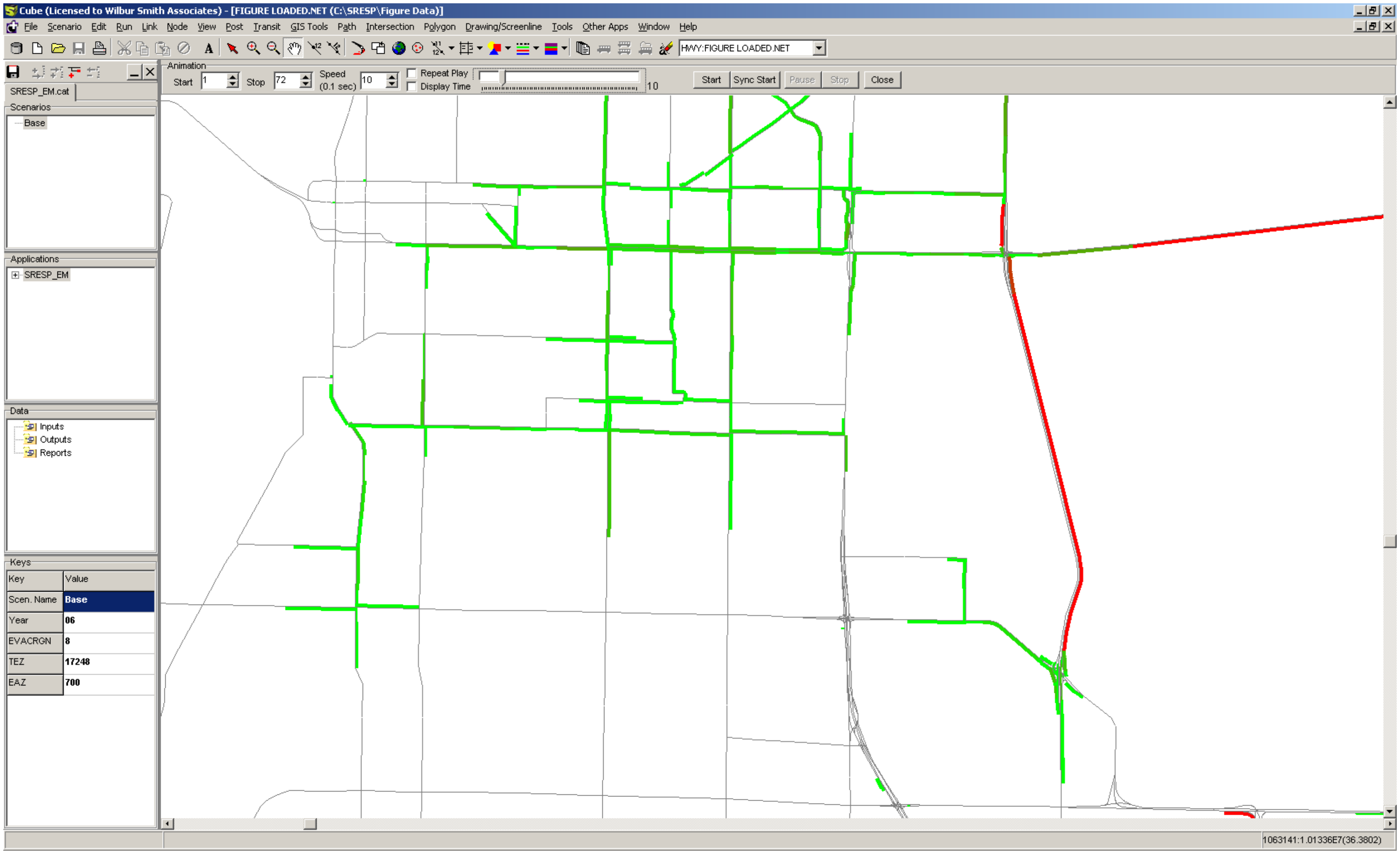


Figure II-16: Queuing Delay Fifteen Hours into an Evacuation from a Dynamic Assignment Model

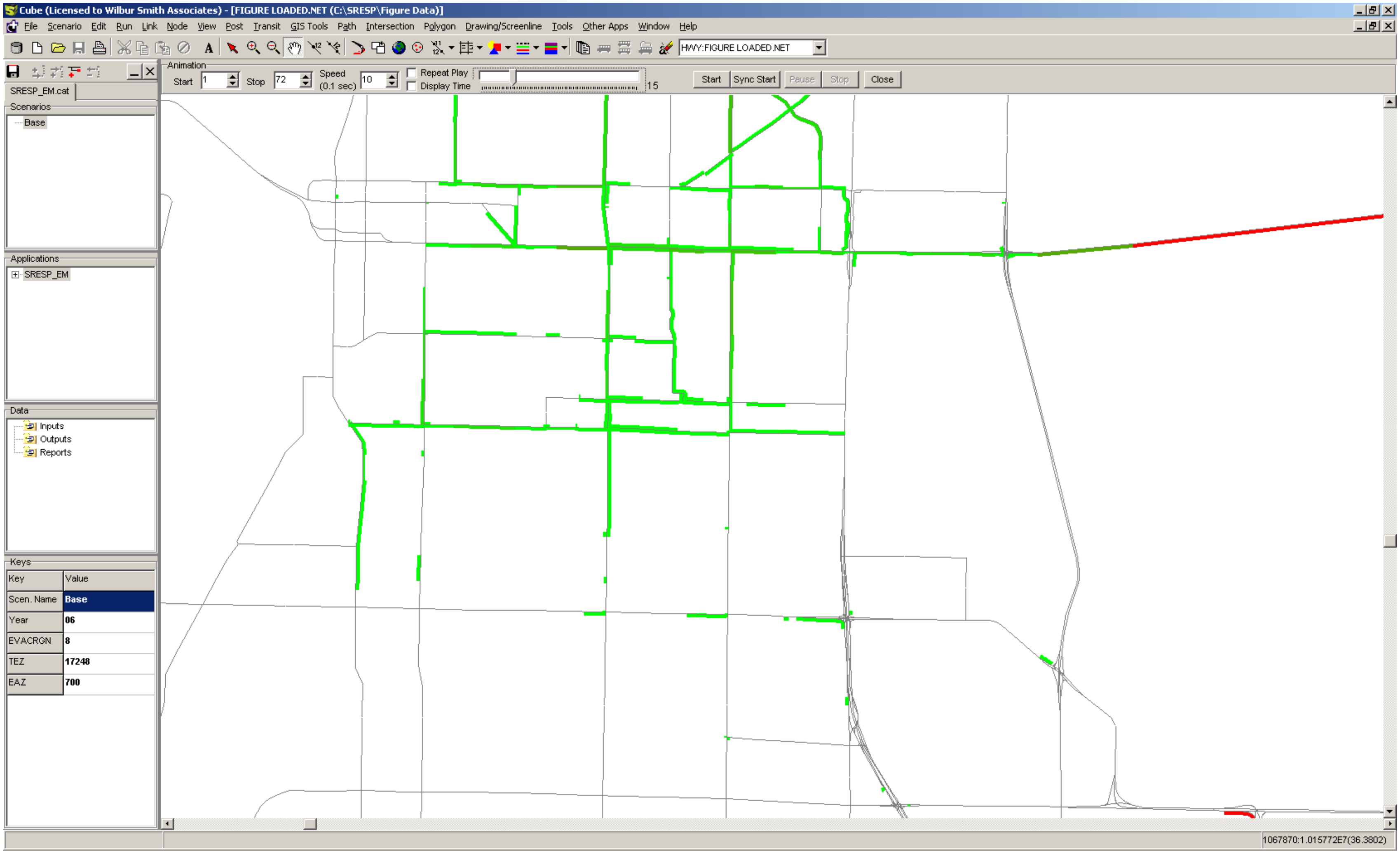
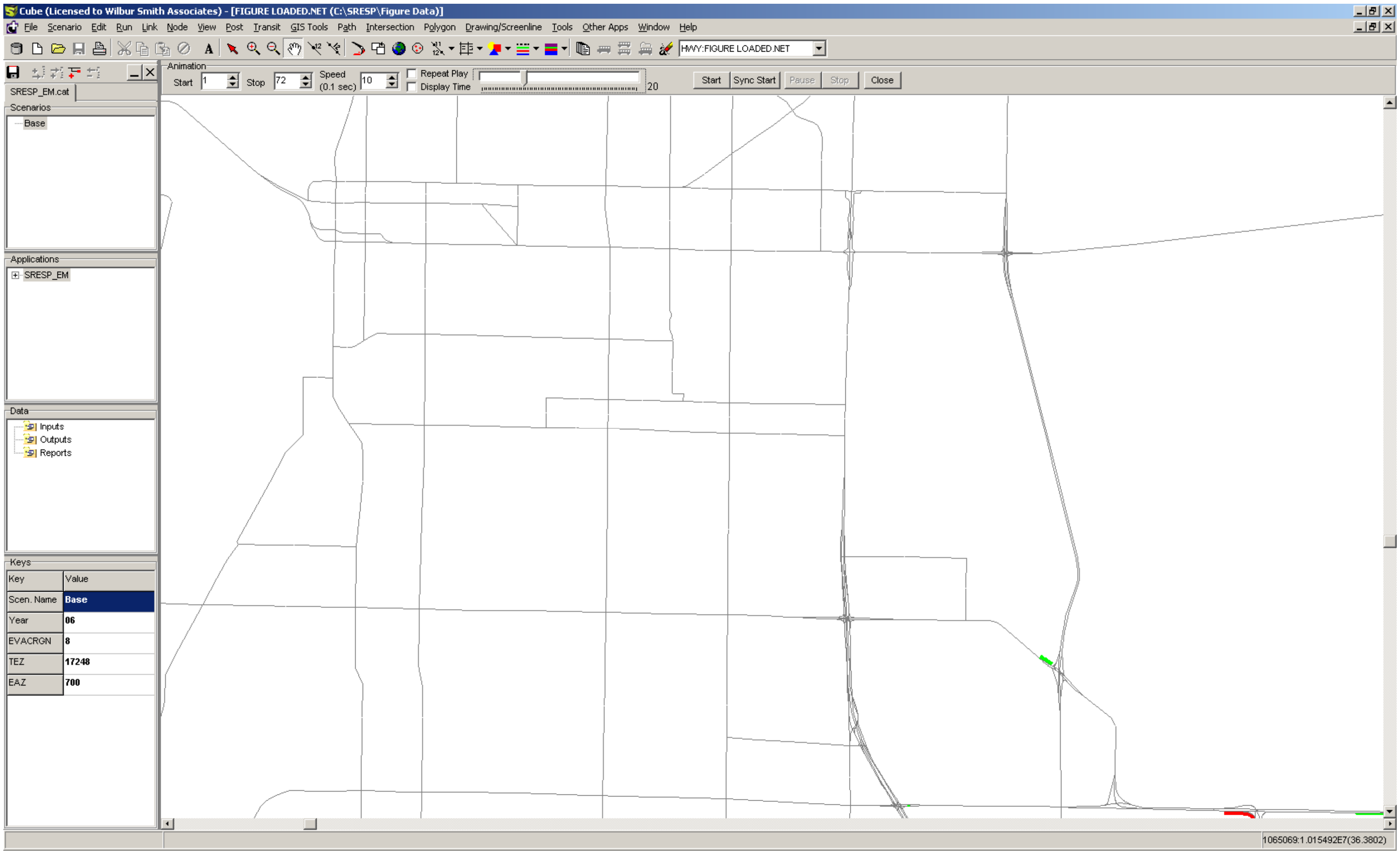


Figure II-17: Queuing Delay Twenty Hours into an Evacuation from a Dynamic Assignment Model



H. Transportation Interface for Modeling Evacuations (TIME)

The Transportation Interface for Modeling Evacuations (TIME) was developed to allow individuals who were not technical experts in either travel demand modeling or the Cube modeling software to set-up, manage, and execute evacuation model scenarios. Individuals who have some basic experience with Geographic Information System (GIS) software and are accustomed to working in a windows graphic user interface environment should have little difficulty using TIME.

Many of the features designed for TIME were made deliberately restrictive to minimize the likelihood of user error. These features focus on making individual changes specific to a given scenario. Furthermore, access to key input data that are not intended to change between scenarios, such as evacuation participation rates, are restricted in TIME. Making changes to the model is possible beyond what TIME allows. Doing so requires that the individual making the changes be a knowledgeable and skilled travel demand modeler as making such changes can have drastic negative consequences to model performance.

Basic GIS Icons

The following icons are common ArcGIS icons that appear repeatedly throughout the GIS components of TIME. They are described here for convenience.

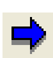
Zoom-In: Clicking on this icon gives the user a zoom tool that allows the user to zoom closer into a view by either click on the view or dragging a box around the desired area.

Zoom-Out: Clicking on this icon gives the user a zoom tool that allows the user to zoom further out of a view by either clicking on the view or dragging a box around the desired area.

Pan: Clicking on this icon gives the user a tool that allows the user to move the view around by clicking and dragging on the view.

Full Extent: Clicking on this icon zooms the user to an extent that covers the continental United States.

Previous Extent: Clicking on this icon zooms the view to the last extent the user was looking at.

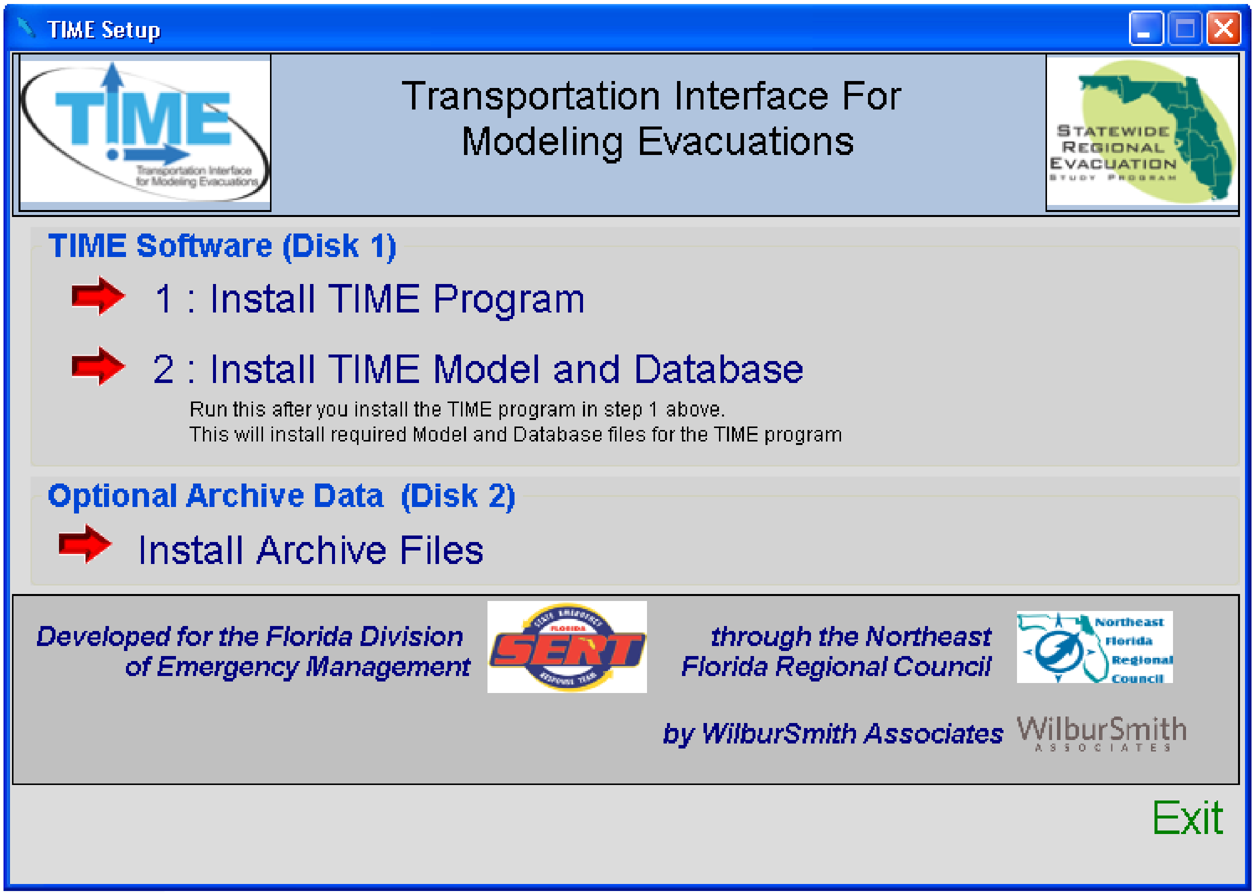


Next Extent: Clicking on this icon zooms the view to the next extent the user was looking at. This icon becomes available only after the user has clicked the *Previous Extent* icon.

Information: Clicking on this icon gives the user a tool that will open a window displaying the attribute data contained by the feature clicked.

Select Feature: Clicking on this icon give the user a tool that will allow the user to select specific features in the view.

Installation Screen



The installation screen appears when TIME is first installed on a computer.

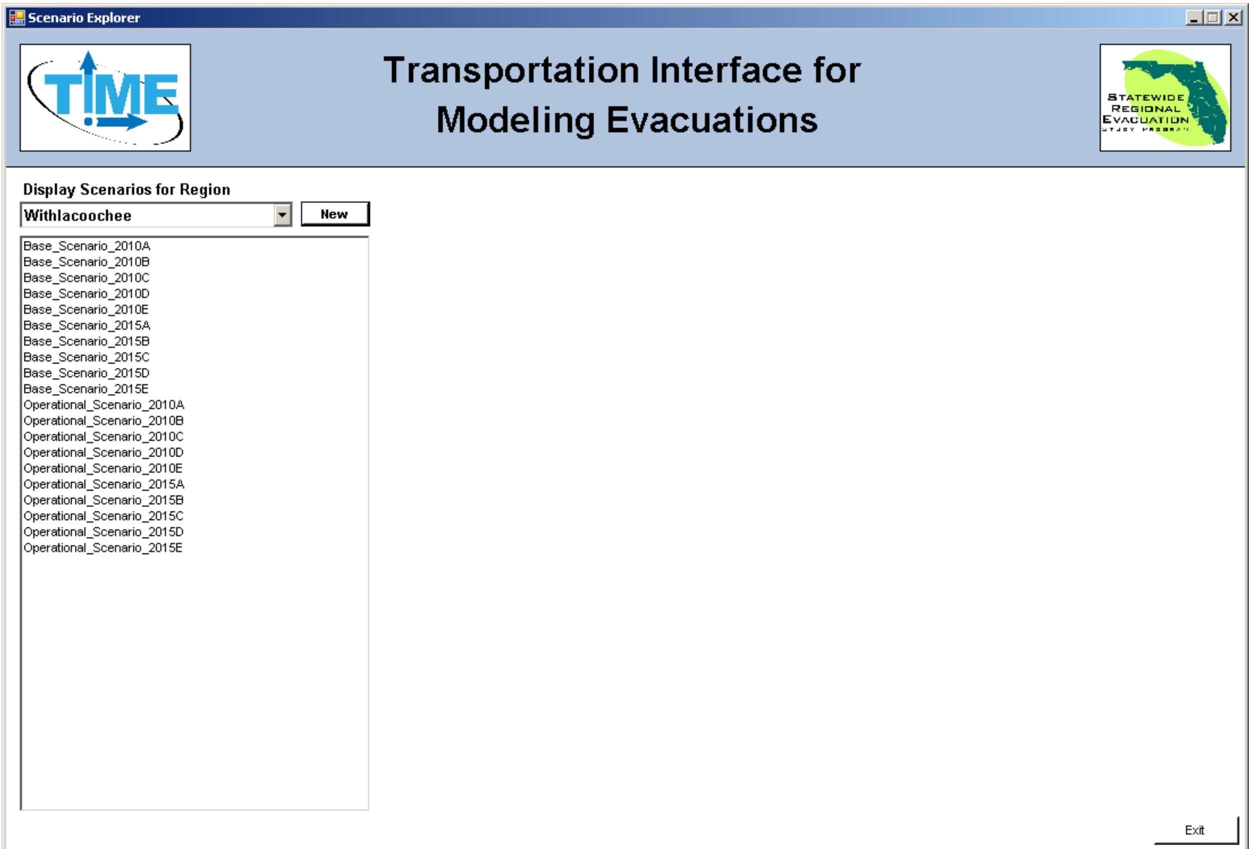
- ***1 : Install TIME Program*** – Clicking on this initiates the installation of the TIME interface. Follow the instructions that appear on the screen in order to successfully install the TIME interface. The TIME interface must be installed before installing any other TIME components. (Required to run TIME)
- ***2 : Install TIME Model and Database*** – Clicking on this will install the evacuation model database needed to set-up evacuation model scenarios and execute the evacuation model. (Required to run TIME)
- ***Install Archive Files*** – This is an optional installation feature that allows the user to install archived data from the SRESP Evacuation Study Transportation Analysis. This installs the outputs and key inputs for each scenario that was executed as part of the study. Users will not be able to run these scenarios, but they will be able to set-up new scenarios using the input scenarios from the archives as a starting point.
- ***Exit*** – This allows you to exit the installer.

TIME Desktop Icon:


TIME

After installation the TIME icon will appear on your desktop. Double-click on the icon to launch TIME.

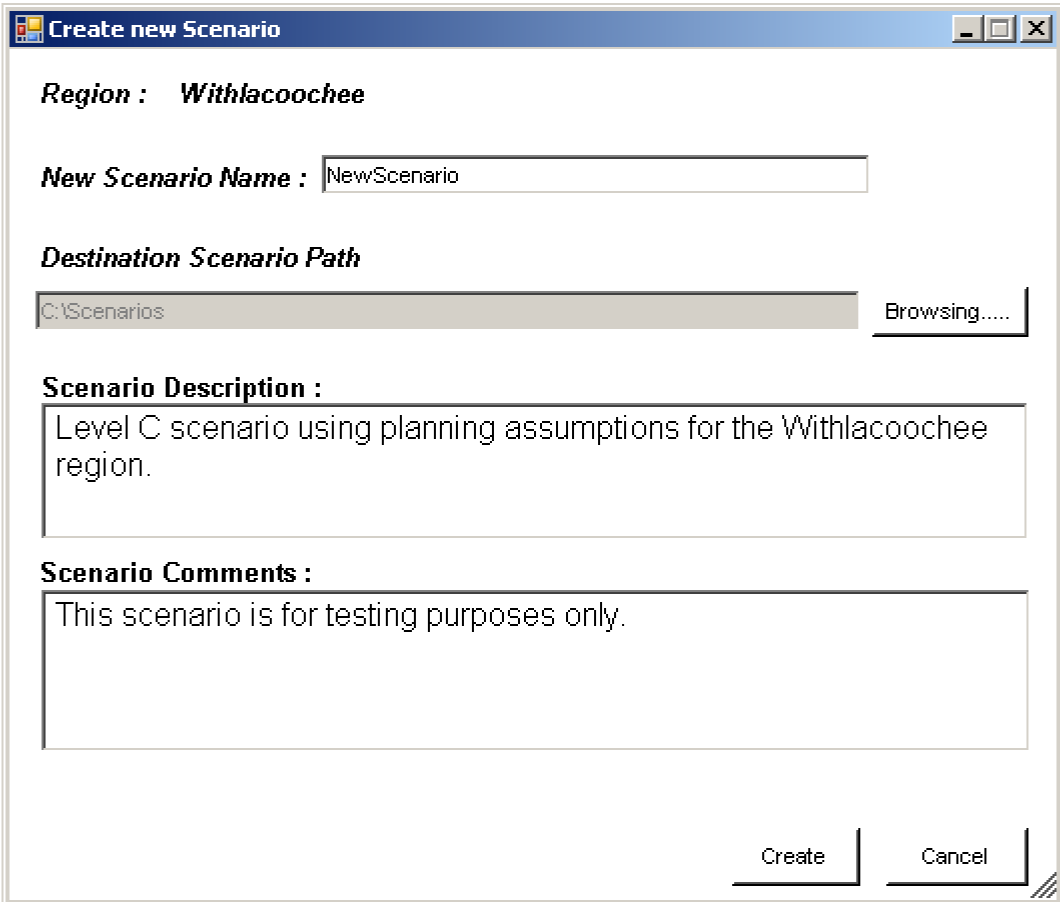
Scenario Explorer



The Scenario Explorer is the primary interface for TIME.

- ***Display Scenarios for Region*** – This is a drop down menu that allows you to select any of the eleven regions in the evacuation model. Once a region is selected, all of the scenarios that currently exist for that region are displayed in the window beneath. The user can open a scenario by clicking on the scenario name. TIME will automatically open with whichever region was active the last time that the user closed TIME.
- ***New*** – Click here to create a new scenario for the region selected.
- ***Exit*** – Click here to exit TIME.

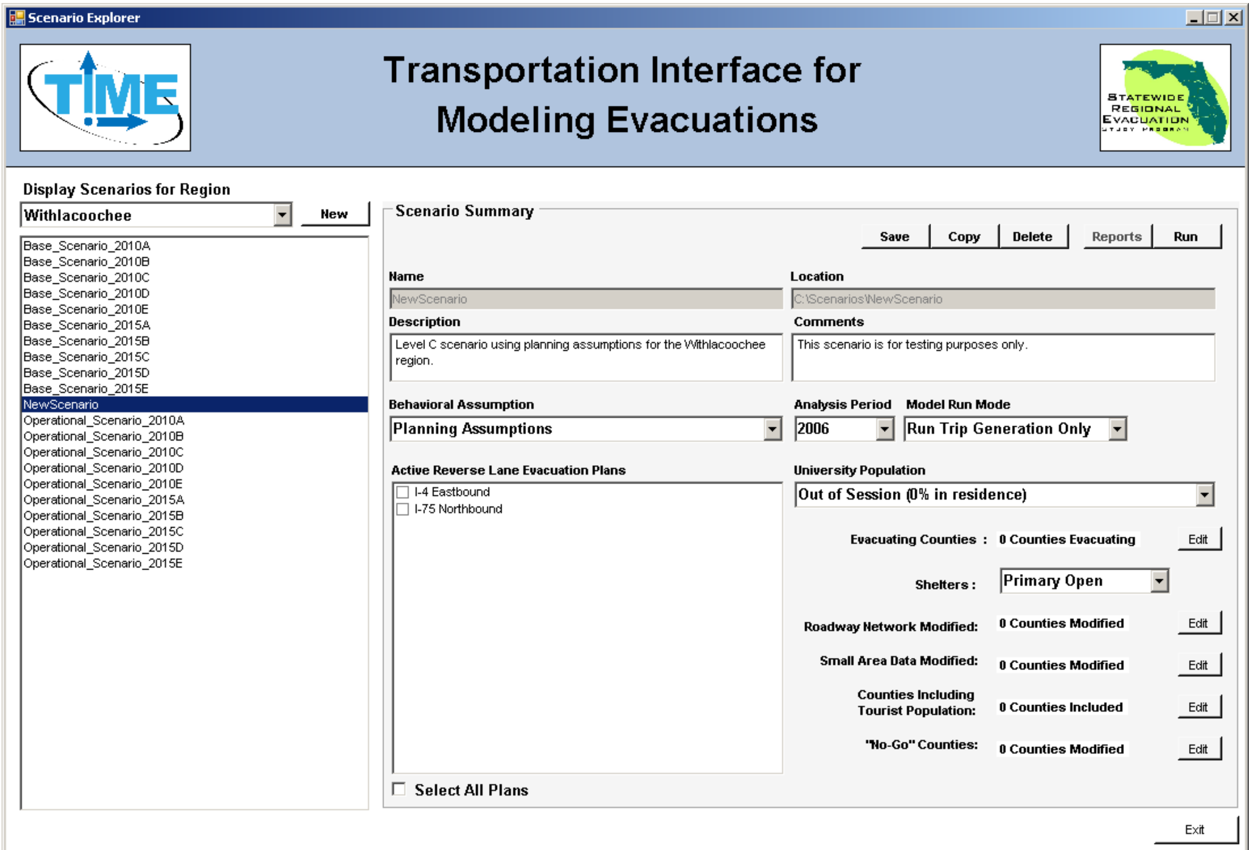
Create New Scenario



This interface opens if the user clicks ***New*** from the Scenario Explorer.

- ***Region*** – This informs the user as to the region in which the scenario is being created.
- ***New Scenario Name*** – Input the name of the new scenario here. TIME will automatically create a folder with this name on the user's hard drive.
- ***Destination Scenario Path*** – Browse to a specific location on the hard drive. TIME will create a folder with the scenario's name at the location specified here by the user.
- ***Scenario Description*** – Enter a text description of the scenario for quick reference in this space.
- ***Scenario Comments*** – Additional comments concerning the status of the scenario or a brief summary of the model results can be entered here.
- ***Create*** – Clicking this will create a new scenario in TIME.
- ***Cancel*** – This cancels the scenario creation process.

Scenario Summary



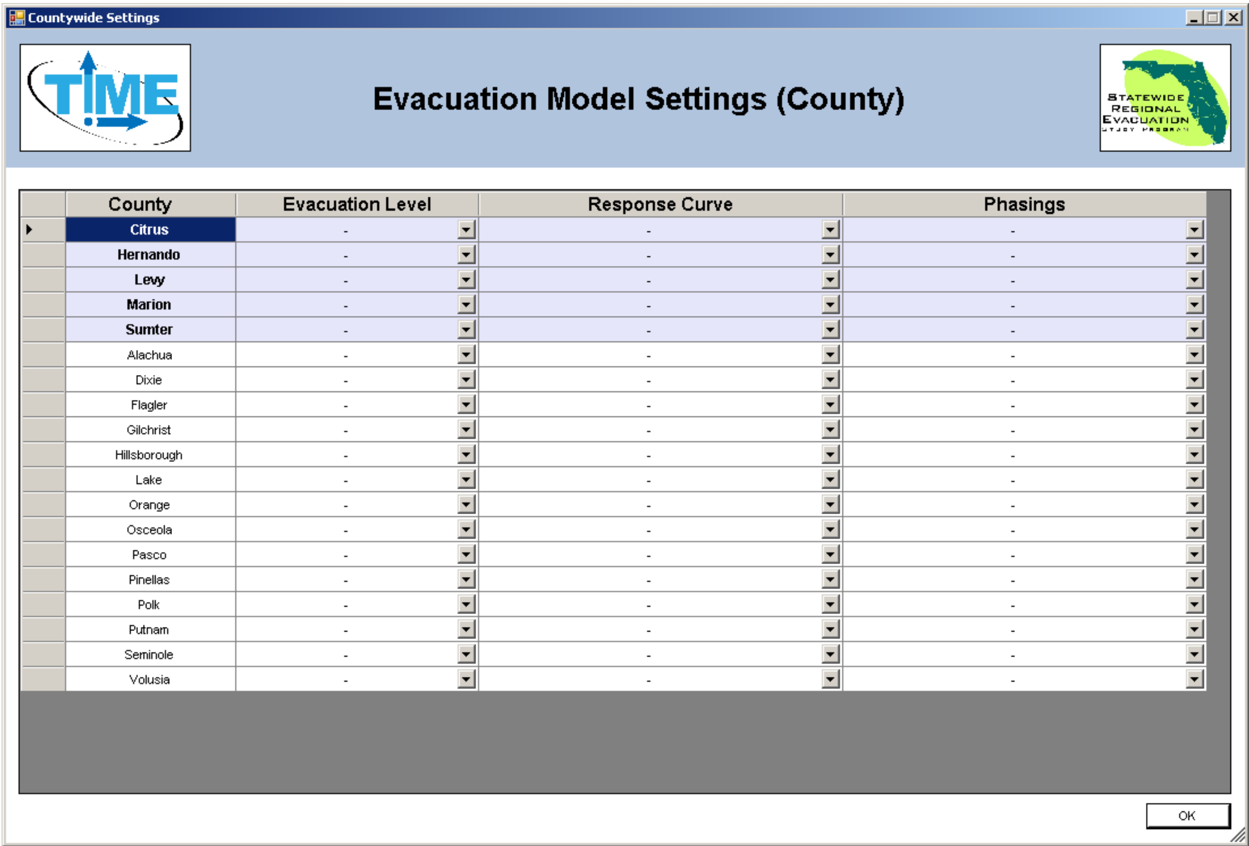
This form appears in the Scenario Explorer after the user selects or creates a scenario and shows an overview of the scenario's current settings. The user can edit the scenario settings by interacting with this form.

- ***Save*** – Save the scenario settings.
- ***Copy*** – Create a new scenario by creating a copy of the open scenario.
- ***Delete*** – Delete the open scenario.
- ***Reports*** – View the model run report of the open scenario. This option is not available is the scenario has not yet been run.
- ***Run*** – Start running the evacuation model. The model will be executed using the settings established in the Scenario Summary form.
- ***Name*** – This displays the name of the scenario that is open.
- ***Location*** – This displays the folder path for where the scenario is located on the hard drive.
- ***Description*** – Edit the text description of the scenario by typing in this area.
- ***Comments*** – Edit comments about the scenario by typing in this area.
- ***Behavioral Assumptions*** – Select between two options of evacuation participation rates. These options are described in greater detail elsewhere in this document under the section on Scenario Types.
    - *100% Response*
    - *Planning Assumption*
- ***Analysis Period*** – Choose between three analysis years.

  - *2006*
  - *2010*
  - *2015*
- ***Model Run Mode*** – Select between two model run modes.
  - *Run Trip Generation Only* – This mode sets up the scenario to run only the trip generation portion of the model. The results of this mode will provide information on the number of evacuation trips, the evacuating population, and the shelter demand by county in the region involved in the evacuation. This mode will not develop clearance times. This mode causes the model to take approximately 1.5 to 2 minutes to execute.
  - *Run Full Model* – This mode sets up the scenario to run the entire evacuation model. The results of this mode will provide information on the number of evacuation trips, the evacuating population, the shelter demand, and the clearance times by county in the region involved in the evacuation. This mode causes the model to take between 2 to 48 hours to execute. Run times vary depending on the processing capabilities of the computer on which TIME is installed and the severity of the evacuation scenario being modeled.
- ***Save Animation*** – Save a Cube Avenue log file. This file is necessary if the user wishes to view a packet animation of the evacuation. This option is recommended only for single county evacuation scenarios since the size of the file can cause the model to crash. This option appears only if the user selects the *Run Full Model* run mode.
- ***Active Reverse Lane Evacuation Plans*** – Select one or more reverse lane evacuation plans to be active in the scenario. The user can choose not to include any reverse lane evacuation plans for a given scenario. Not all regions have reverse lane evacuation plans.
- ***Select All Plans*** – Allows the user to select all visible reverse lane evacuation plans at once.
- ***University Population*** – Select the size of the student population in residence at major universities and colleges around the state.
  - *Out of Session (0% in residence)*
  - *Summer Session (50% in residence)*
  - *Fall/Spring Session (100% in residence)*
- ***Evacuating Counties*** – Shows the user how many counties are evacuating in the scenario. By clicking the Edit button, the user can choose which counties are evacuating.
- ***Shelters*** – Select between three options.
  - *All Open* – Opens all public shelters for the scenario.
  - *Primary Open* – Opens all primary shelters only for the scenario.
  - *Customized* – Select which shelters are opened for the scenario and modify existing shelter capacities. If *Customized* is selected, an Edit button will appear that will allow the user to modify the shelter settings as needed.
- ***Roadway Networks Modified*** – Shows the user how many counties have had changes to the capacities of the roadway network made. By clicking the Edit button, the user can add or remove lanes from specific segments of road.
- ***Small Area Data Modified*** – Shows the user how many counties have had changes to the TEZ data made. By clicking the Edit button, the user can make changes to the population data by TEZ.
- ***Counties Including Tourist Population*** – Shows the user how many counties are including tourists in the evacuation. By clicking the Edit button, the user can modify how many tourists will be included in the evacuation.

- ***"No-Go" Counties*** – Shows the user how many counties have been designated as no-go counties. A no-go county will not receive any evacuation trips, though some trips may evacuate through these counties if needed to get to their final destinations. This option allows the user the ability to shut off portions of the state in order to test what might happen if evacuees could be successfully directed to evacuate in a particular direction. By clicking the Edit button, the user can designate specific counties as no-go counties.
- ***Exit*** – Closes TIME.

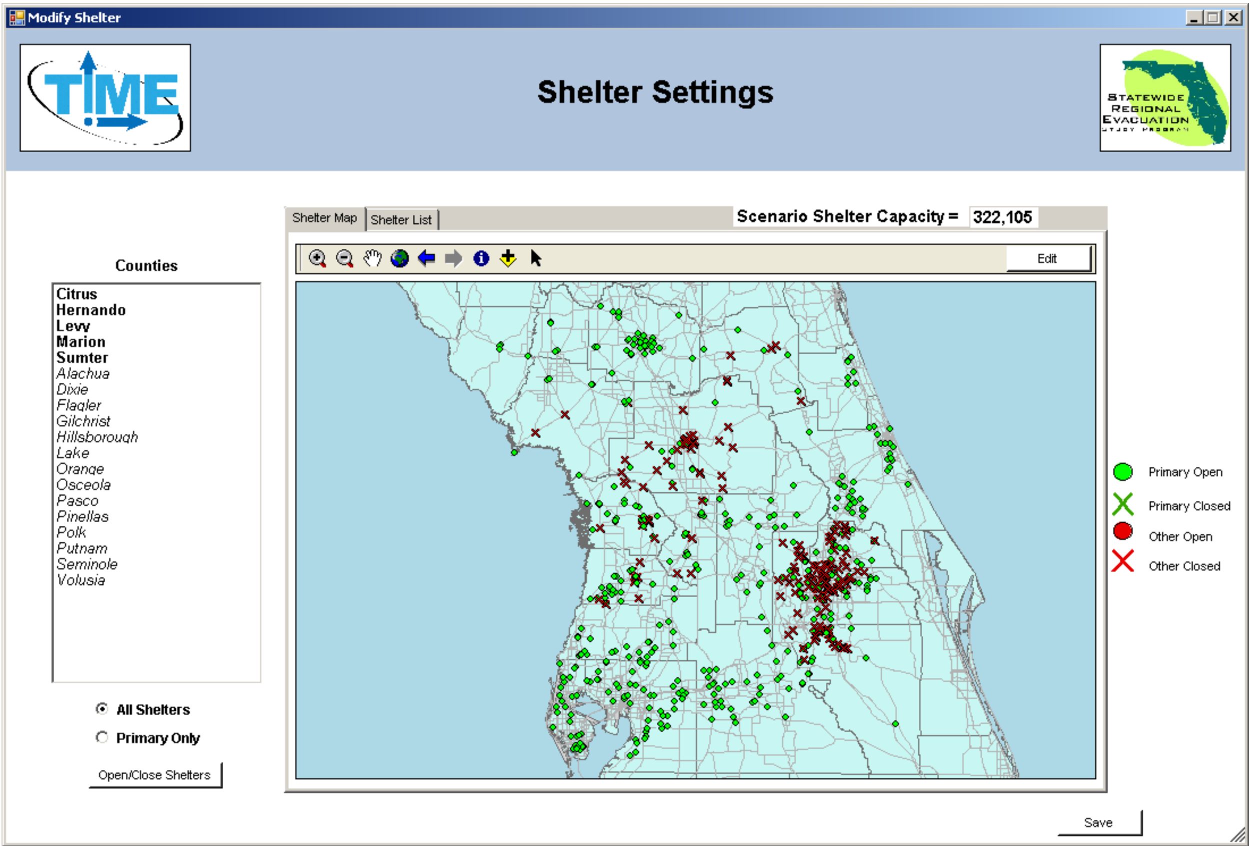
Evacuation Model Settings (County)



The Evacuation Model Settings window appears if you click the Edit button next to ***Evacuating Counties*** in the Scenario Summary form. This interface allows the user to determine which counties evacuate for a given scenario.

- ***County*** – Names of the counties available to evacuate for a given scenario. Counties located within the region are at the top of the list and in bold type. Other counties are listed below.
- ***Evacuation Level*** – Select an evacuation level ranging from A through E with E being the most intense. The level of the evacuation is consistent with the evacuation zone being ordered to evacuate. A null value will result in that county not evacuating for the scenario.
- ***Response Curve*** – Select a response curve ranging from 6 hours to 36 hours. The response curve describes the period of time over which evacuees begin their journey. A county with an evacuation level set must have a response curve.
- ***Phasing*** – Determine in which hour of the event the evacuation for a given county begins. The first county to evacuate in the scenario should always be set to hour 1. Counties can be set to evacuate simultaneously.
- ***OK*** – Closes the Evacuation Model Settings window.

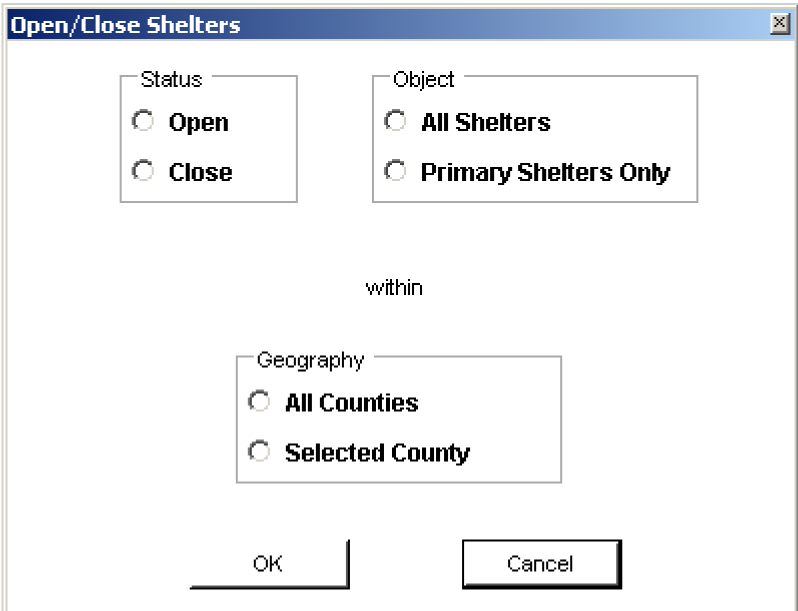
Shelter Settings



This window appears after clicking the Edit button that appears when ***Shelters*** in the Scenario Summary form is set to *Customized*. This interface lets the user open and close select shelters and modify shelter capacities.

- ***Counties*** – List of the counties for which shelters can be modified in the scenario. Selecting a county will zoom the map to that county. The user can only edit data in the county that has been selected.
- ***All Shelters*** – Selecting this displays all available shelters for the scenario.
- ***Primary Only*** – Selecting this displays available primary shelters for the scenario.
- ***Open/Close Shelters*** – Opens a window that allows the user to open and close groups of shelters at a time.
- ***Shelter Map*** – This tab shows a map of shelter locations for the scenario.
- ***Shelter List*** – This tab shows a list of all the shelters for the selected county along with associated data for those shelters.
- ***Scenario Shelter Capacity*** – Displays a running total of open shelter capacity.
- ***Edit*** – Clicking this places the interface in edit mode and gives the user a tool that allows the user to open or close specific shelters as well as modify the capacities at those shelters.
- ***Exit Edit*** – Takes the interface out of Edit mode. Appears only if the interface is in the Edit mode.
- ***Save*** – Saves changes to the shelter database and closes the Shelter Settings window.

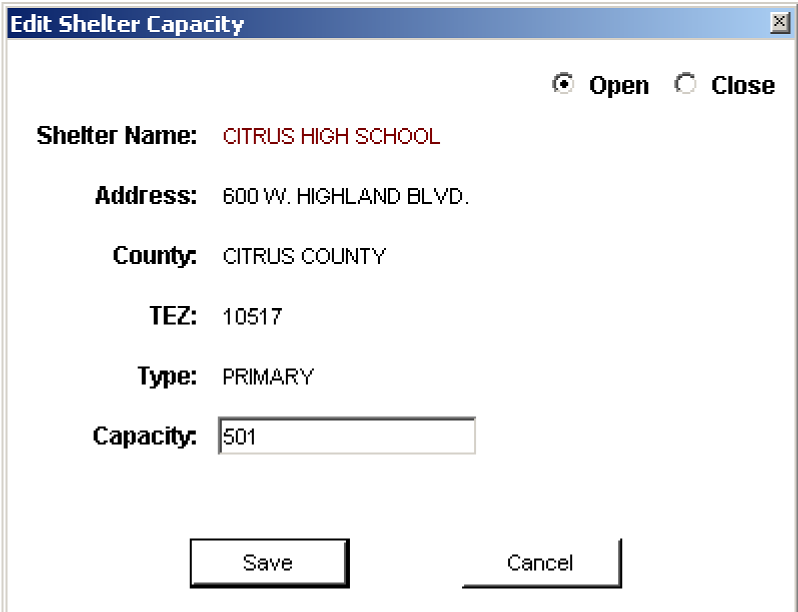
Open/Close Shelters



This window opens if the ***Open/Close Shelters*** button in the Shelter Settings interface is clicked.

- ***Status*** – Select whether to open or close shelters identified elsewhere in this window.
- ***Object*** – Select whether to affect all shelters or only the primary shelters.
- ***Geography*** – Select whether to affect shelters in all counties or only in the county currently selected in the Shelter Settings interface.
- ***OK*** – Execute the opening or closing of shelters as defined in this window.
- ***Cancel*** – Cancels the opening or closing of shelters as defined in this window.

Edit Shelter Capacity



This window opens after the user clicks on a shelter in the Shelter Settings interface while the ***Edit*** button is selected.

- ***Open*** – Indicates that the shelter is to be opened.
- ***Close*** – Indicates that the shelter is to be closed.
- ***Shelter Name*** – Displays the name of the shelter.
- ***Address*** – Displays the address of the shelter.
- ***County*** – Displays the name of the county in which the shelter is located.
- ***TEZ*** – Displays the number of the evacuation model traffic evacuation zone in which the shelter is located.
- ***Type*** – Indicates whether the shelter is a primary shelter or other shelter.
- ***Capacity*** – Indicates the number of people that can be safely sheltered at this location.
- ***Save*** – Saves the changes made to the shelter.
- ***Cancel*** – Cancels changes made to the shelter.

Shelter List Tab

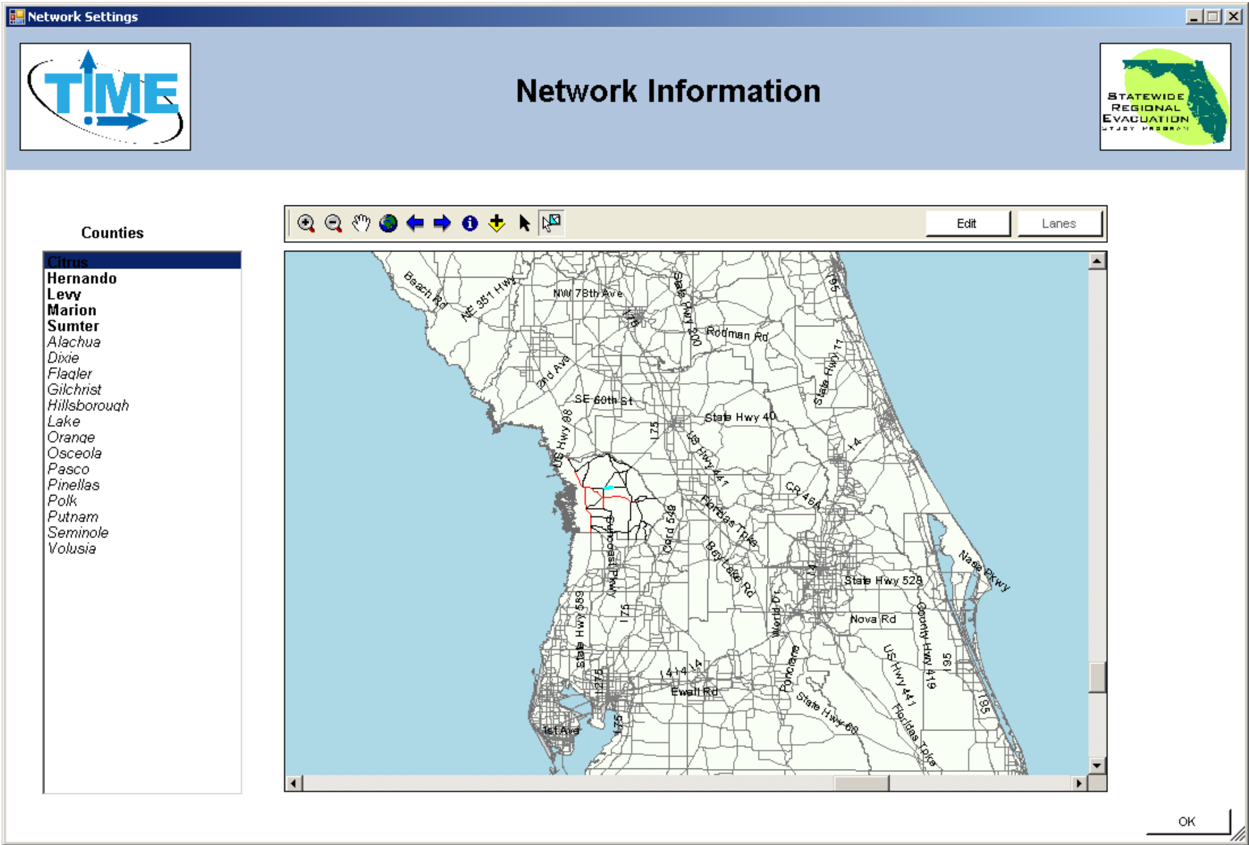
Shelter Map | Shelter List — **Scenario Shelter Capacity =** 322,606

Shelter Name	Address	Capacity	TEZ	Shelter Type	County	Activ
ACADEMY OF E...	12695 W FORT I...	0	10476	PRIMARY	CITRUS COUNTY	1
CITRUS COUNTY...	3620 W. EDUCA...	0	10527	PRIMARY	CITRUS COUNTY	1
CITRUS COUNTY...	1007 W MAIN ST	501	10515	PRIMARY	CITRUS COUNTY	1
CYPRESS CREE...	2855 W WOODL...	0	10509	PRIMARY	CITRUS COUNTY	1
MARINE SCIENCE...	12646 W FORT I...	0	10476	PRIMARY	CITRUS COUNTY	1
FIRST LUTHERA...	1900 W. HWY 44	0	10508	OTHER	CITRUS COUNTY	0
MAIN STREET B...	960 SOUTH HW...	0	10516	OTHER	CITRUS COUNTY	0
OUR LADY OF F...	550 S. HWY 41	0	10516	OTHER	CITRUS COUNTY	0
V.F.W. LEROY R...	1930 SOUTH HW...	0	10524	PRIMARY	CITRUS COUNTY	1
BEVERLY HILLS ...	72 BEVERLY HIL...	0	10504	PRIMARY	CITRUS COUNTY	1
CITRUS SPRINGS...	3570 W CENTUR...	0	10499	PRIMARY	CITRUS COUNTY	1
CITRUS SPRINGS...	150 W CITRUS S...	1449	10499	PRIMARY	CITRUS COUNTY	1
HOPE EVANGELI...	9425 N. CITRUS ...	0	10499	OTHER	CITRUS COUNTY	0
FIRST BAPTIST C...	8545 E. MAGNO...	0	10513	OTHER	CITRUS COUNTY	0
FLORAL CITY C...	8370 E.ORANGE ...	0	10513	PRIMARY	CITRUS COUNTY	1
FLORAL CITY EL...	8457 E MARVIN ST	0	10513	PRIMARY	CITRUS COUNTY	1
HERNANDO ELE...	2353 N CROFT A...	0	10508	PRIMARY	CITRUS COUNTY	1
INVERNESS PRIM...	206 SOUTH LIME...	0	10515	PRIMARY	CITRUS COUNTY	1
PLEASANT GRO...	630 PLEASANT ...	0	10509	PRIMARY	CITRUS COUNTY	1
WITHLACOOCHE...	1201 W. MAIN H...	0	10515	PRIMARY	CITRUS COUNTY	1

This table opens if the user clicks on the Shelter List tab in the Shelter Settings interface. All fields can be sorted by clicking on the field name. This table provides an alternative way of interacting with the shelter database.

- ***Shelter Name*** – Name of the shelter.
- ***Address*** – Street address of the shelter.
- ***Capacity*** – Number of people that can be safely sheltered at this location. This field is editable.
- ***TEZ*** – The number of the evacuation model traffic evacuation zone in which the shelter is located.
- ***Shelter Type*** – Indicates whether the shelter is a primary shelter or other shelter.
- ***County*** – Name of the county in which the shelter is located.
- ***Active*** – Indicates whether the shelter is open or closed. This field is editable.
  - 0 = Closed
  - 1 = Open

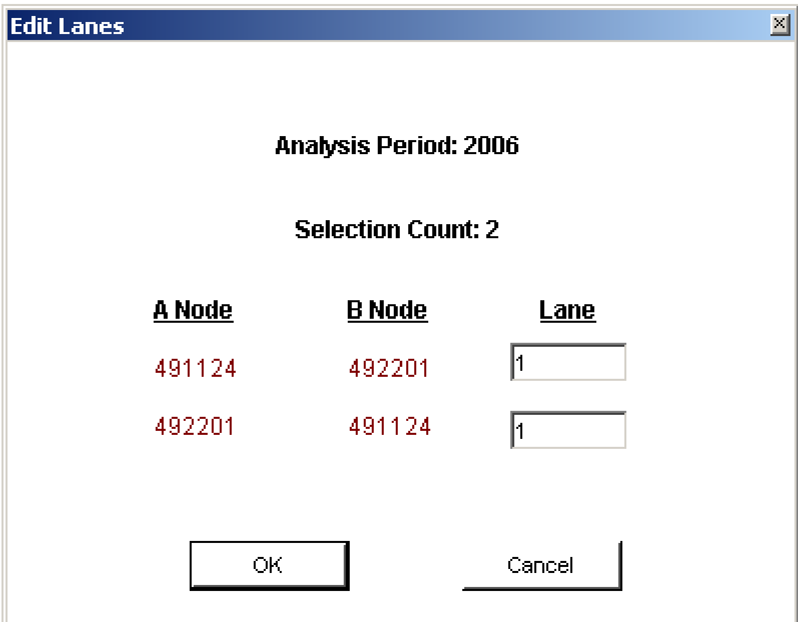
Network Information



This interface opens when the user clicks the Edit button next to ***Roadway Network Modified*** in the Scenario Summary form. This opens a map of the highway network used in the evacuation model.

- ***Counties*** - List of the counties for which road segments can be modified in the scenario. Selecting a county will zoom the map to that county. The user can only edit data in the county that has been selected.
- ***Edit*** – Places the interface into edit mode. This button appears only after the user has used the *Select Feature* tool to select a roadway segment. The user may only edit one segment at a time.
- ***Exit Edit*** – Takes the interface out of Edit mode. Appears only if the interface is in Edit mode.
- ***Lanes*** – Allows the user to edit the number of lanes on a roadway segment. The user must be in Edit mode and only one segment must be selected. The user may not set the number of lanes to zero.
- ***OK*** – Accepts the changes made to the roadway network and returns the user to the Scenario Summary form.

Edit Lanes

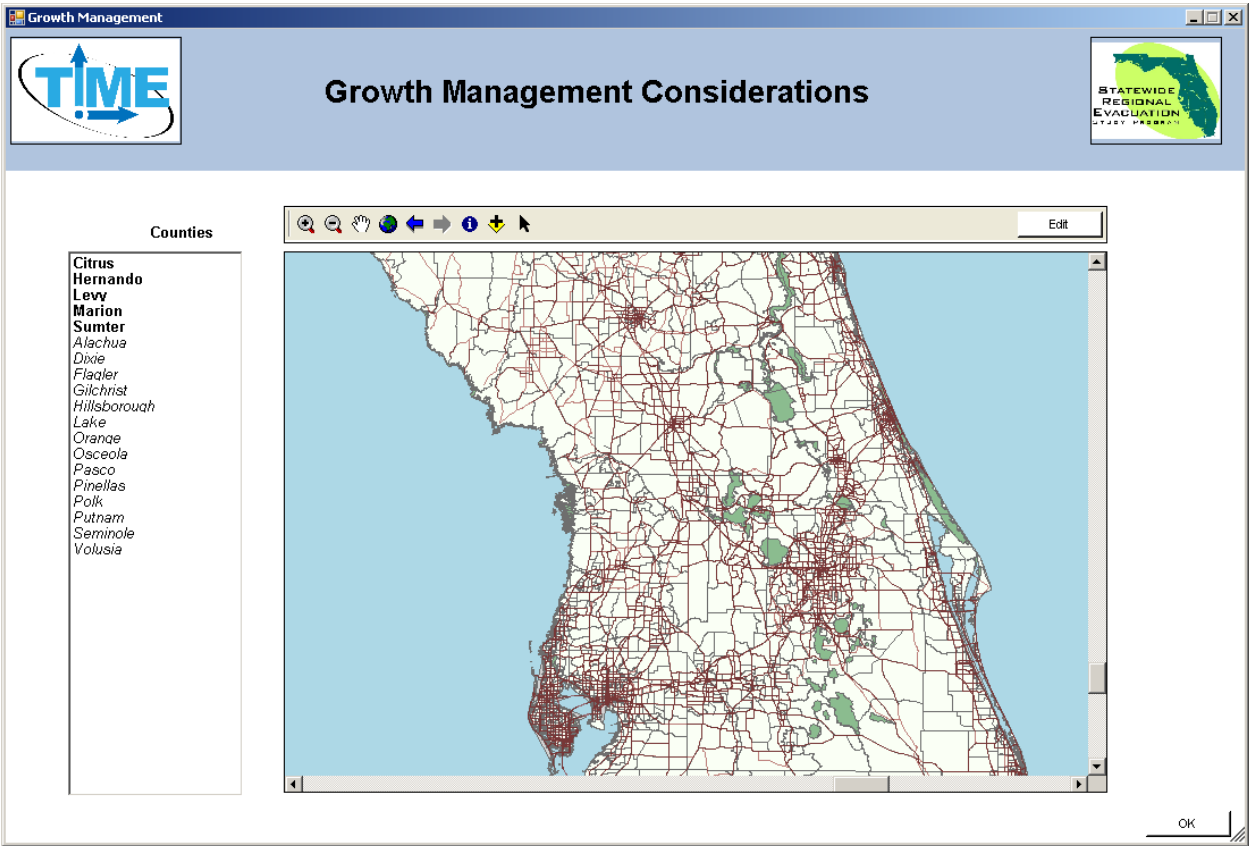


This window appears when the user clicks the ***Lanes*** button in the Network Information interface. Directionality for roads is indicated by the node numbers. The current version of TIME does not have a way of indicating which direction is which. Users are advised when increasing or decreasing lanes to do so in both directions simultaneously. Also, interstate highways and other freeways are coded in the network as a pair of parallel links. To modify lanes on these facilities it is necessary to select one direction at a time. The restrictive nature of this editing is meant to prevent user error by inadvertently select multiple segments and making unwanted edits to the network.

The network can also be edited outside of TIME by opening the geodatabase in Cube. Cube will allow the user to edit multiple links simultaneously as well as identify the direction of each side of the road to be edited. Also, Cube will allow the user to make other edits to the network not currently permitted by TIME, such as deleting existing roads or adding new roads.

- ***Analysis Period*** – Indicates which year of the highway network is being edited. This depends on the analysis period that is selected in the Scenario Summary form.
- ***Selection Count*** – Indicates how many features have been selected. On a two-way segment of road, this value should be 2. On a one-way segment of road or on a freeway, this value should be 1.
- ***A Node*** – The number of the A node in the highway network used by the model to track direction.
- ***B Node*** – The number of the B node in the highway network used by the model to track direction.
- ***Lane*** – Number of lanes in each direction. This field is editable. Values must range between 1 and 9. Values of 0 are prohibited.
- ***OK*** – Accepts changes to the number of lanes for the roadway segment.
- ***Cancel*** – Rejects changes to the number of lanes for the roadway segment.

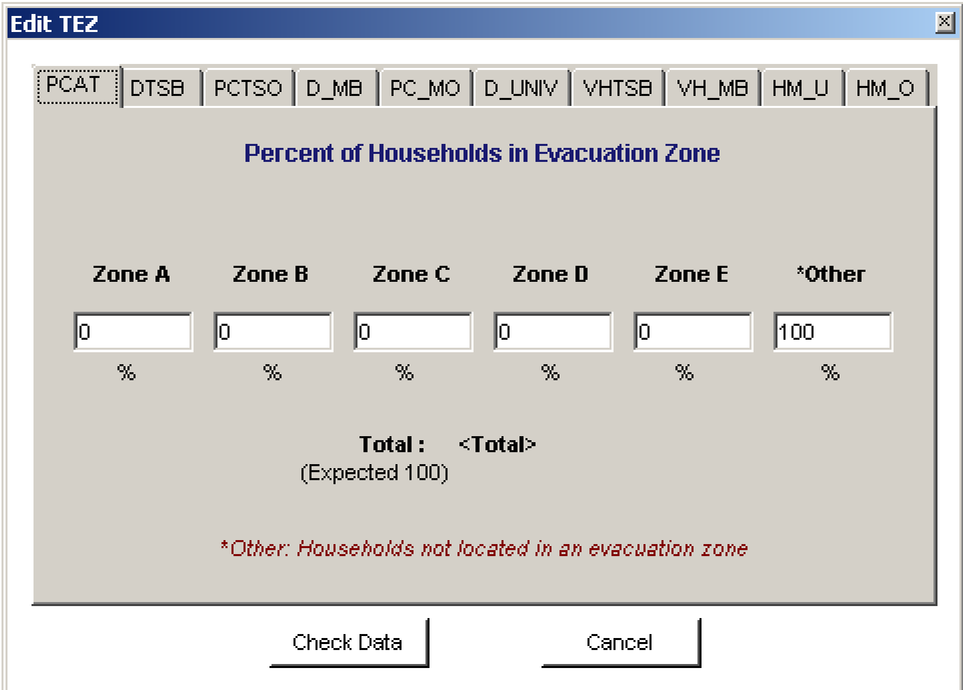
Growth Management Considerations



This interface opens when the user clicks the Edit button next to ***Small Area Data Modified*** in the Scenario Summary form. This interface allows the user to edit data related to the population for a given scenario.

- ***Counties*** - List of the counties for which small area data can be modified in the scenario. Selecting a county will zoom the map to that county. The user can only edit data in the county that has been selected.
- ***Edit*** – Places the interface in Edit mode. The user can then edit data in a specific TEZ by clicking on the appropriate location in the map.
- ***Exit Edit*** – Takes the interface out of Edit mode. Appears only if the interface is in Edit mode.
- ***OK*** – Returns the user to the scenario summary form.

Edit TEZ

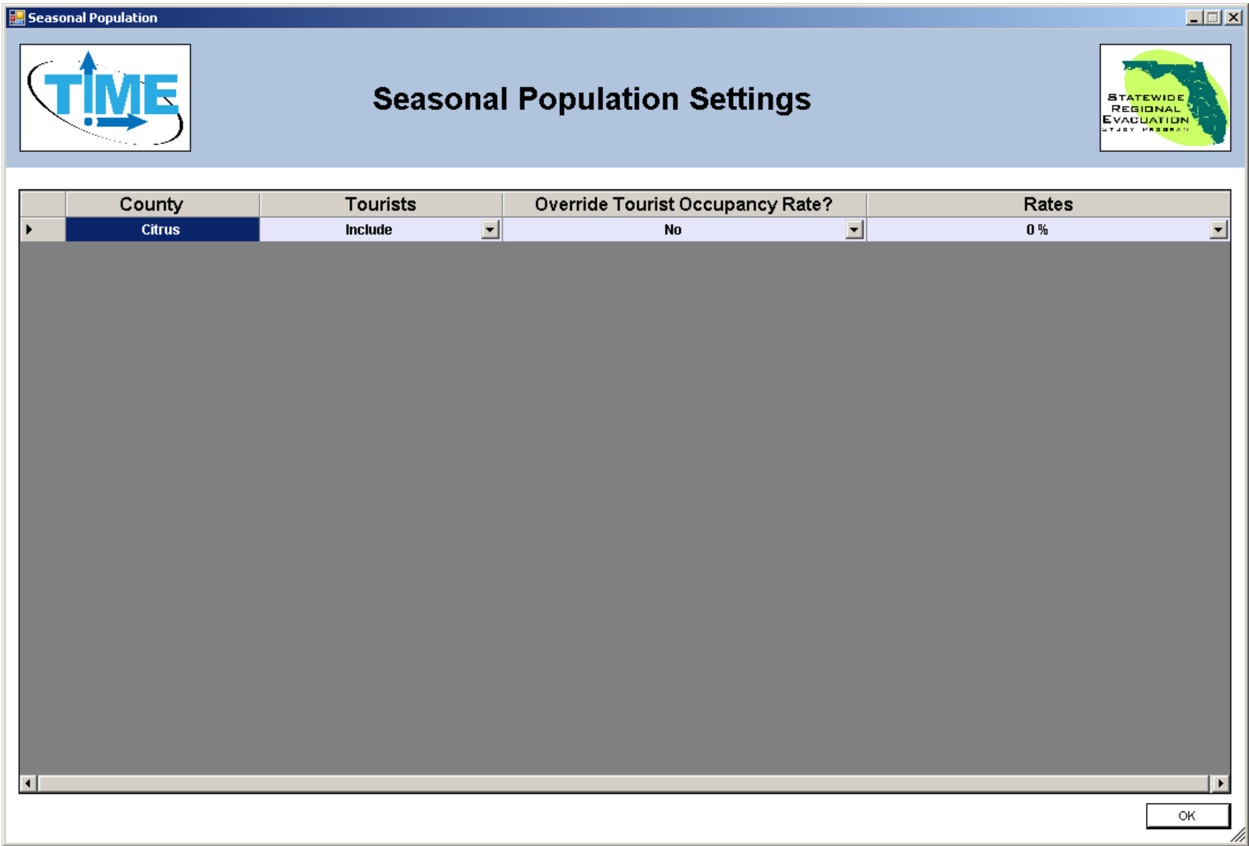


This window opens when the user clicks on a TEZ in the Growth Management Considerations interface while in ***Edit*** mode. This window contains multiple tabs. Each tab allows the user to modify specific information in the TEZ database found in the scenario's geodatabase. All changes are specific to the TEZ selected. Only one TEZ can be edited at a single time. The TEZ database can be edited outside of TIME in Cube. Cube allows the user to make changes to multiple TEZs simultaneously. Furthermore, the user can also use ArcGIS or MS Access to make large scale changes very quickly, such as updating a county's population data with more recent information.

- ***PCAT*** – Allows the user to determine what percent of the households in the TEZ are located in each evacuation zone. TEZs do not line up exactly with evacuation zones. PCAT allows the user great flexibility on determining the number of households located within the threatened area for a given scenario. TIME expects that all PCAT percentages will sum to 100.
- ***DTSB*** – Number of site-built dwelling units in the TEZ for the years 2006, 2010, and 2015.
- ***PCTSO*** – Percent of site-built dwelling units in the TEZ occupied for the years 2006, 2010, and 2015.
- ***D_MB*** – Number of mobile homes in the TEZ for the years 2006, 2010, and 2015.
- ***PC_MO*** – Percent of mobile homes in the TEZ occupied for the years 2006, 2010, and 2015.
- ***D_UNIV*** – Number of university dwelling units (dorm rooms) in the TEZ for the years 2006, 2010, and 2015.
- ***VHTSB*** – Number of vehicles per occupied site-built dwelling unit in the TEZ for the years 2006, 2010, and 2015.

- ***VH_MB*** – Number of vehicles per occupied mobile home in the TEZ for the years 2006, 2010, and 2015.
- ***HM_U*** – Number of hotel, motel, or other tourist dwelling units in the TEZ for the years 2006, 2010, and 2015.
- ***HM_O*** – Percent of occupied hotel, motel, or other tourist dwelling units in the TEZ for the years 2006, 2010, and 2015.
- ***Check Data*** – Confirms that PCAT percentages sum to 100.
- ***Save Data*** – Accept changes made to TEZ data. Appears only after the user has clicked ***Check Data*** and the data have been accepted.
- ***Cancel*** – Reject changes made to the TEZ data.

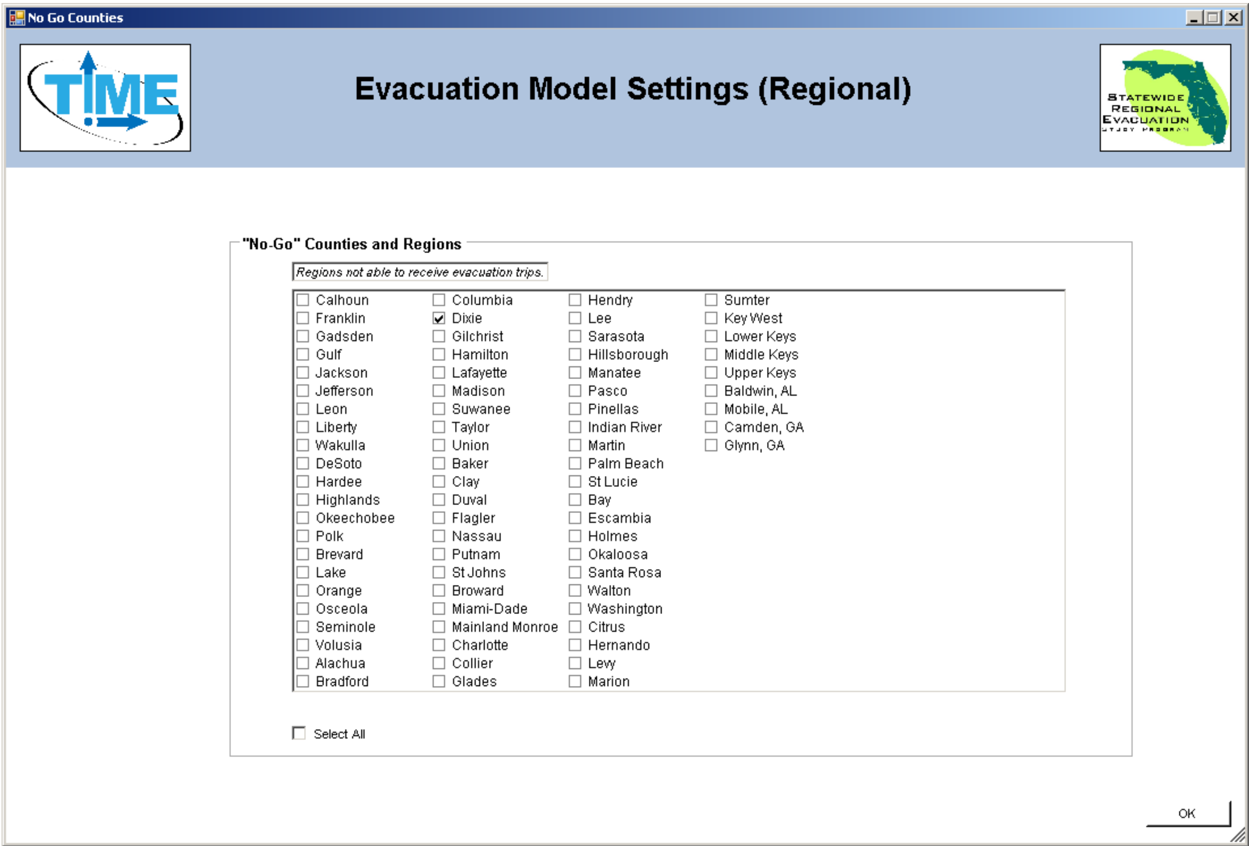
Seasonal Population Settings



This interface opens if the user clicks the Edit button next to ***Counties Including Tourist Population*** in the Scenario Summary form. The user will see data on seasonal population only for those counties that have been set to evacuate. The user can use this interface to determine whether or not to include tourists in the evacuation analysis.

- ***County*** – Name of the county or counties evacuating in the scenario.
- ***Tourists*** – Determines whether or not to include tourists in the evacuation analysis. Users have two options.
  - *Include*
  - *Do Not Include*
- ***Override Tourist Occupancy Rate?*** – Allows the user to override the default tourist occupancy rates included in the TEZ database.
  - *No*
  - *Yes*
- ***Rates*** – Sets the tourist occupancy rate for the entire county if the user has decided to override the TEZ database default tourist occupancy rates. TIME allows the user to select rates ranging from 0% to 100% in 5% increments.
- ***OK*** – Returns the user to the Scenario Summary form.

No Go Counties

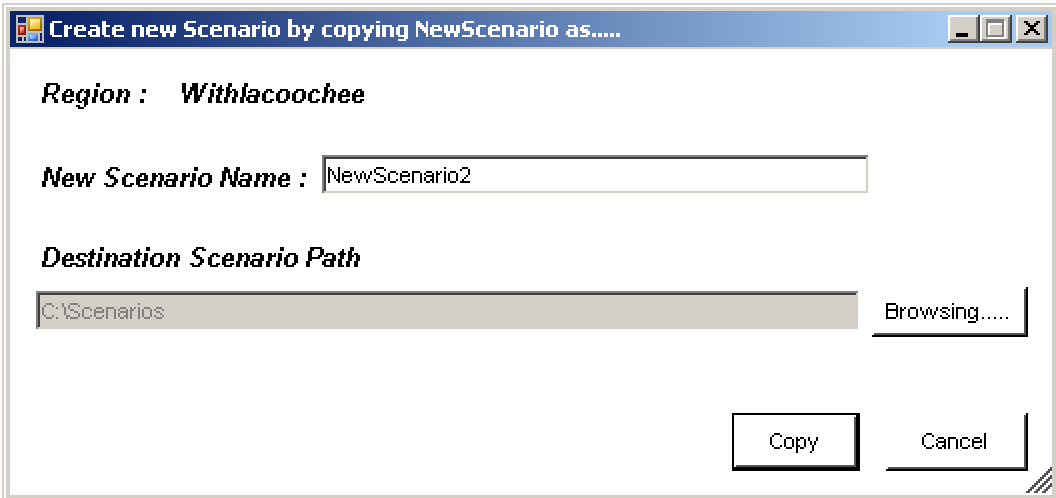


This interface appears when the user clicks the Edit button next to ***"No-Go" Counties*** in the Scenario Summary form. This interface allows the user to select those counties that will be prohibited from receiving evacuees. Evacuation trips may sill pass through these counties if needed to reach destinations beyond the No-Go counties.

It is expected that this feature will be used very infrequently and only to test hypothetical situations. The destinations calculated by the model reflect the best available data collected for the SRESP. These data reflect both the observed and stated preferences of the respondents. It is recognized by the study that state and local authorities have an extremely limited ability to compel an evacuee's choice of destination. While existing policies directing evacuees to head for specific areas of the state may have an influence on an evacuee's choice of destination, these influences have already been accounted for by the model.

- ***"No-Go" Counties and Regions*** – Select any and all counties that will be designated as no-go counties for the scenario.
- ***Select All*** – Designate all counties as no-go counties at once. If all counties are selected as no-go counties, then all evacuees will seek destinations outside of Florida.
- ***OK*** – Returns the user to the Scenario Summary form.

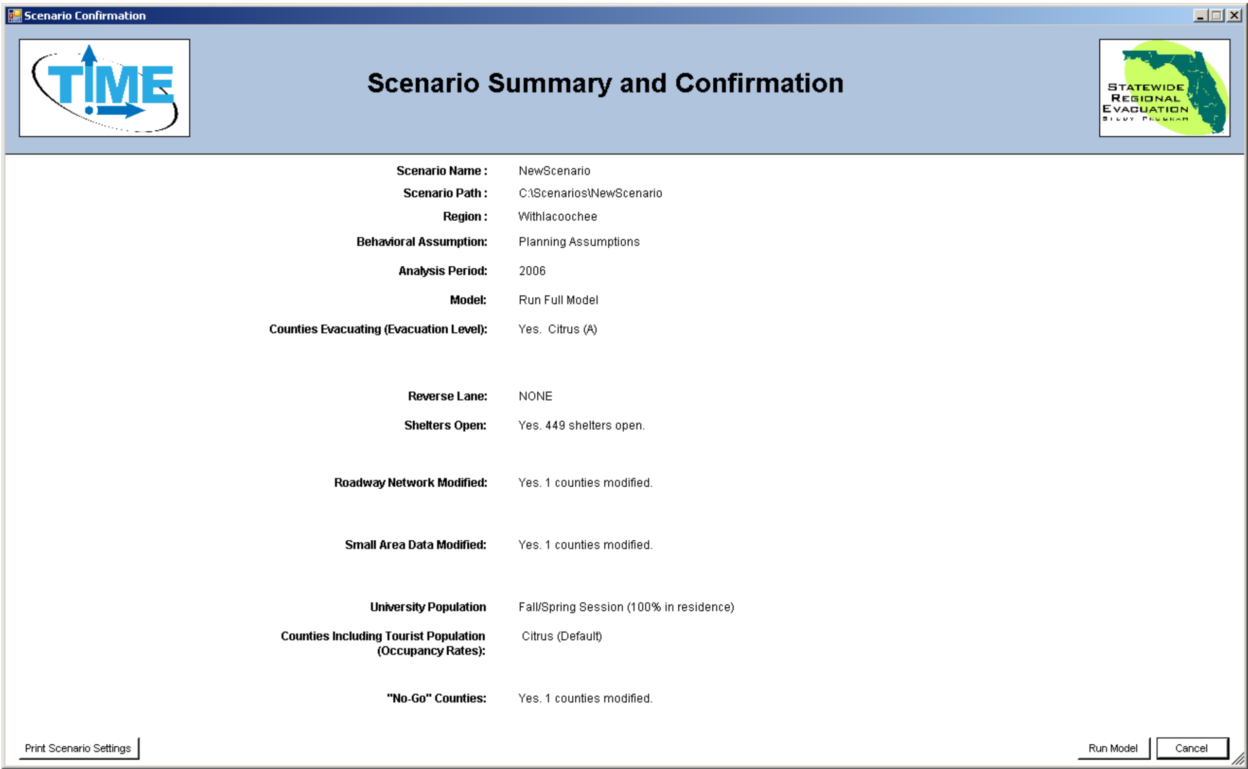
Create new Scenario by copying



This window appears when the user clicks the ***Copy*** button on the Scenario Summary form. It allows the user to create a new scenario by copying an existing one. This can be very convenient if the user intends to test multiple scenarios that are very similar to each and differ only slightly. This feature will copy all of the inputs from the existing scenario and place them into the new scenario. This includes all scenario parameters, such as which counties are evacuating and whether or not to include tourists, along with the geodatabase with all existing edits that have previously been made.

- ***Region*** – Displays the name of the region in which the scenario will be created. Scenarios created by copying from an existing scenario are limited to being in the same region as the original.
- ***New Scenario Name*** - Input the name of the new scenario here. TIME will automatically create a folder with this name on the user's hard drive.
- ***Destination Scenario Path*** - Browse to a specific location on the hard drive. TIME will create a folder with the scenario's name at the location specified here by the user.
- ***Copy*** – Creates the new scenario as a copy of the existing scenario.
- ***Cancel*** – Returns the user to the Scenario Summary form without creating a new scenario.

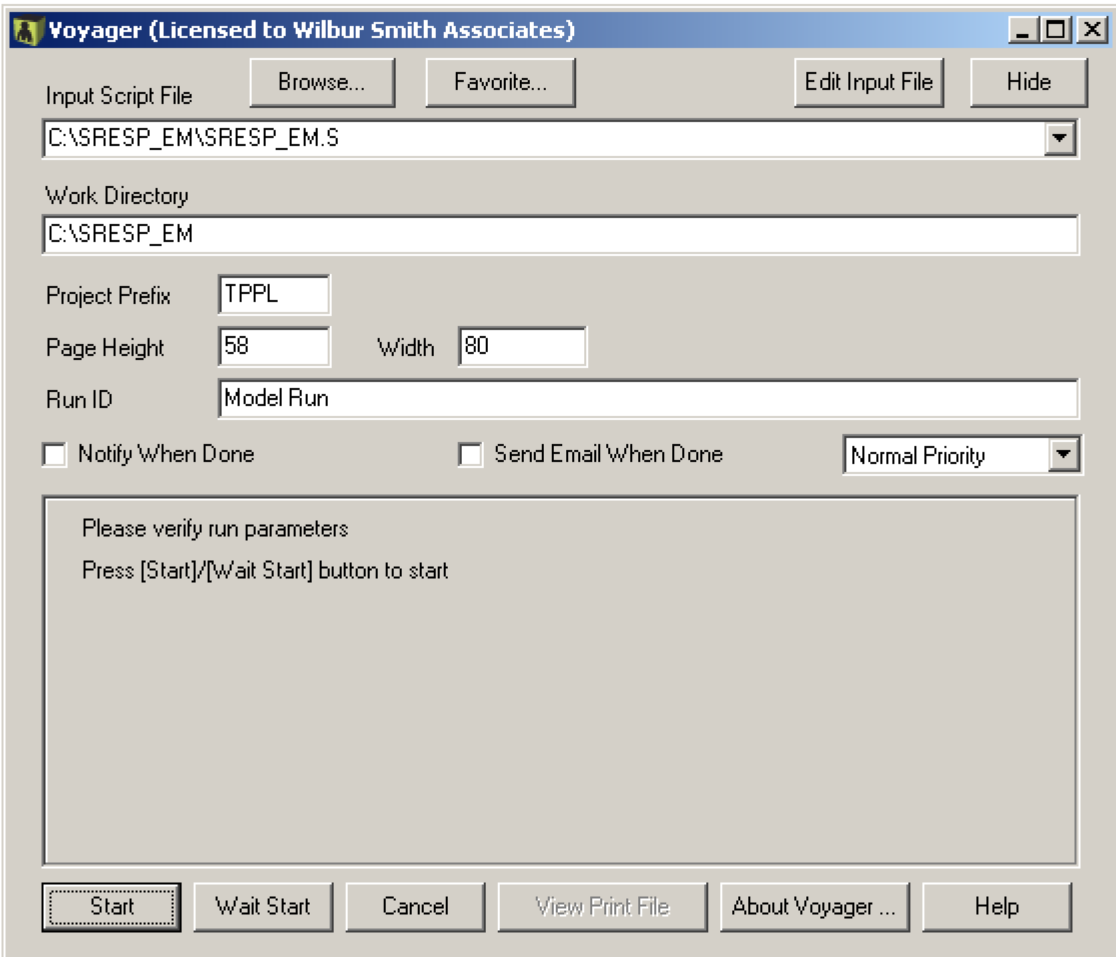
Scenario Summary and Confirmation



This window appears when the user clicks the ***Run*** button on the Scenario Summary form. It provides a brief summary of all of the settings the user has selected for this scenario before running the model.

- ***Print Scenario Settings*** – Prints a hard copy of the scenario summary for the user to keep as part of their records.
- ***Run Model*** – Launch Cube Voyager so that the evacuation model can be run.
- ***Cancel*** – Returns the user to the Scenario Summary form without running the model.

Voyager Task Monitor

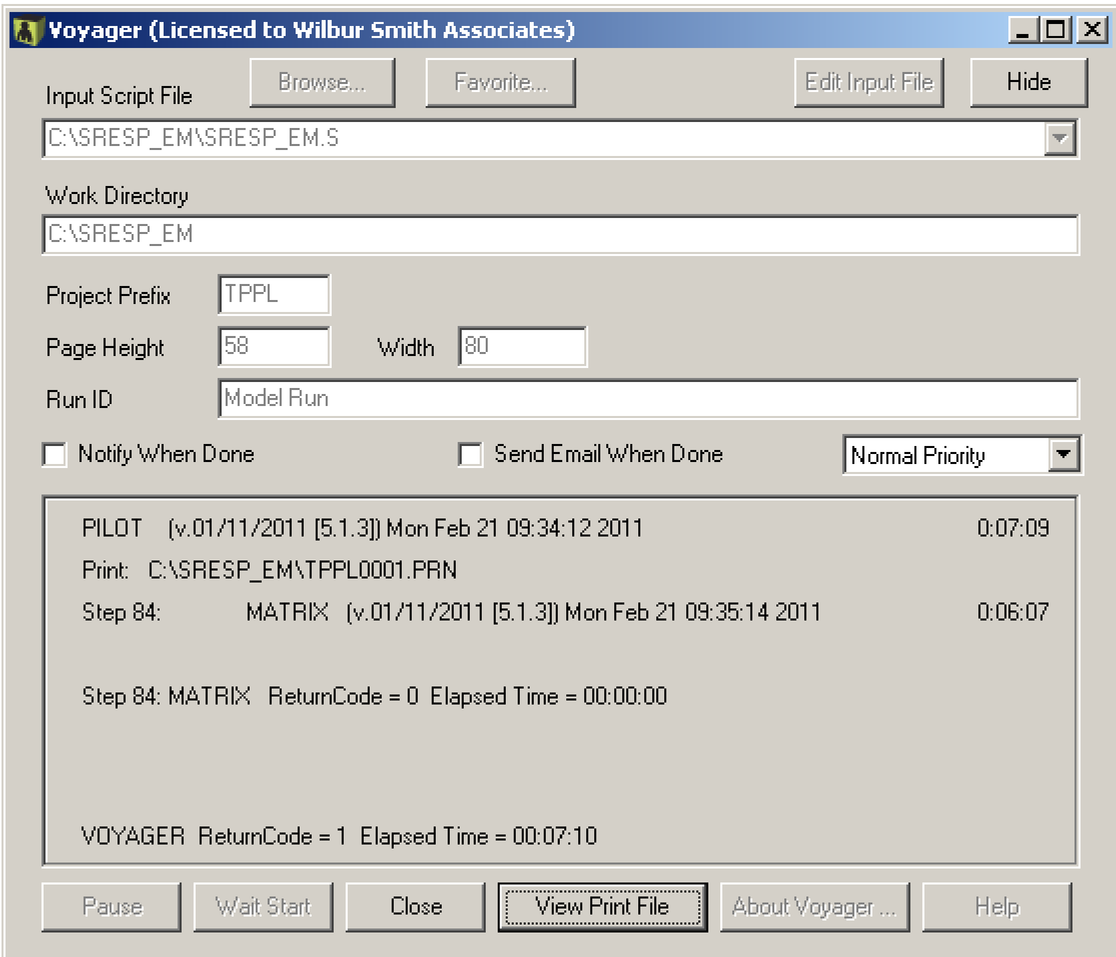


This window appears when the user clicks the ***Run Model*** button in the Scenario Summary and Confirmation window. This is the Cube Voyager Task Monitor responsible for executing the evacuation model. Most of this interface is specific to running models in Cube and is not of interest to the user.

- ***Start*** – Begins the evacuation model run. While the model is running, TIME will not be accessible to the user.
- ***Cancel*** – Returns the user to the Scenario Summary form.
- ***Abort*** – Stops the model from running. This button appears only after the user has clicked ***Start***.

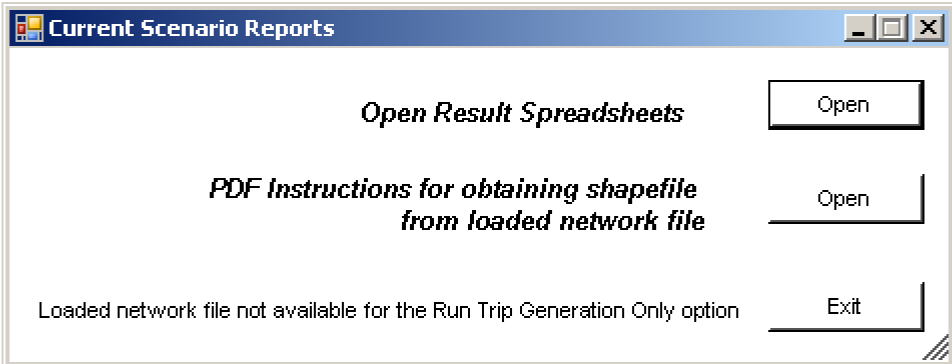
After the model has begun running a series of spreadsheets will be opened by the model. The user may view the spreadsheets if desired. After the user has finished viewing the spreadsheets, they must be closed manually.

Once the spreadsheets have been closed, the task monitor will once again be visible.



- ***VOYAGER ReturnCode*** – This indicates how the model performed.
  - 0 = Model executed without errors
  - 1 = Model executed without errors but with messages
  - 2 = Model crashed.
  - 3 = User scripted abort. (For the evacuation model this means that there is more shelter demand than there is shelter capacity open. The user must open more shelter capacity for the model to execute properly)
- ***Close*** – Returns the user to the Scenario Summary form.
- ***View Print File*** – Opens a text report detailing the model's performance throughout its run.

Current Scenario Reports



This window opens when the user clicks the Reports button on the Scenario Summary form.

- ***Open Result Spreadsheets*** – Opens the spreadsheets reporting the results of the scenario's most recent run. Because the report spreadsheets contain active formulas, multiple files have to be opened simultaneously. This button allows that to happen. The report spreadsheet should only be viewed by clicking this button.
- ***PDF Instructions for obtaining a shapefile…*** – Opens a document explaining how to export a shapefile from the loaded network file from the model.
- ***Exit*** – Returns the user to the Scenario Summary form.

I. Future Enhancements

The SRESP Evacuation Model was developed using the best data available at the time the model was developed. The data collected for this study represents the most comprehensive data set ever collected on the characteristics pertaining to evacuation trip making behavior for Florida. This model represents one of the largest scales attempted for mesoscopic dynamic traffic assignment and despite many enhancements made by the software vendor to Cube during the course of this study, there are still evacuation scenarios that may be desirable to analyze but which current commonly available computer technology does not make possible.

As technology improves and becomes more readily available the following enhancements to the SRESP Evacuation Model should be pursued:

- ***Statewide Assignment*** – It was hoped at the beginning of the study that evacuation models could be run using a statewide extent. This would have eliminated the need to extract sub-area models for the evacuation trip assignment. One of the limitations imposed for this model by the study is that the final product had to be a tool that could be executed from desktop computers the type of which were commonly found in use at public agency offices. As more advanced computers become available, a statewide extent should be possible. Future versions of the SRESP Evacuation Model should continue to pursue a statewide extent.

- ***No Assignment Aggregation*** – As part of the need to execute the evacuation model as efficiently as possible, TEZs had to be aggregated into large zone geographies called EAZs. This resulted in some loss of data resolution. The aggregation plans for each county were designed to minimize this loss as much as possible with less aggregation along the coast and more aggregation inland. No aggregation would be preferable. As more advanced computers become commonly available, future versions of the SRESP Evacuation Model should eliminate the EAZ process.

- ***Dynamic Participation*** – Recent work in academia has demonstrated that it is possible to created dynamic choice models for determining who evacuates and when. The current process uses static rates for participation along with static response curves. The benefit of a dynamic choice model is that the decision when to evacuate is made simultaneously with the decision to evacuate by individuals in the model. This means that individuals in the model can respond more realistically based on parameters more intuitive to emergency management staff, such as when an evacuation order is given and when landfall is expected. It was hoped that this technique could be employed for the current version of the SRESP Evacuation Model, but a lack of robust temporal data in the SRESP behavioral survey prevented this. Future behavioral analyses for evacuations should include questions intended to determine when an individual first began their evacuation journey. The answers provided should be as specific as possible.

- ***Enhanced Trip Distribution*** – The coarse level of trip distribution data contained in the SRESP behavioral analysis made it difficult to develop any but the most rudimentary trip distribution model. The nature of trip distribution during an evacuation is different than that of normal every day trip making behavior. Additional questions concerning the respondent's destination should be asked. Detail at the zip-code level should be acquired at a minimum, though more precise information would be preferable. The respondents should be asked how distant their destination was along with what time they arrived at their destination. This information could be used to determine a statistical probability that a particular TEZ would be more or less likely to receive evacuees.

- ***Cloud Computing*** – When the SRESP Evacuation Model was first being developed the possibility of hosting the model on a server and giving users account access to the model to set up and run scenarios was discussed. This approach was rejected at the time in favor of a model that operates on a local machine. Issues related to the distribution and maintenance of the evacuation model may prompt those responsible for maintaining the model to revisit this option. Cube 6 will support a cloud computing platform. Models can be maintained and operated by logging into servers hosted by the software vendor. These machines are more powerful than what is typically available in most public agency offices. This would allow the SRESP Evacuation Model to make use of more advanced techniques without placing additional burden on end users' computer resources. Future versions of the SRESP Evacuation Model should explore implementation in a cloud environment.

- ***Improved Dynamic Traffic Assignment*** – The Cube software is always being enhanced. More sophisticated algorithms for executing dynamic traffic assignments are being developed every day. The SRESP Evacuation Model should be periodically updated to ensure that the most up-to-date algorithms are being implemented in the model. This will ensure that the evacuation model continues to provide the most accurate clearance times possible.

- ***Integration with Microscopic Modeling and Operational Analysis*** – During the course of the study, it became apparent that there was a high demand for operational analysis tools that could be used by emergency management staff during an event. The SRESP Evacuation Model was never intended to be such a tool. There does exist an opportunity to integrate data from the SRESP Evacuation Model into operational analysis tools that could be of great benefit for emergency management staff. Future efforts should include attempts to synthesize data from the SRESP Evacuation Model and other data sources to create on operational analysis tool that could be used in real time to assist in decision making during an emergency.

- ***Refined Background Traffic*** – The SRESP Behavioral Analysis focused explicitly on evacuation trips. Information concerning those people who were in evacuating counties but did not evacuate was not collected. This information is crucial to getting a better understanding of the character of background traffic. Previous studies tended to look at counties in isolation so simple assumptions about deteriorating background traffic over time were logical. For this study, since the areas being modeled were so huge, a different set of assumptions were used that could not assume uniformly deteriorating background traffic. Additional information concerning the characteristics of those individuals who do not evacuate would provide a greater understanding of how much normal travel behavior changes during an evacuation.

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CHAPTER III
DEMOGRAPHIC AND LAND USE ANALYSIS METHODOLOGY

A. Guiding Principles for the Demographic Analysis

1. The best available data should be used for creating housing unit counts and population estimates, housing unit and population projections, and demographic profiles.
2. All regional studies should use an April 1, 2006, baseline for housing unit and population estimates, with April 1, 2010 and April 1, 2015 projections for comparison.
3. Demographic estimates for both counties and small areas for the baseline, and the projections for 2010 and 2015, should be consistent with "official" county-level totals (current state estimates and projections from the University of Florida's Bureau of Economic and Business Research or adopted comprehensive plans with methodology approved by the Florida Department of Community Affairs).

The regional evacuation study scope of work required the preparation of a socio-economic profile of the population of each county, as well as the collection of small-area data to support both the vulnerable population analysis and the transportation analysis. The socio-economic profile is based on 2000 Census block group data. The small-area geography used in the prevailing transportation model for the county, if there was one, determined the type of data that was collected for transportation modeling. All small-area data was incorporated into a Geographic Information System (GIS).

B. Socio-Economic Profile

Chapter I of the Technical Data Report includes the socio-economic profile for the RPC region as a whole, along with an appendix for each county-level profile. Template files for the regional summary (I-RegionalDemographicLandUseAnalysis.doc) and for the county appendices (I-CountyDemographicLandUseAnalysis.doc) were posted on the SRESP FTP site at ftp://ftp.floridaevac.org/uploads/TDR_Templates/1_Demographics/. Printable versions of the templates with the maps attached (I-RegionalDemographicLandUseAnalysis.pdf for South Florida and I-CountyDemographicLandUse_wMaps.pdf for Broward County) were posted in the same folder. The socio-economic profile for the region and each county is based on 2000 Census block group data. For the 40 counties that had data from the 2006 American Community Survey (ACS), a comparison was prepared between county summaries in 2000 and the corresponding county profiles for 2006. Where all of the counties in the region had data from the 2006 ACS (East Central Florida, Tampa Bay, Treasure Coast and South Florida), a 2006 comparison profile and analysis was included in Chapter I.

The South Florida Regional Planning Council provided 2000 Census data to each RPC in a pair of region-specific files on the Demographic and Land Use Analysis – Support Data 1 CD-ROM delivered at the GIS methodology meeting on March 19, 2007, in Tampa. The files are named CensusSF3HBG*nn*.xls and CensusSF3PBG*nn*.xls, where "*nn*" represents a unique 2-character identifier for each RPC. The same data was made available on the SRESP FTP site in the folders for each RPC under ftp://ftp.floridaevac.org/GIS/RPC/Demographics/Profiles/. The data is from Summary File 3 (SF3), at the block group (BG) level, with county totals, for every county in each of the 11 RPC regions; the files include base data taken directly from SF3, as well as a set of summarized and calculated variables to be used as socio-economic indicators. The specific SF3 tables from which the basic data were drawn, broken into housing unit and person characteristics, are identified on tabs (SF3HTables and SF3PTables) included in the spreadsheets. A list of the summarized and calculated variables was included for housing unit and person characteristics on two other tabs (HVariables and PVariables). The indicators were calculated for each block group and for the county totals, and are available on tabs (SRESPHData and SRESPPData) in the same spreadsheets.

Step 1A (block group data for all counties)

Each RPC incorporated the indicator data (SRESPHData and SRESPPData) for the region as a whole or for each county separately into a GIS, along with a 2000 Census block group boundary layer, and used the GIS to create thematic maps and analyze characteristics of the population, showing concentrations of potentially vulnerable populations. **Table III-1** lists the indicators developed for thematic mapping and highlights in light green the ones that should be incorporated into the final Chapter I report and the county appendices. RPCs were advised to include additional maps as deemed appropriate. Once the counties in the region defined new evacuation zones, this data was used, along with updated small-area projections of housing units, to analyze vulnerable populations within each evacuation zone.

Step 1B (county-level profile data for all counties)

The South Florida Regional Planning Council provided county-level summary tables of housing unit and person characteristics of the population in 2000 on the Demographic and Land Use Analysis – Support Data 2 CD-ROM that was distributed at the methodology meeting on May 8, 2007. The files are named *nn*RPCProfileH.xls and *nn*RPCProfileP.xls, where "*nn*" represents the same 2-character identifier for each RPC. The same data was posted on the SRESP FTP site in the folders for each RPC under ftp://ftp.floridaevac.org/GIS/RPC/Demographics/Profiles/. Each RPC used these tables to prepare an analysis of the socio-economic characteristics of each county and the region. RPCs also used block group data to develop sub-county highlights, where appropriate, incorporating any maps generated in Step 1A. All of the summary tables were designed and included in the demographic analysis template files.

Step 2A (40 counties with data from the 2006 American Community Survey)

County-level summary tables of housing unit and person characteristics of the population in 2006, based on the American Community Survey (ACS), were included along with the 2000 tables in the same profile spreadsheets referenced in Step 1B. The profiles draw from 2006 ACS spreadsheets for each county that follow the naming scheme 2006ACS*County*.xls, where "*County*" is filled by the name of the county. The 2006 ACS data files were posted on the FTP site under ftp://ftp.floridaevac.org/GIS/RPC/Demographics/Profiles/ in the folders for each RPC. The profile spreadsheets for each RPC, initially developed with 2005 ACS data, were updated to include the 2006 ACS data, along with the 2000 Census data, and posted on the FTP site.

Each RPC prepared a descriptive summary of the characteristics of the population for each county as a whole in 2006, and compared it, where appropriate, with the characteristics of the population in 2000 (see the template file, I-CountyDemographicLandUseAnalysis.doc, which includes an analysis of Broward County). Note that 2006 American Community Survey is from a relatively small sample, so comparisons should be made with caution. ACS data is published with a Margin of Error (MOE) statistic, which can be viewed in the source data file and in the profile tables – it is important to consult the MOE before concluding that significant changes have taken place in 2006 with regard to the 2000 baseline.

Step 2B (27 counties without data from the 2006 American Community Survey)
If there was no 2006 ACS data available for a county in the region, the tables reserved for 2006 data in the profile were left blank. However, if significant demographic changes had occurred since the 2000 Census, for example as a result of major storms in recent years, RPCs were encouraged to use the best available data to discuss in the narrative the possible effects of those changes on the socio-economic characteristics of the population.

C. Development of Small Area Data for Transportation Modeling

Small-area data on housing units by type (permanent, mobile home and tourist), number of people and number of vehicles was based on either traffic analysis zones (TAZs) or 2000 Census block groups (BGs). Data from the 2000 Census required updating to a 2006 baseline, which was projected out to 2010 and 2015. The RPCs were instructed to make all projections consistent with the county-level mid-range projections based on April 1, 2006 (released in February 2007), prepared by the University of Florida's Bureau of Economic and Business Research (BEBR), unless an alternative set of projections had been approved by the Florida Department of Community Affairs (DCA).

Step 3A
RPCs were instructed to determine whether existing transportation models for the county use TAZs, BGs or other geography, by consulting with the following organizations (where applicable):

- County – large county planning departments sometimes develop their own estimates and projections for small-area geography.
- Metropolitan Planning Organization (MPO) – counties and MPOs work together to develop the basic data sets for transportation models for each planning area.
- Florida Department of Transportation (FDOT) – for counties that are not within the jurisdiction of an MPO, default housing unit, population and vehicle projections for small areas are built into the statewide transportation model.
- In some cases, consulting firms may play a role in developing and maintaining transportation models for the county and/or the MPO.

RPCs were asked to determine whether small-area demographic projections out to at least 2015 were already in use and represented a consensus of the above groups. If so, they were asked to determine whether the projections were consistent (at the county level) with those prepared by BEBR. If they were, these would constitute the preferred baseline. If there were consensus projections that were not consistent with BEBR, the RPC should determine whether they had been approved by DCA; otherwise, it was important to work with partners to revise the projections. If there were competing sets of projections, the RPCs were instructed to work with county staff to decide which set should serve as the starting point.

Step 3B
Based on the results in Step 3A, the RPCs defined the small-area geography that was used for

data collection for traffic modeling in the regional evacuation study.

- If projections for TAZs were being used in the applicable transportation model and were acceptable to all, they were the first choice.
- Otherwise, BGs should be used.
- If census tracts (CTs) were being used in the transportation model, data should be collected at the block group level and aggregated as needed for traffic modeling.

Step 4

RPCs then reviewed the available datasets to acquire the best available small-area data for 2000. Required demographic information for BGs from 2000 Census Summary File 3 was provided for all counties for the demographic profiles and mapping. Additional data was provided from the 2000 Census Transportation Planning Package (CTPP) for TAZs (31 counties) or BGs (10 counties) – 5 of the counties with BG data also have TAZ data on the 2000 CTPP disc, which leaves a total of 31 counties with neither. The purpose of working with the CTPP data, even for RPCs using BGs, was to obtain additional detail about the number of vehicles by type of unit, which is not available in Summary File 3.

2000 CTPP data at the TAZ or BG level for 36 counties, along with summarized and calculated variables for all 67 counties and the State of Florida, was provided on the Demographic and Land Use Analysis – Support Data 2 CD-ROM that was distributed at the methodology meeting on May 8, 2007. The same data was posted on the SRESP FTP site, in the folder ftp://ftp.floridaevac.org/GIS/RPC/Demographics/2000Census/Census_trans_package/.

- Total Number of Persons (Table 1-047)
- Household Size by Vehicles Available by Number of Units in Structure (Table 1-077)
- Total Number of Units (Table 1-083)
- Occupancy Status by Number of Units in Structure (Table 1-086)
- Vacancy Status (Table 1-087)
- Aggregate Number of Vehicles in Households (Table 1-109)

Step 5A

If consensus small-area projections did not exist, the RPCs were instructed to use building permit data from the county and municipal planning and zoning departments to identify new dwelling units built since 2000. This data was geocoded and tabulated for the level of geography used in the transportation model and produced updated estimates for the 2006 baseline, as well as projections for 2010 and 2015. Alternatively, or as a supplement, the RPC was instructed to use information from the county Property Appraiser database to analyze changes in the number and type of units since 2000. For each year and for each small-area geographic unit, the final transportation modeling inputs required included the number of occupied non-mobile home dwelling units, the number of occupied mobile home units, and the number of persons and vehicles per unit for each type. Similarly, for hotel/motel units, we required the number of units and the number persons and vehicles per unit.

Step 5B

RPCs were instructed to collect data on the current number of permitted mobile home parks from the Florida Department of Health's Environmental Health Inspected Facilities database (www.doh.state.fl.us/environment/programs/EhGis/EhGisDownload.htm) and compare to the 2000 baseline. A copy of the March 16, 2007, version of this database (StateMHPMaster.xls), with 5,669 records for mobile home parks in the State of Florida, was included on the

Demographic and Land Use Analysis – Support Data 1 CD-ROM that was distributed at the GIS methodology meeting on March 19, 2007, in Tampa. The same data was posted on the SRESP FTP site in the folder ftp://ftp.floridaevac.org/GIS/State/Demographics/. This data was used to geocode and tabulate for the level of geography used in the transportation model and produce updated estimates for 2006 and projections for 2010 and 2015. RPCs were alerted to verify whether any mobile home units had been converted or otherwise ceased to exist. Alternatively, or as a supplement, information from the county Property Appraiser database was used to analyze changes in the number of mobile home units since 2000.

Step 5C

RPCs were instructed to collect data on the current number of hotel and motel rooms from the lodging licenses database at the Florida Department of Business and Professional Regulation (www.myfloridalicense.com/dbpr/sto/file_download/hr_lodging.shtml) and compare to the 2000 baseline. A copy of the March 14, 2007, version of this database (HotelMotelFL.xls), with 37,412 records for the State of Florida, was included on the Demographic and Land Use Analysis – Support Data 1 CD-ROM that was distributed at the GIS methodology meeting on March 19, 2007, in Tampa. The same data was posted on the SRESP FTP site in the folder ftp://ftp.floridaevac.org/GIS/State/Demographics/Lodging/. Richard Butgereit (FDEM) geocoded this data and made a shapefile available on the FTP site in the same folder, along with a revised "join" file (new_lodge_join.dbf). The RPCs reviewed and tabulated this data for the level of geography used in the transportation model and produced updated estimates for 2006 and projections for 2010 and 2015. Alternatively, or as a supplement, they used information from the county Property Appraiser database to analyze changes in the number of hotel and motel units since 2000.

Step 6

The RPCs then prepared a dataset for either TAZs or BGs with baseline data for transportation modeling that contained the following data for 2006, 2010 and 2015:

- Permanent units and occupancy rate, yielding occupied dwelling units
- Mobile home units and occupancy rate, yielding occupied mobile home units
- Hotel/Motel rooms
- Persons per unit for each of the above
- Vehicles per unit for each of the above

A field list for the input files, with definitions, is included in **Table III-2**.

Table III-1
Socio-Economic Indicator List
2000 Census Block Group Data

Variable	Field Name	Universe	Description
Housing Unit Indicators			
SRESPH06	AreaLand	Geography	Land Area (square miles)
SRESPH07	AreaWater	Geography	Water Area (square miles)
SRESPH08	POP100	Population	Total resident population from the 100% count
SRESPH09	HU100	Population	Total housing units from the 100% count
SRESPH10	TotalUnits	Housing	Total housing units
SRESPH11	OccUnits	Housing	Occupied units
SRESPH12	OwnerOcc	Housing	Owner-occupied units
SRESPH13	RenterOcc	Housing	Renter-occupied units
SRESPH14	TotalVacant	Housing	Vacant units
SRESPH15	VacantTrans	Housing	Vacant units - for rent, for sale, rented/sold but not occupied
SRESPH16	VacantSeas	Housing	Vacant units - seasonal
SRESPH17	VacantMigr	Housing	Vacant units - migrant workers
SRESPH18	%Renter	Housing	% Renter-occupied units
SRESPH19	%Vacant	Housing	% Vacant units
SRESPH20	%Season	Housing	% Vacant units - seasonal
SRESPH21	PopOcc	Population	Population in occupied housing units
SRESPH22	OwnerPop	Population	Population in owner-occupied units
SRESPH23	RenterPop	Population	Population in renter-occupied units
SRESPH24	HHAvgSize	Household	Average household size in occupied housing units
SRESPH25	OwnerAvg	Household	Average household size in owner-occupied units
SRESPH26	RenterAvg	Household	Average household size in renter-occupied units
SRESPH27	SFUnits	Housing	Single-family units
SRESPH28	MFUnits	Housing	Multi-family units
SRESPH29	MHomes	Housing	Mobile homes
SRESPH30	BoatsRVs	Housing	Boats, RVs, vans, etc.
SRESPH31	OccSF	Housing	Occupied single-family units
SRESPH32	OccMF	Housing	Occupied multi-family units
SRESPH33	OccMH	Housing	Occupied mobile homes
SRESPH34	OccBoats	Housing	Occupied boats, RVs, vans, etc.
SRESPH35	SFSize	Household	Average household size in occupied single-family units
SRESPH36	MFSize	Household	Average household size in occupied multi-family units
SRESPH37	MHSize	Household	Average household size in occupied mobile homes
SRESPH38	BRVSize	Household	Average household size in occupied boats, RVs, vans, etc.
SRESPH39	%VacSF	Housing	% Vacant - Single-family units
SRESPH40	%VacMF	Housing	% Vacant - Multi-family units
SRESPH41	%VacMH	Housing	% Vacant - Mobile homes
SRESPH42	%VacBRVs	Housing	% Vacant - Boats, RVs, vans, etc.
SRESPH43	NoVehicle	Household	Households with no vehicle available
SRESPH44	AvgVehicles	Household	Average number of vehicles per household
SRESPH45	AvgVehOwn	Household	Average number of vehicles per owner-occupied household
SRESPH46	AvgVehRen	Household	Average number of vehicles per renter-occupied household

Variable	Field Name	Universe	Description
Person Indicators			
SRESPP06	AreaLand	Geography	Land Area (square miles)
SRESPP07	AreaWater	Geography	Water Area (square miles)
SRESPP08	Density	Population	Population per gross square mile (land + water)
SRESPP09	POP100	Population	Total Resident Population from the 100% Count
SRESPP10	HU100	Population	Total Housing Units from the 100% Count
SRESPP11	WhiteNH	Population	White alone, not Hispanic or Latino
SRESPP12	BlackNH	Population	Black or African American alone, not Hispanic or Latino
SRESPP13	OtherNH	Population	Other race alone and two or more races, not Hispanic or Latino
SRESPP14	Hispanic	Population	Hispanic or Latino (all races)
SRESPP15	%BlackNH	Population	% Black or African American alone, not Hispanic or Latino
SRESPP16	%OtherNH	Population	% Other race alone and two or more races, not Hispanic or Latino
SRESPP17	%Hispanic	Population	% Hispanic or Latino (all races)
SRESPP18	Age<5	Population	Age under 5 years
SRESPP19	Age5to17	Population	Age 5 to 17 years
SRESPP20	Age18to24	Population	Age 18 to 24 years
SRESPP21	Age25to34	Population	Age 25 to 34 years
SRESPP22	Age35to44	Population	Age 35 to 44 years
SRESPP23	Age45to54	Population	Age 45 to 54 years
SRESPP24	Age55to64	Population	Age 55 to 64 years
SRESPP25	Age65to74	Population	Age 65 to 74 years
SRESPP26	Age75to84	Population	Age 75 to 84 years
SRESPP27	Age85+	Population	Age 85 years and over
SRESPP28	%Age<5	Population	% Age under 5 years
SRESPP29	%Age<18	Population	% Age under 18 years
SRESPP30	%Age65+	Population	% Age 65 years and over
SRESPP31	%Age85+	Population	% Age 85 years and over
SRESPP32	FamilyPop	Population	Population in family households
SRESPP33	NonFamPop	Population	Population in nonfamily households
SRESPP34	LiveAlone	Population	Living alone
SRESPP35	GQInst	Population	Institutionalized population in group quarters
SRESPP36	GQNonInst	Population	Noninstitutionalized population in group quarters
SRESPP37	%NonFam	Population	% Population in nonfamily households
SRESPP38	%GQ	Population	% Population in group quarters
SRESPP39	%GQInst	Population	% Instituionalized population in group quarters
SRESPP40	Alone65+	Population	Population that is 65 years and over and is living alone
SRESPP41	%Alone65+	Population	% of the population that is 65 years and over and is living alone
SRESPP42	SpeakEng	Households	Speak English
SRESPP43	SpeakSpa	Households	Speak Spanish
SRESPP44	SpeakOth	Households	Speak other languages
SRESPP45	LingIsoSpa	Households	Linguistically isolated - Spanish

Variable	Field Name	Universe	Description
SRESPP46	LingIsoOth	Households	Linguistically isolated - other languages
SRESPP47	%LingIso	Households	% Linguistically isolated
SRESPP48	NativeFl	Population	Native - Born in state of residence
SRESPP49	NativeUS	Population	Native - Born in other state in the United States
SRESPP50	NativeNUS	Population	Native - Born outside the United States
SRESPP51	ForBornCit	Population	Foreign born - Naturalized citizen
SRESPP52	ForBornNCit	Population	Foreign-born - Not a citizen
SRESPP53	%Foreign	Population	% Foreign-born
SRESPP54	%NCitizen	Population	% Not a citizen
SRESPP55	CivilPop5+	Population	Civilian noninstitutionalized population, 5 years and older
SRESPP56	Disab5to15	Population	Civilian noninstitutionalized population with a disability, 5 to 15 years
SRESPP57	Disab16to20	Population	Civilian noninstitutionalized population with a disability, 16 to 20 years
SRESPP58	Disab21to64	Population	Civilian noninstitutionalized population with a disability, 21 to 64 years
SRESPP59	Disab65to74	Population	Civilian noninstitutionalized population with a disability, 65 to 74 years
SRESPP60	Disab75+	Population	Civilian noninstitutionalized population with a disability, 75 and over
SRESPP61	%wDisability	Population	% Civilian noninstitutionalized population with a disability
SRESPP62	%Disab65+	Population	% Civilian noninstitutionalized population with a disability, 65+
SRESPP63	LaborForce	Population	Population 16 years and over in labor force
SRESPP64	ArmedForce	Population	In armed forces
SRESPP65	Employed	Population	Civilian employed
SRESPP66	Unemployed	Population	Civilian unemployed
SRESPP67	NLabForce	Population	Population 16 years and over not in labor force
SRESPP68	%Unemp	Population	% Unemployed
SRESPP69	%LabForce	Population	% In labor force (Labor Force Participation Rate)
SRESPP70	MedianHHY	Population	Median household income in 1999
SRESPP71	PerCapitaY	Population	Per capita income in 1999
SRESPP72	PovDeterm	Population	Population for whom poverty status is determined
SRESPP73	BelowPov	Population	Population with income in 1999 below poverty level
SRESPP74	Pov<18	Population	Population under 18 years of age below poverty level
SRESPP75	Pov65+	Population	Population 65 years of age and over below poverty level
SRESPP76	%BelowPov	Population	% of total population with income in 1999 below poverty level
SRESPP77	%Pov<18	Population	% of population under 18 years of age below poverty level
SRESPP78	%Pov65+	Population	% of population 65 years of age and over below poverty level

Table III-2
Recommended Fields for Preparation of Small Area Data
Baseline Data for 2006

Field #	Field Name	Description
0	REGTAZ	Unique ID for each geographic unit (TAZ or Census Block Group)
1	DSSB_06	Total Dwelling Unit Site-Built Homes 2006 - Single Family (optional)
2	DMSB_06	Total Dwelling Unit Site-Built Homes 2006 - Multi-Family (optional)
3	DTSB_06	Total Dwelling Unit Site-Built Homes 2006 - Total
4	PCSSO_06	Percent of Site-Built Homes Occupied during Hurricane Season 2006 - Single Family (optional)
5	PCMSO_06	Percent of Site-Built Homes Occupied during Hurricane Season 2006 - Multi-Family (optional)
6	PCTSO_06	Percent of Site-Built Homes Occupied during Hurricane Season 2006 - Total
7	ODSSB_06	Occupied Site-Built Homes 2006 - Single Family (optional)
8	ODMSB_06	Occupied Site-Built Homes 2006 - Multi-Family (optional)
9	ODTSB_06	Occupied Site-Built Homes 2006 - Total
10	PHSSB_06	Persons per Occupied Site-Built Home 2006 - Single Family (optional)
11	PHMSB_06	Persons per Occupied Site-Built Home 2006 - Multi-Family (optional)
12	PHTSB_06	Persons per Occupied Site-Built Home 2006 - Total
13	PSSB_06	Population in Site-Built Homes 2006 - Single Family (optional)
14	PMSB_06	Population in Site-Built Homes 2006 - Multi-Family (optional)
15	PTSB_06	Population in Site-Built Homes 2006 - Total
16	VHSSB_06	Vehicles per Occupied Site-Built Home 2006 - Single Family (optional)
17	VHMSB_06	Vehicles per Occupied Site-Built Home 2006 - Multi-Family (optional)
18	VHTSB_06	Vehicles per Occupied Site-Built Home 2006 - Total
19	VSSB_06	Vehicles in Site-Built Homes 2006 - Single Family
20	VMSB_06	Vehicles in Site-Built Homes 2006 - Multi-Family
21	VTSB_06	Vehicles in Site-Built Homes 2006 - Total
22	D_MB_06	Total Dwelling Unit Mobile Homes 2006
23	PC_MO_06	Percent of Mobile Homes Occupied during Hurricane Season 2006
24	O_MB_06	Occupied Mobile Homes 2006
25	PH_MO_06	Persons per Occupied Mobile Home 2006
26	P_MB_06	Population in Mobile Homes 2006
27	VH_MB_06	Vehicles per Occupied Mobile Home 2006
28	V_MB_06	Vehicles in Mobile Homes 2006
29	HM_U_06	Hotel-Motel Units 2006
30	HM_O_06	Hotel-Motel Occupancy Rates 2006
31	HM_OU_06	Occupied Hotel-Motel Units 2006
32	HM_PH_06	Persons per Occupied Hotel-Motel Unit 2006
33	HM_P_06	Population in Hotel-Motel Units 2006
34	HM_VH_06	Vehicles per Hotel-Motel Unit 2006
35	HM_V_06	Vehicles in Hotel-Motel Units 2006
36	GQ_P_06	Population in Group Quarters in 2006 (only those that would participate in a general evacuation)
37	GQ_V_06	Vehicles in Group Quarters in 2006 (only those that would participate in a general evacuation)
38	SH_CP_06	Shelter Capacity (Number of Persons) 2006

Observations:

1 Please prepare a separate data file for each of the study years: 2006 (baseline), 2010 and 2015. The suffix on the field names in each data file should reflect the reference year (06, 10 or 15).

2 These fields should be used to present data by Traffic Analysis Zone (TAZ) or Census Block Group.

3 The breakout between single-family and multi-family site-built homes should be used if data is available for the county. Otherwise, use the lines for total site-built homes.

4 The total number of site-built homes, mobile homes or hotel-motel units should be the starting point. Multiply the total number of units by the occupancy rate (2000 Census) to get occupied units (households). Multiply occupied units by persons per household (2000 Census) to get the number of people. Multiply occupied units by vehicles per household (2000 Census) to get the number of vehicles.

5 The number of persons and vehicles per hotel-motel unit may be based on typical transportation assumptions if no better data is available.

CHAPTER IV
2007-2010 SRESP SURGE INUNDATION MODEL TOOL METHODOLOGY

A. Origins of Methodology

Starting from the original documentation from the Hurricane Center explanation of the SLOSH Model, the following will explain the methodology and use of the SRES Surge Inundation Modeling Toolset. SLOSH Model methodology: (Red text references new comments added)

> Surge elevation, or water height, is the output of the SLOSH model. At each SLOSH grid point, the water height is the maximum value that was computed at that point. The water height is calculated relative to mean sea level of 1929 **(this is now NAVD 1988)**, also referred to as National Geodetic Vertical Datum (~~NGVD~~ **NAVD88**), and not relative to the ground elevation. Height of water above terrain is not calculated because terrain height varies within a SLOSH grid square. For example, the altitude of a 1-mile grid square may be assigned a value of 1.8 meters (6 feet), but this value represents an average of land heights that may include values ranging from 0.9 to 2.7 meters (3 to 9 feet). In this case, a surge value of 2.5 meters (8 feet) in this square, implying, a 0.7 meters (2 feet) average depth of water over the grid's terrain, would include some terrain without inundation and other parts with as much as 1.5 meters (5 feet) of overlying water. Therefore, the depth of surge flooding above terrain at a specific site in the grid square is the result of subtracting the actual terrain height from the model-generated storm surge height in that square. **This is in fact what the surge modeling does – subtract detailed terrain to get an inundation layer which is combined to form the surge zones. Another tool in the set actually performs this explained step to get the actual depth of inundation per storm category.** It should be noted that, even if the SLOSH model is supplied accurate data, the computed surges may contain errors of 20 percent of observed water levels.
>
> - Will Shaffer, National Weather Service (1991)

What we needed for this project was a consistent uniform methodology to develop surge zones all across the state following the established steps, in a relatively short amount of time. The Tampa Bay region has been doing this type of surge analysis and Storm Tide Atlases since 1992. The 2000 Atlas was the first atlas to use GIS automation to develop surge zones. This was done using the new (at the time) ArcView product from ESRI and the Avenue development language. ArcGIS was used previously on a SUN workstation using AML language, but not in a completely encapsulated process. This was developed further in the 2005 Hurricane Evacuation Update.

In the earlier days during the workstation Arc/Info days, the processing was completely fulfilled in the vector realm. The 2000 Update heralded the first raster based update for one of Tampa Bay region's counties. This was due to the delivery of LIDAR elevation data from a pilot project from the University of Florida. The raw data points were interpolated into detailed ESRI GRID format at a horizontal pixel resolution of 3 meters. The processing for Pinellas County was then processed in the raster realm and converted to vector polygons at the end. The other three counties (Pasco and Manatee) were processed using interpolated vector hypsography from USGS 7.5 minute quadrangles.

The 2005 Evacuation Update was completed with processing completely in the raster realm. All counties except Hillsborough used LIDAR for elevation. Hillsborough County was also processed in the same way, however this was with survey elevation data at larger horizontal posting spaces.

For this current project (2007-2010), automation was a primary concern as well as consistency. First, all the regions (11) in the state had to upgrade to at least ArcGIS 9.3 with the Spatial Analyst extension. Then the previous methodology using ArcView Avenue code had to be ported to Visual Basic for Applications (VBA) to run inside the ArcMap session (this was done at the beginning of 2008).

The objectives:

- Almost push-button completion of surge zone creation
- Flexibility with raster cell sizes
- Flexibility with using or not using Tropical Storms
- Flexibility with respect to Ocean-borne or Lake-borne surge (Okeechobee)
- Multiple tools to help the regional GIS modeler

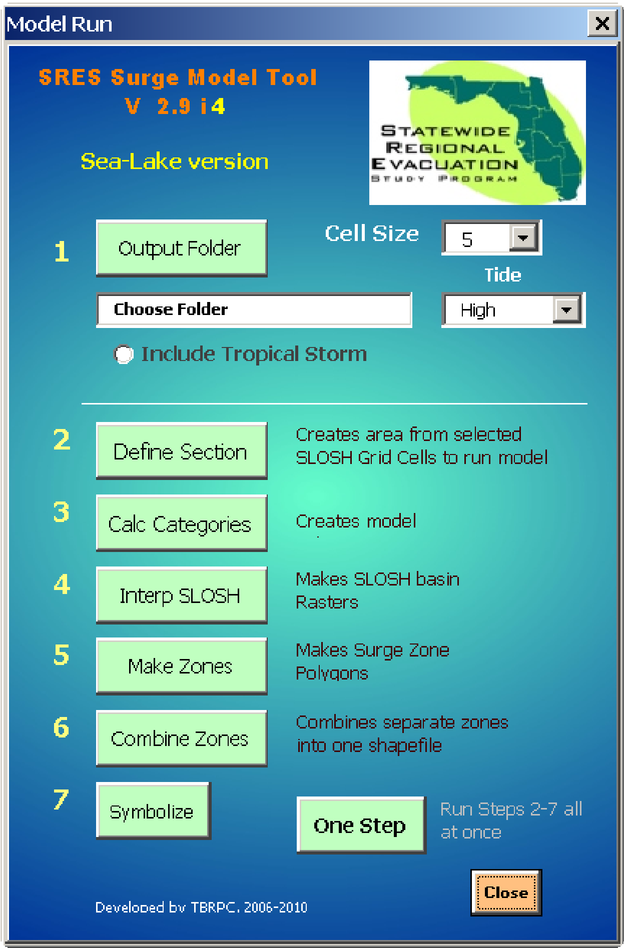
Choice of using VBA for the development language was easy. The fact it can be debugged and runs inside ArcMap makes troubleshooting fairly straightforward. This Toolset will be ported to .NET or Python, but at the time-being, it is being used in ArcMap as an empty MXD with the toolbar pre-existing. This was by-far the easier way to distribute amongst the Regional Planning Councils.

B. Surge Inundation Model Tool

This is by far the most important tool in the Toolset – the Surge Inundation Modeler (SIM). Once one has the elevation raster (digital elevation model – DEM) and the SLOSH MOM basin (vector polygons), and the water surge source layer (vector polygons), processing can begin on the surge zones for creating your Storm Tide Atlas.

Perhaps an explanation here about vector and raster processing, is in order. Vectors in the GIS world are either lines (polylines) or polygons. Rasters are the same technology as an image file, with pixels making up the complete image or file. The default raster format for ESRI products is the ESRI GRID format. Another format is the point, which is neither raster or vector, by nature. In fact, the point is really the bridge between the vector and raster format – as a centroid of a polygon can be interpolated into a raster file.

The Surge Inundation Modeling Toolset uses a windowed interface to ease the choices that need to be made in the surge modeling process.



At the top are changeable options like output folder and raster cell size.

On the bottom half are the processing steps and the One Step to run all unattended.

This window allows for each step to be run individually or with one gesture to run unattended. Tool was originally set up this way for troubleshooting and debugging, it turns out it has come in handy for various issues that have been encountered throughout the state. The plan was to select areas to process and then join them together later. This presented itself as fairly tedious and by omitting those polygon joins afterward, the process becomes that much faster. In its original inception, Step 2 was necessary to create polygon footprints of areas that would be joined at a later time. A fast way to determine the extent of the area selected. The steps were originally kept for the reason of making depth layers, which would use Step 4 and the raster calculator. This has since become obsolete because of the addition of a completely separate Depth Tool. The future version of this Toolset with have an abbreviated list of steps in the window.

These steps are still very useful for troubleshooting and recovery, however. The areas around the state have varying terrain and landforms. Many large counties like Miami-Dade had to be completed using the Steps as the ‘One Step’ method bailed due to sheer number of polygons (the raster processing was at 5ft cell size) due to the conversion of raster to polygons. Because of development in VBA, the code was adapted after this to accommodate larger county size.

C. Underneath the Methodology

As stated in the first paragraph in this document, the SLOSH basins developed by the Hurricane Center (NOAA) use average values in their calculations for the terrain underneath the basin grid squares. One can view the basin SLOSH surge results alone in the SLOSH Display Program and see the results of that averaged terrain in the basin displayed on the screen.

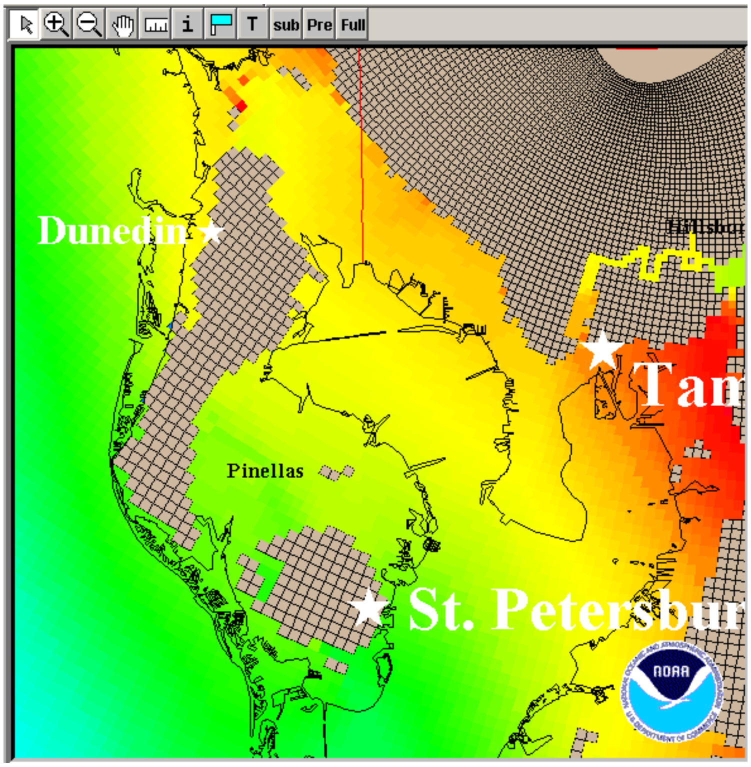


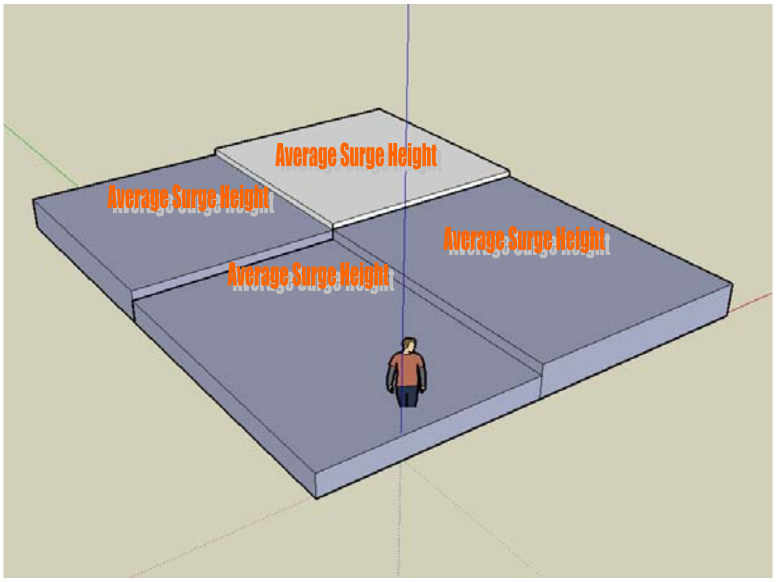
Figure IV-1 SLOSH Display output

At a scale that is multi-county wide, or for a whole coastal state, the SLOSH Display program using the raw values in the basin is visually acceptable. If you need to zoom in for inundation at a city or block scale, you need something that will delineate inundation with the terrain. How do we get this?

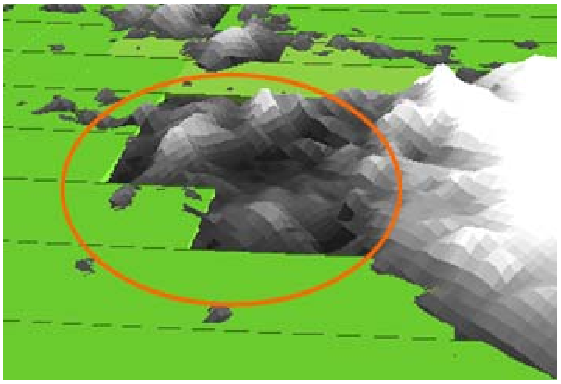
As mentioned in that first paragraph, the way to get depth of the surge is to subtract the elevation out of the raw basin surge values. This brings back the resolution that may or may not have been there in the first place*. Because this study was commissioned with new elevation data (LIDAR) as part of its scope of work, the raw data going into the NOAA SLOSH model is actually derived from this improved elevation data.

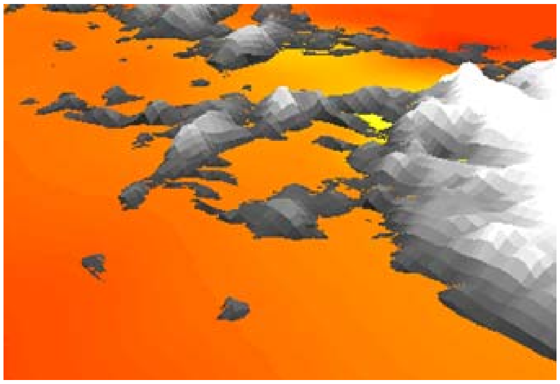
* Even with less resolution data with interpolated 5ft contours or low resolution DEM, subtracting out these points, lines, rasters can be a marked improvement over the SLOSH basin averaged values as-is.

If we were to use the SLOSH basin data as-is, we might get something that looks like this for inundation:



Since we all know that water and surge does not flow in squared off blocks, we definitely want to opt for something that at least looks like it flows as water. The way we do that is to interpolate those averaged values so there is a smooth variation when processing. This is just a matter of taking the centroids[1] of the MOM polygons and creating a surface that approximates the top of the surge surface. In the example below, the image on the left is what the SLOSH values in their raw form would produce – here 99.9 (dry) is not available for subtraction with elevation, so there is squared of boundaries of no surge.





The image on the right is what we get with interpolation with modeling calculations, where it actually hugs the coastline as it should.

[1] Point that is the geographic center of a polygon

So just what happens? Here is a simplified listing of what the process actually does once it is started:

1. SLOSH basin Squares (polygons) are selected for processing
2. Centroids for the selected polygons are created with SLOSH values
3. Values that are dry (99.9) are marked for change
4. Marked polygons are calculated with average of adjacent wet polygons
5. Selected Centroids are interpolated into raster surface using Spline interpolation
6. DEM raster is subtracted from SLOSH surface raster
7. Noise reduction is performed to eliminate small slivers and pockets of dry area
8. The reduced polygon output from the raster is dissolved by like inundated polygons
9. The water feature which simulates surge potential source is buffered
10. The surge polygon features are selected by buffered water to get contiguous polys
11. Contiguous polygons are exported to become the inundation layer for that category
12. When all storm categories are processed, they are combined together
13. The resultant combination shapefile is coded for all the category storms
14. The complete surge zone shapefile is symbolized on the display with approved colors

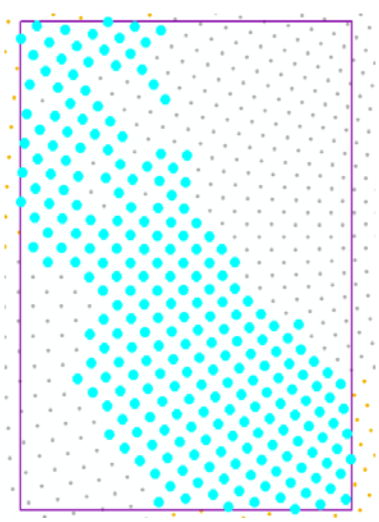
Here is an excerpt from a portion of zone creation VBA code in the processing:

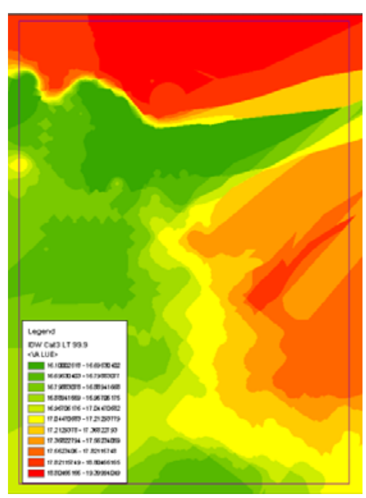
```
 'MsgBox "There is no Sea intersecting this Category!"
 'Now we run interior away from sea process
 If pCheckRed < 1 Then
    'MsgBox pcloseedge
    Call makeline(pcloseedge)
    'MsgBox pcloseedge
    PSBar.Message(0) = "Inland Processing: Using nearest edge to Sea..."
    'MsgBox ("The closest Edge is: " + pcloseedge)
    'Find the edge poly to process
    For em = 0 To pMap.LayerCount - 1
       pCmpName = UCase(pMap.Layer(em).name)
       'MsgBox ("Layer: [" + pCmpName + "] , Edge: [" + pcloseedge + "]")
       If (Trim(pCmpName) = (UCase(Trim(pcloseedge)))) Then
         'MsgBox (i)
         Set pEdgeLayer = pMap.Layer(em)
         'MsgBox ("It matches!")
       Else
         'MsgBox ("That Layer is not matching....")
       End If
    Next
 End If
'Process the new intersection with edge layer
' Process: Select Layer By Location...
buffer_edge = pcloseedge
```

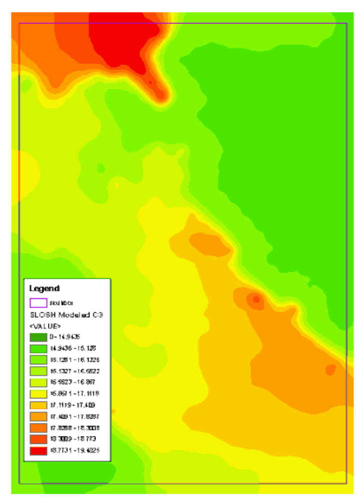
That code above is between step 9 and 10, and was inserted into SIM in case selected SLOSH grid squares are far inland without intersecting surge source (Gulf, Atlantic, Intracoastal, and rivers). It was necessary because only contiguous inundated surge polygons are used, and inland selections may not intersect with surge source water features. Normally, the whole county is selected at once which negates the use of the above code.

Step 4 may be an interesting step to elaborate on further. When one interpolates data, the interpolation method is important and can create different results. The IDW method is primarily good for getting an interpolation of a number of data points like temperatures and other non-tangible values to create visualization. The Spline method is good for data that tends to be smooth like flat terrain or water features. Since we are modeling water features (surge), spline interpolation is just what is needed. The particular type of spline interpolation for this process is the tension version.

In spline tension interpolation, by the nature of its definition, the surface has to intersect with the point creating that particular surface area in the immediate vicinity. Therefore, the Centroids of the category SLOSH values will have the resulting raster surface with the exact value where it originally was. If one were to interpolate the surface without any dry polygons or their Centroids, the spline surface will try to interpolate the missing data based on the most recent point values and trend towards the missing area. The problem of just selecting wet value polygons and interpolating with Inverse Distance Weighted (IDW), is that there is nothing stopping the interpolation engine from trending onward continuously, or worse, trending upward if it seems to be trending in that direction. In other words, if the terrain was relatively flat and got lower in elevation inland, the IDW model could have surge flowing forever. The SIM interpolation method with spline tension, forces the values to be exactly what the SLOSH basin values are at the centroid area, as modeled by NOAA. Beyond those areas where there not supposed to be surge, the SIM tool calculates the dry values to trend lower the same as gravity and momentum would interact with flowing water. The images below show the difference. First with the actual selected inundated SLOSH Centroids, and then what the output of interpolated SLOSH height would be with IDW, and then the SIM tool output using spline interpolation.



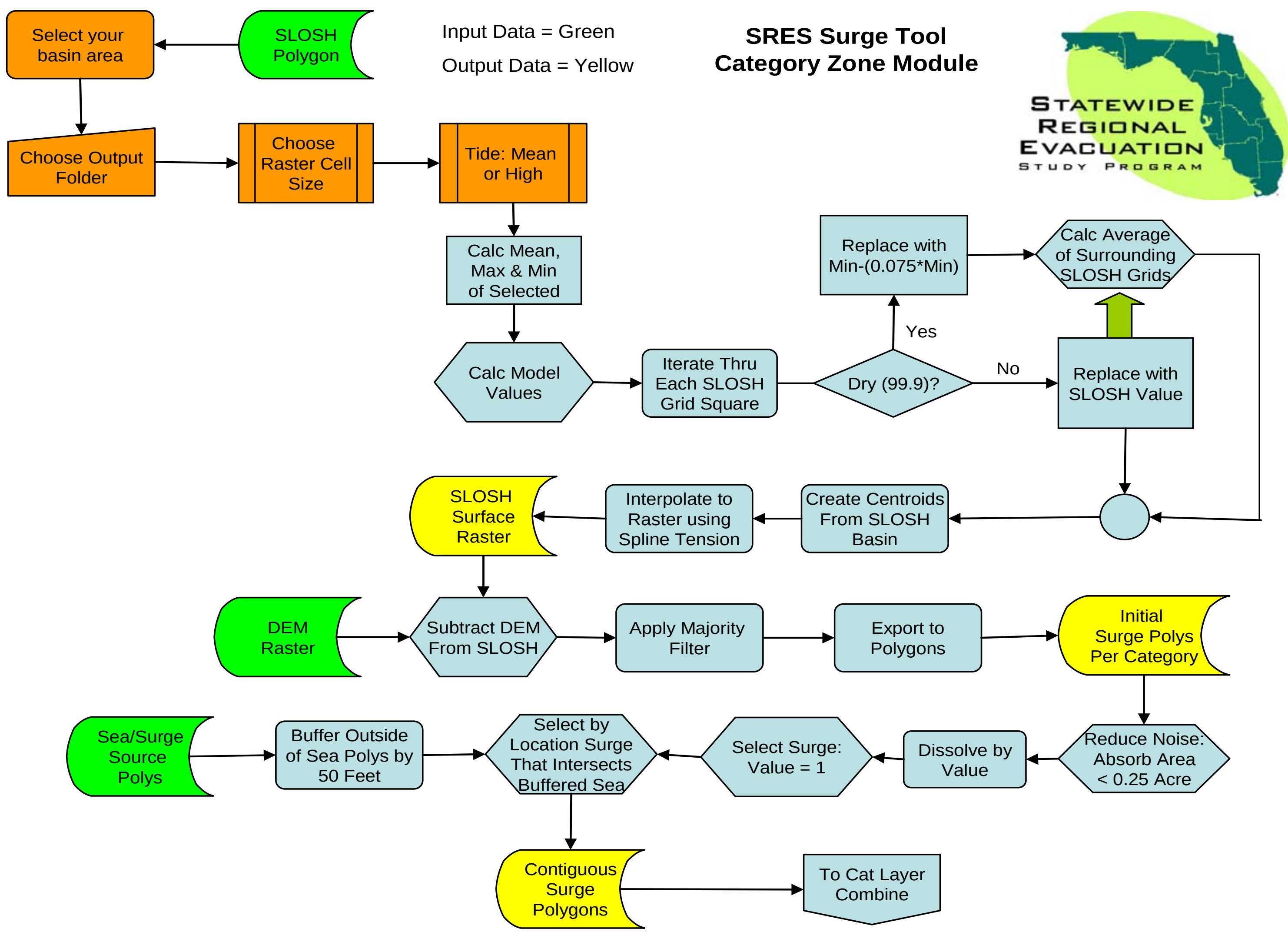


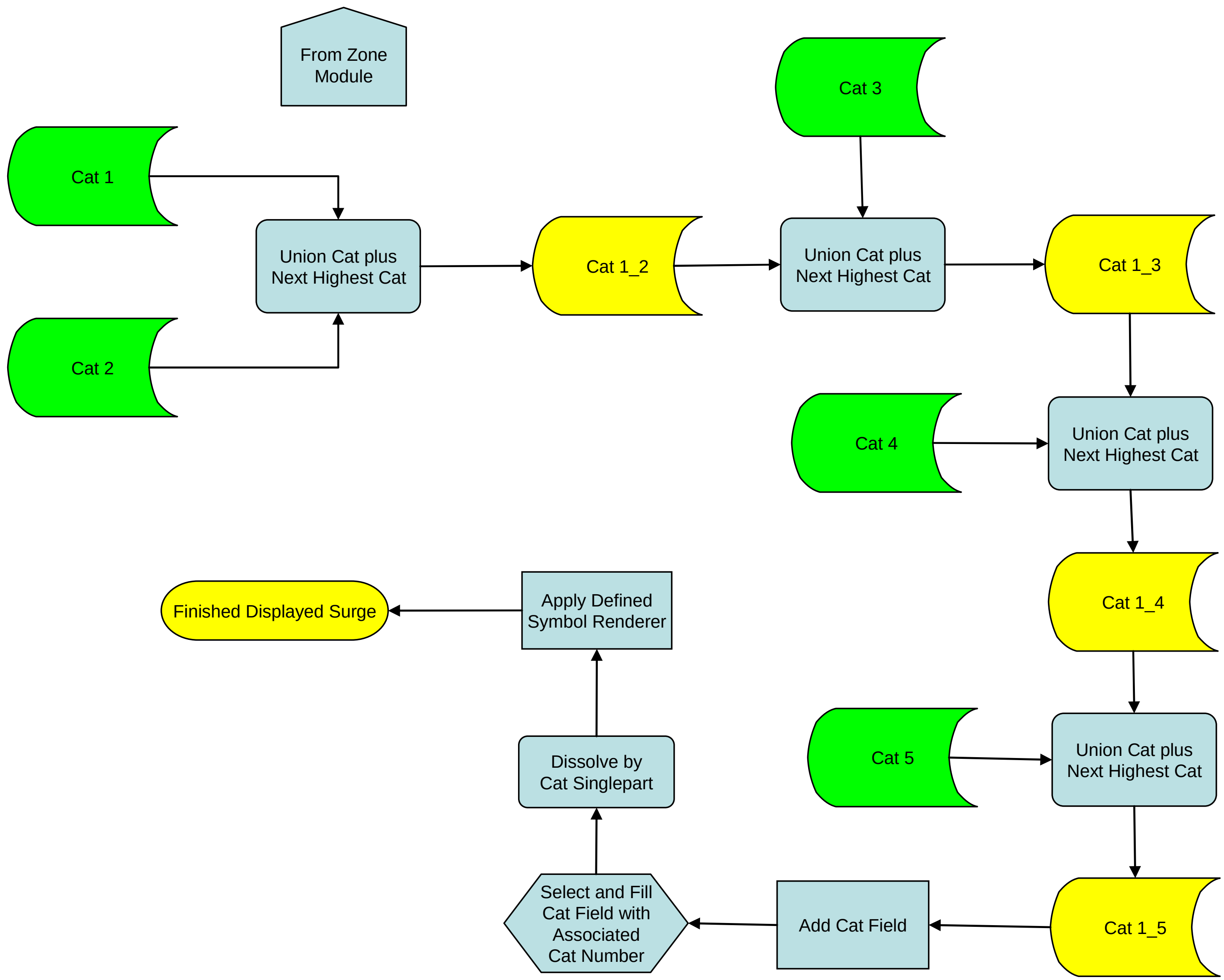


This is done in step 4 from the list above (not step 4 in the Tool), we take the average of the surrounding non-dry SLOSH basin grid squares* which smoothes and reduces the values the further away one gets from surge source.

* If you notice, we use the term ‘SLOSH grid square’, instead of SLOSH grid ‘cell’. This is because for the confusion it may cause because we are dealing with raster files and technology, in which pixels are sometimes described as cells.

Figure IV-2 Surge Inundation Model Tool Flowchart




From Zone Module
Cat 1
Cat 2
Union Cat plus Next Highest Cat
Cat 1_2
Cat 3
Union Cat plus Next Highest Cat
Cat 1_3
Cat 4
Union Cat plus Next Highest Cat
Cat 1_4
Cat 5
Union Cat plus Next Highest Cat
Cat 1_5
Add Cat Field
Select and Fill Cat Field with Associated Cat Number
Dissolve by Cat Singlepart
Apply Defined Symbol Renderer
Finished Displayed Surge

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CHAPTER V
GEODATABASE DESIGN AND METHODOLOGY

A. Introduction

Gathering data and assembling it for separate agencies that will be part of a statewide project needs some sort of direction and format. To that end, a structured data schema and standards was developed for this project. Since this project has been in existence with earlier 'update' versions from various Regional Planning Councils in the past, the use of relevant data with GIS is not a new concept and the various components were needed before. The challenge came from the project lasting about 3 years. In that time, data had evolved and data sources had changed.

There were many areas in this project where data schema and makeup was dictated by the deliverables in the scope. The rest of the data could be considered ancillary or supplemental to support the core data. An example of this was the thrust towards the transportation analysis element. Small area data structures had to be designed to be homogenous across the state even though the sources would be different (TAZ vs. Census Block Group). These data structures fed directly into the transportation dataset with particular data elements.

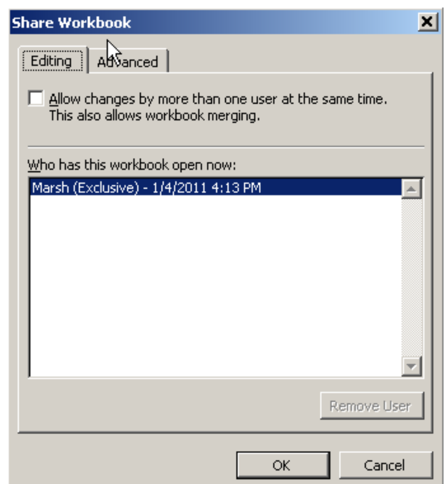
Figure V-1: Typical Data Flow Process Diagram

B. Core GIS Data Components

The core GIS data components for this Study centered on Transportation and Vulnerability. As mentioned above, the transportation analysis used data from each region that was derived from small area population and demographic data. Because of this, demographic data was assembled into a schema using the best data available, which in most cases began with Census data, which was updated. The other component was vulnerability, which included FEMA NFIP data, Department of Agriculture Forestry and Fire data, and most importantly the modeled surge data derived from NOAA SLOSH data. The support or supplemental data sets included National Hydrological data from USGS, Wind data from FEMA HAZUS, FDOT Highway and Street data, and even NOAA Tornado touchdown data.

C. Shelter Data Components

In the first year of the Study, data gathering and assembling was an important element for this process. One such task was compiling shelter data from all the counties. This data had to be linked to a GIS point file for further use in vulnerability analysis at a later date. The data overlapped current efforts by the Emergency Management departments of the counties, so a format that utilized or mimicked the existing efforts was paramount. Another necessity was providing the data in a format usable to all the departments needed to fill it out. Not every Emergency Management department in the state had GIS capability. As a result, an elaborate export, distribution, and re-import process was developed to allow end-users the ability to use Excel spreadsheets. This involved the 'sharing' function built-in to Excel, so multiple users can add and contribute to the spreadsheet and then the additions/changes can be merged back into the spreadsheet. Then the returned spreadsheet data would be merged back into a master data table which was joinable to the shelter point file (file Geodatabase).



Because the Study involved eleven separate agencies (Regional Planning Councils) working as one, it was important to be using the same version of GIS software. The reason for this was there were changes in the versions of ESRI's ArcGIS software during this three-year period. Both the Geodatabase structure was changed/updated and the MXD (Mapping document) structure and format had changed. In the case of a planning council using version 9.0 or 9.1 (for instance), they would not be able to open a version 9.3 MXD document. We had to upgrade to the latest version of ArcGIS software as soon as 9.3 became available (which was in the second year of the project).

D. Future Land Use Data Components

One deliverable for the project was the Future Land Use for the state of Florida by region. To create a Geodatabase that encompassed vastly different areas of a state with local governments in various states of technology sophistication (read: GIS), this process proved daunting. A look-up table walkthrough was developed through consensus that would enable the compositing of different sources and ideologies. The land use categories had to be boiled down to their least common denominator roots. The Florida Department of Community Affairs wanted this data re-traceable back to the source governments – as much as humanly possible. To this end, we did not perform any dissolving in assembling our regional FLU profiles. Since this Geodatabase was a deliverable so early in the project, it was developed as a separate data set.

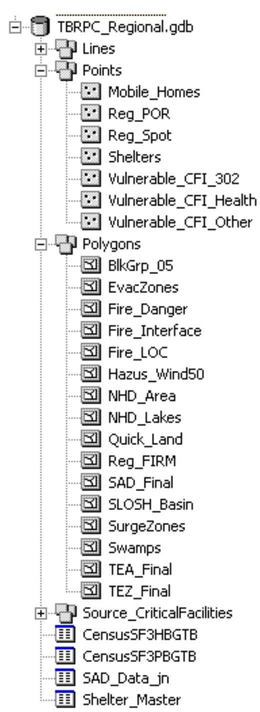
E. Critical Facilities Data Components

Critical facilities, which was a point data set, and used for vulnerability analysis, was an example of a dataset format used as it was developed and just corrected/updated. This data was designed by and delivered back to Florida Division of Emergency Management (FDEM). This data also went through an eveolution of sorts, due to technology changes and upgrades. The final updated source from FDEM came as an SDE data set. This, in turn, where applicable and possible was corrected and updated by the RPC in their region and returned.

F. Data Collaboration and Updates

A note here about deliverables and updates: Due to the long time span of this project, it was determined early on that a means to exchange data as soon as possible for sharing and review. This was accomplished in two ways. A project Sharepoint® site was developed for meeting and document sharing and review. And for the data uploads and sharing, a private FTP site was created so data that was too large for emails could be uploaded and downloaded. This became the mandatory method to exchange data sets after it was found to be so useful. In this way, even though FDEM was the agency we ultimately finished the project for, we were working side-by-side with data exchanges and updates years before the final deliverables were due.

Figure V-2 Regional Geodatabase Schema



G. Vulnerability Data Components

The bulk of the data used for this project came under the category of Vulnerability Analysis. Here is where the development of the surge zones which led to the evacuation zones, and transportation evacuation zones, etc. could be found. When working with so many polygon or point files, it really is best to combine the data sets into a Geodatabase. For this project, the database model wasn't dictated to be in a certain type of Geodatabase (file vs. personal vs. SDE), but it did have to conform to the basic schema outline as shown in Figure V-2, above.

Creating the maps for the document and the Atlas plates were dramatically easier when utilizing the Geodatabase for the layer sources. Future updates to the data will be easier because of the database format as well.

The following pages are exhibits, more-or-less describing the different examples of the geodatabase structures used in this project.

Exhibit A

Geodatabase Designer

Developed by The Applications Prototype Lab, ESRI® Redlands

Schema Creation

Creation Date	2011-02-22 14:08:00
Creator	marsh **on IT-GIS**

Geodatabase

Workspace Type	Personal
Flavor	Access
Version	2.2.0

Connection Properties

DATABASE	G:\project\hurricane\SRES_TB\SRES_maps\tbrpc\TBRPC_FLU.gdb

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Object Classes

ObjectClass Name	Type	Geometry	Subtype	
TBRPC				SR
Regional_Ply	FeatureClass	Polygon	-	
Stand Alone ObjectClass(s)				
FLU_Summary	Table	-	-	

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FLU_Summary

Alias	FLU_Summary
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Local_FLU	Local_FLU	String	0	0	254	Yes	Yes	No	No
Cnt_Local_	Cnt_Local_	Integer	0	0	4	Yes	Yes	No	No
RPC_Code	RPC_Code	String	0	0	8	Yes	Yes	No	No
State_Code	State_Code	String	0	0	8	Yes	Yes	No	No
St_Descrip	St_Descrip	String	0	0	48	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID

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Regional_Ply

Alias	Regional_Ply	**Geometry:**	Polygon
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	9000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FLUCODE	FLUCODE	String	0	0	9	Yes	Yes	No	No
ID	ID	Integer	0	0	4	Yes	Yes	No	No
SqMiles	SqMiles	Single	0	0	4	Yes	Yes	No	No
Acres	Acres	Single	0	0	4	Yes	Yes	No	No
Juris	Juris	String	0	0	25	Yes	Yes	No	No
FIPS	FIPS	String	0	0	3	Yes	Yes	No	No
Local_FLU	Local_FLU	String	0	0	9	Yes	Yes	No	No
RPC	RPC	String	0	0	6	Yes	Yes	No	No
State	State	String	0	0	6	Yes	Yes	No	No
SRES_ID	SRES_ID	String	0	0	16	Yes	Yes	No	No
Descrip	Descrip	String	0	0	45	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	Yes	No	Shape

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Spatial References

Dimension	Minimum	Precision
TBRPC		
X	-5120900	10000
Y	-9998100	
M	-100000	10000
Z	-100000	10000

Coordinate System Description
PROJCS["NAD_1983_UTM_Zone_17N",GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",500000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-81.0],PARAMETER["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0.0],UNIT["Meter",1.0]]

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Exhibit B

Geodatabase Designer

Developed by The Applications Prototype Lab, ESRI® Redlands

Schema Creation

Creation Date	2011-02-22 14:14:02
Creator	marsh **on IT-GIS**

Geodatabase

Workspace Type	Personal
Flavor	Access
Version	2.2.0

Connection Properties

DATABASE	G:\project\hurricane\2009\CFI\CriticalFacilities_Export_Full.mdb

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Domains

Domain Name	Owner	Domain Type
BOOLEAN		Coded Value
COUNTY_FIPS		Coded Value
EMER_FUNCTION		Coded Value
FACILITY_TYPE		Coded Value
SHELTER_TYPE		Coded Value
STATUS		Coded Value

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BOOLEAN

Owner	
Description	Boolean
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	Value
YES	YES
NO	NO

Associations

ObjectClass	Subtype	Field
CFI_DBO_Shelters	-	ARC_4496
CFI_DBO_Shelters	-	General_
CFI_DBO_Shelters	-	PetFriendly
CFI_DBO_Shelters	-	SpecialNeeds

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COUNTY_FIPS

Owner	
Description	Official FIPS Code and County Name - http://www.census.gov/geo/www/fips/fips65/data/12000.html
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	Value
ALACHUA	001
BAKER	003
BAY	005
BRADFORD	007
BREVARD	009
BROWARD	011
CALHOUN	013
CHARLOTTE	015
CITRUS	017
CLAY	019
COLLIER	021
COLUMBIA	023
DESOTO	027
DIXIE	029
DUVAL	031
ESCAMBIA	033
FLAGLER	035
FRANKLIN	037
GADSDEN	039
GILCHRIST	041
GLADES	043
GULF	045
HAMILTON	047
HARDEE	049

HENDRY	051
HERNANDO	053
HIGHLANDS	055
HILLSBOROUGH	057
HOLMES	059
INDIAN RIVER	061
JACKSON	063
JEFFERSON	065
LAFAYETTE	067
LAKE	069
LEE	071
LEON	073
LEVY	075
LIBERTY	077
MADISON	079
MANATEE	081
MARION	083
MARTIN	085
MONROE	087
NASSAU	089
OKALOOSA	091
OKEECHOBEE	093
ORANGE	095
OSCEOLA	097
PALM BEACH	099
PASCO	101
PINELLAS	103
POLK	105
PUTNAM	107
ST. JOHNS	109
ST. LUCIE	111
SANTA ROSA	113
SARASOTA	115
SEMINOLE	117
SUMTER	119
SUWANNEE	121
TAYLOR	123
UNION	125
VOLUSIA	127
WAKULLA	129
WALTON	131
WASHINGTON	133
DADE	025
MIAMI-DADE	086

Associations

ObjectClass	Subtype	Field
CFI_DBO_Communications	-	County
CFI_DBO_Community_Resources	-	County
CFI_DBO_Correctional_Facilities	-	County

CFI_DBO_Education	-	County
CFI_DBO_Emergency_Services	-	County
CFI_DBO_Energy	-	County
CFI_DBO_Hazardous_Materials	-	County
CFI_DBO_HealthCare_Facilities	-	County
CFI_DBO_Infrastructure	-	County
CFI_DBO_Logistics	-	County
CFI_DBO_Military	-	County
CFI_DBO_Shelters	-	County
CFI_DBO_Transportation	-	County

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EMER_FUNCTION

Owner	
Description	Emergency Function
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	Value
COMMUNITY RESOURCES	CR
EDUCATION	ED
ENERGY	ENR
EMERGENCY SERVICES	ES
GOVERNMENT FACILITIES	GOV
HUMAN SERVICES	HS
INFRASTRUCTURE	INF
COMMUNICATIONS	IT
LOGISTICAL	LOG
MILITARY	MIL
PUBLIC HEALTH	PB
PUBLIC SAFETY	PS
TRANSPORTATION	TRN

Associations

ObjectClass	Subtype	Field
CFI_DBO_Communications	-	Emer_Function
CFI_DBO_Community_Resources	-	Emer_Function
CFI_DBO_Correctional_Facilities	-	Emer_Function
CFI_DBO_Education	-	Emer_Function
CFI_DBO_Emergency_Services	-	Emer_Function
CFI_DBO_Energy	-	Emer_Function
CFI_DBO_Hazardous_Materials	-	Emer_Function
CFI_DBO_HealthCare_Facilities	-	Emer_Function
CFI_DBO_Infrastructure	-	Emer_Function
CFI_DBO_Logistics	-	Emer_Function

CFI_DBO_Military	-	Emer_Function
CFI_DBO_Shelters	-	Emer_Function
CFI_DBO_Transportation	-	Emer_Function

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FACILITY_TYPE

Owner	
Description	Facility Type
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	**Value**
ADULT FAMILY CARE HOME	52
AIRPORT	81006
AMBULATORY SURGICAL CENTER	14
ASSISTED LIVING FACILITY	11
ATTRACTION	82002
CALL CENTER	11318
CLINICAL LABORATORY	26
COAST GUARD	74010
COLLEGE	73004
COMMERCIAL PORTS	81044
COMMUNITY CENTER	82011
CORRECTIONAL FACILITY	74036
CRISIS STABILIZATION UNIT	17
DISASTER RECOVERY CENTER	90005
DISASTER RECOVERY CENTER-MOBILE	90006
ELECTRIC POWER PLANT	75030
ELECTRIC SUBSTATION	75038
EMERGENCY MEDICAL SERVICE	74017
EMERGENCY OPERATIONS CENTER	74044
END-STAGE RENAL DISEASE	18
FAITH-BASED FACILITY	82020
FIRE STATION	74026

FUEL FACILITY - ALONG EVACUATION ROUTE	72004
FUEL FACILITY - DOT	75018
HAZARDOUS MATERIALS FACILITY	10400
HELIPORT/HELIPAD	81026
HOSPICE	22
HOSPITAL	23
HOSPITALS- VA	24
INTERMEDIATE CARE FACILITY	25
LAW ENFORCEMENT	74034
LIBRARY	82024
LOCAL GOVERNMENT FACILITY	83026
LOGISTICAL STAGING AREA	90002
MAJOR INTERSECTION	90001
NATIONAL GUARD	67306
NUCLEAR POWER PLANT	75034
POINT OF DISTRIBUTION	90003
PRIVATE SCHOOL	73007
PUBLIC SCHOOL	73002
PUBLIC WATER SUPPLY	85004
RADIO COMMUNICATIONS TOWER	11303
RELIEF AGENCY	74002
RESIDENTIAL TREATMENT FACILITY	32
SEAPLANE BASE	81072
SHELTER	90004
SKILLED NURSING FACILITY	35
SOLID WASTE FACILITY	75041
STADIUM	82046
STATE GOVERNMENT FACILITY	83034
TELEVISION	88012
TRANSITIONAL LIVING FACILITY	34
WASTEWATER FACILITY	85006

Associations

ObjectClass	Subtype	Field

CFI_DBO_Communications	-	Facility_Type
CFI_DBO_Community_Resources	-	Facility_Type
CFI_DBO_Correctional_Facilities	-	Facility_Type
CFI_DBO_Education	-	Facility_Type
CFI_DBO_Emergency_Services	-	Facility_Type
CFI_DBO_Energy	-	Facility_Type
CFI_DBO_Hazardous_Materials	-	Facility_Type
CFI_DBO_HealthCare_Facilities	-	Facility_Type
CFI_DBO_Infrastructure	-	Facility_Type
CFI_DBO_Logistics	-	Facility_Type
CFI_DBO_Military	-	Facility_Type
CFI_DBO_Shelters	-	Facility_Type
CFI_DBO_Transportation	-	Facility_Type

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SHELTER_TYPE

Owner	
Description	Shelter Types
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	Value
HOST	HOST
GENERAL	GENERAL
RISK	RISK
SPECIAL NEEDS	SPECIAL NEEDS
PET FRIENDLY	PET FRIENDLY
EVACUATION	EVACUATION
MULTIPLE	MULTIPLE

Associations

ObjectClass	Subtype	Field
CFI_DBO_Shelters	-	SHELTER_TYPE

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STATUS

Owner	
Description	Status
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	Value

OPEN	OPEN
CLOSED	CLOSED

Associations

ObjectClass	Subtype	Field
CFI_DBO_Shelters	-	Status

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ObjectClasses

ObjectClass Name	Type	Geometry	Subtype	
Stand Alone ObjectClass(s)				
CFI_DBO_Communications	FeatureClass	Point	-	SR
CFI_DBO_Community_Resources	FeatureClass	Point	-	SR
CFI_DBO_Correctional_Facilities	FeatureClass	Point	-	SR
CFI_DBO_Education	FeatureClass	Point	-	SR
CFI_DBO_Emergency_Services	FeatureClass	Point	-	SR
CFI_DBO_Energy	FeatureClass	Point	-	SR
CFI_DBO_Hazardous_Materials	FeatureClass	Point	-	SR
CFI_DBO_HealthCare_Facilities	FeatureClass	Point	-	SR
CFI_DBO_Infrastructure	FeatureClass	Point	-	SR
CFI_DBO_Logistics	FeatureClass	Point	-	SR
CFI_DBO_Military	FeatureClass	Point	-	SR
CFI_DBO_Shelters	FeatureClass	Point	-	SR
CFI_DBO_Transportation	FeatureClass	Point	-	SR
Group_Care_Facility_Types	Table	-	-	
Hotel_Motel_Types	Table	-	-	
Mobile_Home_RV_Parks_Types	Table	-	-	

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CFI_DBO_Communications

Alias	CFI_DBO_Communications	**Geometry:**	Point
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
		Has Z:	No
FeatureType	Simple	**Grid Size:**	1000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No

Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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CFI_DBO_Community_Resources

Alias	CFI_DBO_Community_Resources	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No	
FeatureType	Simple	**Has Z:**No **Grid Size:**1000	

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No

Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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CFI_DBO_Correctional_Facilities

Alias	CFI_DBO_Correctional_Facilities	**Geometry:**Point
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No
FeatureType	Simple	**Has Z:**No **Grid Size:**1000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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CFI_DBO_Education

Alias	CFI_DBO_Education	**Geometry:**Point
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No
FeatureType	Simple	**Has Z:**No **Grid Size:**1000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	50	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	Yes	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
Shape_INDEX	Yes	Yes	Shape

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CFI_DBO_Emergency_Services

Alias	CFI_DBO_Emergency_Services	**Geometry:**Point
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No
FeatureType	Simple	**Has Z:**No **Grid Size:**1000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No

Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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CFI_DBO_Energy

Alias	CFI_DBO_Energy	**Geometry:** Point	
Dataset Type	FeatureClass	**Average Number of Points:** 0	
		Has M: No	
		Has Z: No	
FeatureType	Simple	**Grid Size:** 1000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Facility_Type	FACILITY_TYPE
Emer_Function	EMER_FUNCTION
County	COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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CFI_DBO_Hazardous_Materials

Alias	CFI_DBO_Hazardous_Materials	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:1000	

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
Facility_Desc	Facility_Desc	String	0	0	255	Yes	Yes	No	No
USNG2	USNG2	String	0	0	50	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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CFI_DBO_HealthCare_Facilities

Alias	CFI_DBO_HealthCare_Facilities	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:1000	

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No

GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
Shape_INDEX	Yes	Yes	Shape

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CFI_DBO_Infrastructure

Alias	CFI_DBO_Infrastructure	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:1000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No

Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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CFI_DBO_Logistics

Alias	CFI_DBO_Logistics	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
		Has Z: No	
FeatureType	Simple	**Grid Size:**1000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	50	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	Yes	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
Status	Status	String	0	0	16	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
Shape_INDEX	Yes	Yes	Shape

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CFI_DBO_Military

Alias	CFI_DBO_Military	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:1000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	50	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	Yes	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
USNG2	USNG2	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
Shape_INDEX	Yes	Yes	Shape

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CFI_DBO_Shelters

Alias	CFI_DBO_Shelters	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
		Has Z: No	
FeatureType	Simple	**Grid Size:**1000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
RedCrossNSS_ID	RedCrossNSS_ID	Integer	0	0	4	Yes	Yes	No	No
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	50	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	20	Yes	Yes	No	No
Countyid	Countyid	String	0	0	4	Yes	Yes	No	No
County	County	String	0	0	24	Yes	Yes	No	No
Zip5	Zip5	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	64	Yes	Yes	No	No
Editdate	Editdate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
ARC_4496	ARC_4496	String	0	0	8	Yes	Yes	No	No
General_	General	String	0	0	3	Yes	Yes	No	No
SpecialNeeds	SpecialNeeds	String	0	0	3	Yes	Yes	No	No
PetFriendly	PetFriendly	String	0	0	3	Yes	Yes	No	No
SHELTER_TYPE	SHELTER_TYPE	String	0	0	36	Yes	Yes	No	No
Status	Status	String	0	0	32	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS
ARC_4496	False	BOOLEAN
General_		BOOLEAN
SpecialNeeds		BOOLEAN
PetFriendly		BOOLEAN
SHELTER_TYPE		SHELTER_TYPE
Status		STATUS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
Shape_INDEX	Yes	Yes	Shape

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CFI_DBO_Transportation

Alias	CFI_DBO_Transportation	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:1000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
SHAPE_INDEX	Yes	Yes	SHAPE

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Group_Care_Facility_Types

Alias	Group_Care_Facility_Types
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
Code	Code	String	0	0	255	Yes	Yes	No	No
Description	Description	String	0	0	255	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
Code	Yes	No	Code

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Hotel_Motel_Types

Alias	Hotel_Motel_Types
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
Code	Code	Integer	0	0	4	Yes	Yes	No	No
Description	Description	String	0	0	255	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
Code	Yes	No	Code

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Mobile_Home_RV_Parks_Types

Alias	Mobile_Home_RV_Parks_Types
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
Code	Code	String	0	0	255	Yes	Yes	No	No
Description	Description	String	0	0	255	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
Code	Yes	No	Code

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Spatial References

Dimension	Minimum	Precision
CFI_DBO_Correctional_Facilities		
X	-19550099.9989645	13863.5428813928
Y	-7526399.99622169	
M	0	1
Z	0	1
Coordinate System Description PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]		
CFI_DBO_Emergency_Services		
X	-19550099.9989645	13863.5428813928
Y	-7526399.99622169	
M	0	1
Z	0	1
Coordinate System Description PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]		
CFI_DBO_HealthCare_Facilities		
X	-19550099.9989645	13863.5428813928
Y	-7526399.99622169	
M	0	1
Z	0	1
Coordinate System Description PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]		
CFI_DBO_Hazardous_Materials		
X	-19550099.9989645	13863.5428813928
Y	-7526399.99622169	

M	0	1
Z	0	1
Coordinate System Description PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]		
CFI_DBO_Education		
X	-19550099.9999743	13863.5428813928
Y	-7526399.99997254	
M	0	1
Z	0	1
Coordinate System Description PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]		
CFI_DBO_Shelters		
X	-19550099.9999743	13863.5428813928
Y	-7526399.99997254	
M	0	1
Z	0	1
Coordinate System Description PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]		
CFI_DBO_Communications		
X	-19550099.9989645	6931.77144069642
Y	-7526399.99622169	
M	0	1
Z	0	1
Coordinate System Description PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-		

84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]

CFI_DBO_Energy

X	-19550099.9989645	6931.77144069642
Y	-7526399.99622169	
M	0	1
Z	0	1

Coordinate System Description
PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]

CFI_DBO_Transportation

X	-19550099.9989645	6931.77144069642
Y	-7526399.99622169	
M	0	1
Z	0	1

Coordinate System Description
PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]

CFI_DBO_Infrastructure

X	-19550099.9989645	6931.77144069642
Y	-7526399.99622169	
M	0	1
Z	0	1

Coordinate System Description
PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]

CFI_DBO_Community_Resources

X	-19550099.9989645	6931.77144069642
Y	-7526399.99622169	
M	0	1
Z	0	1

Coordinate System Description
PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]

CFI_DBO_Military

X	-19550099.9989645	6931.77144069642
Y	-7526399.99622169	
M	0	1
Z	0	1

Coordinate System Description
PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]

CFI_DBO_Logistics

X	-19550099.9989645	6931.77144069642
Y	-7526399.99622169	
M	0	1
Z	0	1

Coordinate System Description
PROJCS["FDEP Albers HARN",GEOGCS["GCS_North_American_1983_HARN",DATUM["D_North_American_1983_HARN",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Albers"],PARAMETER["False_Easting",400000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-84.0],PARAMETER["Standard_Parallel_1",24.0],PARAMETER["Standard_Parallel_2",31.5],PARAMETER["Latitude_Of_Origin",24.0],UNIT["Meter",1.0]]

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Exhibit C

Geodatabase Designer

Developed by The Applications Prototype Lab, ESRI® Redlands

Schema Creation

Creation Date	2011-02-22 14:16:05
Creator	marsh **on IT-GIS**

Geodatabase

Workspace Type	Personal
Flavor	Access
Version	2.3.0

Connection Properties

DATABASE	G:\project\hurricane\SRES_TB\SRES_maps\tbrpc\TBRPC_Regional.gdb

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Domains

Domain Name	Owner	Domain Type
AnnotationStatus		Coded Value
BOOLEAN		Coded Value
BooleanSymbolValue		Coded Value
COUNTY_FIPS		Coded Value
ElevationRange		Range
EMER_FUNCTION		Coded Value
Evac Zones		Coded Value
FACILITY_TYPE		Coded Value
FlowLine Ftype		Coded Value
HorizontalAlignment		Coded Value
Resolution		Coded Value
SHELTER_TYPE		Coded Value
STATUS		Coded Value
Surge Zones		Coded Value
VerticalAlignment		Coded Value
Water Code Types		Coded Value

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AnnotationStatus

Owner	
Description	Valid annotation state values.
Domain Type	Coded Value
Field Type	Small Integer
Merge Policy	Default Value
Split Policy	Duplicate
Domain Members	
Name	**Value**
Placed	0
Unplaced	1

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BOOLEAN

Owner	
Description	Boolean
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value
Domain Members	
Name	**Value**
YES	YES
NO	NO

Associations

ObjectClass	Subtype	Field
CFI_DBO_Shelters	-	ARC_4496
CFI_DBO_Shelters	-	General_
CFI_DBO_Shelters	-	PetFriendly
CFI_DBO_Shelters	-	SpecialNeeds

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BooleanSymbolValue

Owner	
Description	Valid values are Yes and No.
Domain Type	Coded Value
Field Type	Small Integer
Merge Policy	Default Value
Split Policy	Duplicate
Domain Members	
Name	**Value**
Yes	1
No	0

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COUNTY_FIPS

Owner	
Description	Official FIPS Code and County Name - http://www.census.gov/geo/www/fips/fips65/data/12000.html
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	**Value**
ALACHUA	001
BAKER	003
BAY	005
BRADFORD	007
BREVARD	009
BROWARD	011
CALHOUN	013
CHARLOTTE	015
CITRUS	017
CLAY	019
COLLIER	021
COLUMBIA	023
DESOTO	027
DIXIE	029
DUVAL	031
ESCAMBIA	033
FLAGLER	035
FRANKLIN	037
GADSDEN	039
GILCHRIST	041
GLADES	043
GULF	045
HAMILTON	047
HARDEE	049
HENDRY	051
HERNANDO	053
HIGHLANDS	055
HILLSBOROUGH	057
HOLMES	059
INDIAN RIVER	061
JACKSON	063
JEFFERSON	065
LAFAYETTE	067
LAKE	069
LEE	071
LEON	073
LEVY	075
LIBERTY	077
MADISON	079
MANATEE	081

MARION	083
MARTIN	085
MONROE	087
NASSAU	089
OKALOOSA	091
OKEECHOBEE	093
ORANGE	095
OSCEOLA	097
PALM BEACH	099
PASCO	101
PINELLAS	103
POLK	105
PUTNAM	107
ST. JOHNS	109
ST. LUCIE	111
SANTA ROSA	113
SARASOTA	115
SEMINOLE	117
SUMTER	119
SUWANNEE	121
TAYLOR	123
UNION	125
VOLUSIA	127
WAKULLA	129
WALTON	131
WASHINGTON	133
DADE	025
MIAMI-DADE	086

Associations

ObjectClass	Subtype	Field
CFI_DBO_Communications	-	County
CFI_DBO_Community_Resources	-	County
CFI_DBO_Correctional_Facilities	-	County
CFI_DBO_Education	-	County
CFI_DBO_Emergency_Services	-	County
CFI_DBO_Energy	-	County
CFI_DBO_Hazardous_Materials	-	County
CFI_DBO_HealthCare_Facilities	-	County
CFI_DBO_Infrastructure	-	County
CFI_DBO_Logistics	-	County
CFI_DBO_Military	-	County
CFI_DBO_Shelters	-	County
CFI_DBO_Transportation	-	County
Shelters	-	Countyid

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ElevationRange

Owner	
Description	
Domain Type	Range
Field Type	Double
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	**Value**
MinValue	-400
MaxValue	9000

Associations

ObjectClass	**Subtype**	**Field**
NHD_Lakes	-	Elevation
Swamps	-	Elevation

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EMER_FUNCTION

Owner	
Description	Emergency Function
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	**Value**
COMMUNITY RESOURCES	CR
EDUCATION	ED
ENERGY	ENR
EMERGENCY SERVICES	ES
GOVERNMENT FACILITIES	GOV
HUMAN SERVICES	HS
INFRASTRUCTURE	INF
COMMUNICATIONS	IT
LOGISTICAL	LOG
MILITARY	MIL
PUBLIC HEALTH	PB
PUBLIC SAFETY	PS
TRANSPORTATION	TRN

Associations

ObjectClass	**Subtype**	**Field**
CFI_DBO_Communications	-	Emer_Function
CFI_DBO_Community_Resources	-	Emer_Function
CFI_DBO_Correctional_Facilities	-	Emer_Function
CFI_DBO_Education	-	Emer_Function
CFI_DBO_Emergency_Services	-	Emer_Function

CFI_DBO_Energy	-	Emer_Function
CFI_DBO_Hazardous_Materials	-	Emer_Function
CFI_DBO_HealthCare_Facilities	-	Emer_Function
CFI_DBO_Infrastructure	-	Emer_Function
CFI_DBO_Logistics	-	Emer_Function
CFI_DBO_Military	-	Emer_Function
CFI_DBO_Shelters	-	Emer_Function
CFI_DBO_Transportation	-	Emer_Function
Shelters	-	Emer_Function

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Evac Zones

Owner	
Description	Evacuation Levels
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	**Value**
Level A	A
Level B	B
Level C	C
Level D	D
Level E	E
No Evacuation	X

Associations

ObjectClass	**Subtype**	**Field**
EvacZones	-	Evac
Shelters	-	Evac

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FACILITY_TYPE

Owner	
Description	Facility Type
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	**Value**
ADULT FAMILY CARE HOME	52
AIRPORT	81006
AMBULATORY SURGICAL CENTER	14

ASSISTED LIVING FACILITY	11
ATTRACTION	82002
CALL CENTER	11318
CLINICAL LABORATORY	26
COAST GUARD	74010
COLLEGE	73004
COMMERCIAL PORTS	81044
COMMUNITY CENTER	82011
CORRECTIONAL FACILITY	74036
CRISIS STABILIZATION UNIT	17
DISASTER RECOVERY CENTER	90005
DISASTER RECOVERY CENTER-MOBILE	90006
ELECTRIC POWER PLANT	75030
ELECTRIC SUBSTATION	75038
EMERGENCY MEDICAL SERVICE	74017
EMERGENCY OPERATIONS CENTER	74044
END-STAGE RENAL DISEASE	18
FAITH-BASED FACILITY	82020
FIRE STATION	74026
FUEL FACILITY - ALONG EVACUATION ROUTE	72004
FUEL FACILITY - DOT	75018
HAZARDOUS MATERIALS FACILITY	10400
HELIPORT/HELIPAD	81026
HOSPICE	22
HOSPITAL	23
HOSPITALS- VA	24
INTERMEDIATE CARE FACILITY	25
LAW ENFORCEMENT	74034
LIBRARY	82024
LOCAL GOVERNMENT FACILITY	83026
LOGISTICAL STAGING AREA	90002
MAJOR INTERSECTION	90001
NATIONAL GUARD	67306
NUCLEAR POWER	75034

PLANT	
POINT OF DISTRIBUTION	90003
PRIVATE SCHOOL	73007
PUBLIC SCHOOL	73002
PUBLIC WATER SUPPLY	85004
RADIO COMMUNICATIONS TOWER	11303
RELIEF AGENCY	74002
RESIDENTIAL TREATMENT FACILITY	32
SEAPLANE BASE	81072
SHELTER	90004
SKILLED NURSING FACILITY	35
SOLID WASTE FACILITY	75041
STADIUM	82046
STATE GOVERNMENT FACILITY	83034
TELEVISION	88012
TRANSITIONAL LIVING FACILITY	34
WASTEWATER FACILITY	85006

Associations

ObjectClass	Subtype	Field
CFI_DBO_Communications	-	Facility_Type
CFI_DBO_Community_Resources	-	Facility_Type
CFI_DBO_Correctional_Facilities	-	Facility_Type
CFI_DBO_Education	-	Facility_Type
CFI_DBO_Emergency_Services	-	Facility_Type
CFI_DBO_Energy	-	Facility_Type
CFI_DBO_Hazardous_Materials	-	Facility_Type
CFI_DBO_HealthCare_Facilities	-	Facility_Type
CFI_DBO_Infrastructure	-	Facility_Type
CFI_DBO_Logistics	-	Facility_Type
CFI_DBO_Military	-	Facility_Type
CFI_DBO_Shelters	-	Facility_Type
CFI_DBO_Transportation	-	Facility_Type
Shelters	-	Facility_Type

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FlowLine Ftype

Owner	
Description	
Domain Type	Coded Value
Field Type	Integer
Merge Policy	Default Value
Split Policy	Default Value

Domain Members

Name	Value
Artificial Path	558
Canal-Ditch	336
Coastline	566
Connector	334
Pipeline	428
Shoreline	567
Stream-River	460

Associations

ObjectClass	Subtype	Field
NHD_Rivers	-	FType

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HorizontalAlignment

Owner	
Description	Valid horizontal symbol alignment values.
Domain Type	Coded Value
Field Type	Small Integer
Merge Policy	Default Value
Split Policy	Duplicate

Domain Members

Name	Value
Left	0
Center	1
Right	2
Full	3

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Resolution

Owner	
Description	
Domain Type	Coded Value
Field Type	Integer
Merge Policy	Default Value

Split Policy	Duplicate	
Domain Members		
Name	**Value**	
Local	1	
High	2	
Medium	3	
Associations		
ObjectClass	**Subtype**	**Field**
NHD_Lakes	-	Resolution
Swamps	-	Resolution

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SHELTER_TYPE

Owner		
Description	Shelter Types	
Domain Type	Coded Value	
Field Type	String	
Merge Policy	Default Value	
Split Policy	Default Value	
Domain Members		
Name	**Value**	
HOST	HOST	
GENERAL	GENERAL	
RISK	RISK	
SPECIAL NEEDS	SPECIAL NEEDS	
PET FRIENDLY	PET FRIENDLY	
EVACUATION	EVACUATION	
MULTIPLE	MULTIPLE	
Associations		
ObjectClass	**Subtype**	**Field**
CFI_DBO_Shelters	-	SHELTER_TYPE
Shelters	-	Facility_Desc

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STATUS

Owner	
Description	Status
Domain Type	Coded Value
Field Type	String
Merge Policy	Default Value
Split Policy	Default Value
Domain Members	
Name	**Value**
OPEN	OPEN
CLOSED	CLOSED
Associations	

ObjectClass	**Subtype**	**Field**
CFI_DBO_Shelters	-	Status

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Surge Zones

Owner		
Description	Surge Inundation Zones	
Domain Type	Coded Value	
Field Type	Small Integer	
Merge Policy	Default Value	
Split Policy	Default Value	
Domain Members		
Name	**Value**	
Category 1	1	
Category 2	2	
Category 3	3	
Category 4	4	
Category 5	5	
Tropical Storm	9	
Associations		
ObjectClass	**Subtype**	**Field**
SurgeZones	-	Cat

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VerticalAlignment

Owner	
Description	Valid symbol vertical alignment values.
Domain Type	Coded Value
Field Type	Small Integer
Merge Policy	Default Value
Split Policy	Duplicate
Domain Members	
Name	**Value**
Top	0
Center	1
Baseline	2
Bottom	3

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Water Code Types

Owner	
Description	For NHD Features
Domain Type	Coded Value
Field Type	Integer
Merge Policy	Default Value
Split Policy	Default Value
Domain Members	
Name	**Value**

Foreshore	364
Canal Ditch	336
Sea Ocean	445
Sream River	460
Hazard Zone	373
Estuary	493
Lake Pond	390
Reservoir	436
Swamp Marsh	466

Associations

ObjectClass	Subtype	Field
NHD_Area	-	FTYPE
NHD_Lakes	-	FType
Swamps	-	FType

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ObjectClasses

ObjectClass Name	Type	Geometry	Subtype
Lines			SR
DOT_Detail_Rds	FeatureClass	Polyline	-
EvacRoutes_2008	FeatureClass	Polyline	-
Major_Rds	FeatureClass	Polyline	-
NHD_Rivers	FeatureClass	Polyline	-
Tornado_Touchdown	FeatureClass	Polyline	-
Points			SR
Mobile_Homes	FeatureClass	Point	-
Reg_POR	FeatureClass	Point	-
Reg_Spot	FeatureClass	Point	-
Shelters	FeatureClass	Point	-
Vulnerable_CFI_302	FeatureClass	Point	-
Vulnerable_CFI_Health	FeatureClass	Point	-
Vulnerable_CFI_Other	FeatureClass	Point	-
Polygons			SR
BlkGrp_05	FeatureClass	Polygon	-
EvacZones	FeatureClass	Polygon	-
Fire_Danger	FeatureClass	Polygon	-
Fire_Interface	FeatureClass	Polygon	-
Fire_LOC	FeatureClass	Polygon	-
Hazus_Wind50	FeatureClass	Polygon	-
NHD_Area	FeatureClass	Polygon	-
NHD_Lakes	FeatureClass	Polygon	-
Quick_Land	FeatureClass	Polygon	-
Reg_FIRM	FeatureClass	Polygon	-

SAD_Final	FeatureClass	Polygon	-
SLOSH_Basin	FeatureClass	Polygon	-
SurgeZones	FeatureClass	Polygon	-
Swamps	FeatureClass	Polygon	-
TEA_Final	FeatureClass	Polygon	-
TEZ_Final	FeatureClass	Polygon	-
Source_CriticalFacilities			SR
CFI_DBO_Communications	FeatureClass	Point	-
CFI_DBO_Community_Resources	FeatureClass	Point	-
CFI_DBO_Correctional_Facilities	FeatureClass	Point	-
CFI_DBO_Education	FeatureClass	Point	-
CFI_DBO_Emergency_Services	FeatureClass	Point	-
CFI_DBO_Energy	FeatureClass	Point	-
CFI_DBO_Hazardous_Materials	FeatureClass	Point	-
CFI_DBO_HealthCare_Facilities	FeatureClass	Point	-
CFI_DBO_Infrastructure	FeatureClass	Point	-
CFI_DBO_Logistics	FeatureClass	Point	-
CFI_DBO_Military	FeatureClass	Point	-
CFI_DBO_Shelters	FeatureClass	Point	-
CFI_DBO_Transportation	FeatureClass	Point	-
Stand Alone ObjectClass(s)			
CensusSF3HBGTB	Table	-	-
CensusSF3PBGTB	Table	-	-
SAD_Data_jn	Table	-	-
Shelter_Master	Table	-	-

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BlkGrp_05

Alias	BlkGrp_05	**Geometry:** Polygon
Dataset Type	FeatureClass	**Average Number of Points:** 0 **Has M:** No
FeatureType	Simple	**Has Z:** No **Grid Size:** 10000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
BLKGRP_JN	BLKGRP_JN	String	0	0	14	Yes	Yes	No	No
CALC	CALC	Double	0	0	8	Yes	Yes	No	No
Acre	Acre	Single	0	0	4	Yes	Yes	No	No
Sq_Mile	Sq_Mile	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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CensusSF3HBGTB

Alias	CensusSF3HBGTB
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
RPC	RPC	String	0	0	7	Yes	Yes	No	No
COUNTY	COUNTY	String	0	0	7	Yes	Yes	No	No
TRACT	TRACT	String	0	0	7	Yes	Yes	No	No
BLKGRP	BLKGRP	String	0	0	6	Yes	Yes	No	No
BGID	BGID	String	0	0	13	Yes	Yes	No	No
AREALAND	AREALAND	Double	0	0	8	Yes	Yes	No	No
AREAWATER	AREAWATER	Double	0	0	8	Yes	Yes	No	No
POP100	POP100	Integer	0	0	4	Yes	Yes	No	No
HU100	HU100	Integer	0	0	4	Yes	Yes	No	No
TOTALUNITS	TOTALUNITS	Integer	0	0	4	Yes	Yes	No	No
OCCUNITS	OCCUNITS	Integer	0	0	4	Yes	Yes	No	No
OWNEROCC	OWNEROCC	Integer	0	0	4	Yes	Yes	No	No
RENTEROCC	RENTEROCC	Integer	0	0	4	Yes	Yes	No	No
TOTALVACAN	TOTALVACAN	Integer	0	0	4	Yes	Yes	No	No
VACANTTRAN	VACANTTRAN	Integer	0	0	4	Yes	Yes	No	No
VACANTSEAS	VACANTSEAS	Integer	0	0	4	Yes	Yes	No	No
VACANTMIGR	VACANTMIGR	Integer	0	0	4	Yes	Yes	No	No
RENTER	RENTER	Double	0	0	8	Yes	Yes	No	No
VACANT	VACANT	Double	0	0	8	Yes	Yes	No	No
SEASON	SEASON	Double	0	0	8	Yes	Yes	No	No
POPOCC	POPOCC	Double	0	0	8	Yes	Yes	No	No
OWNERPOP	OWNERPOP	Integer	0	0	4	Yes	Yes	No	No
RENTERPOP	RENTERPOP	Integer	0	0	4	Yes	Yes	No	No
HHAVGSIZE	HHAVGSIZE	Double	0	0	8	Yes	Yes	No	No
OWNERAVG	OWNERAVG	Double	0	0	8	Yes	Yes	No	No
RENTERAVG	RENTERAVG	Double	0	0	8	Yes	Yes	No	No
SFUNITS	SFUNITS	Integer	0	0	4	Yes	Yes	No	No
MFUNITS	MFUNITS	Double	0	0	8	Yes	Yes	No	No
MHOMES	MHOMES	Integer	0	0	4	Yes	Yes	No	No
BOATSRVS	BOATSRVS	Integer	0	0	4	Yes	Yes	No	No
OCCSF	OCCSF	Integer	0	0	4	Yes	Yes	No	No
OCCMF	OCCMF	Integer	0	0	4	Yes	Yes	No	No
OCCMH	OCCMH	Integer	0	0	4	Yes	Yes	No	No

OCCBOATS	OCCBOATS	Integer	0	0	4	Yes	Yes	No	No
SFSIZE	SFSIZE	Double	0	0	8	Yes	Yes	No	No
MFSIZE	MFSIZE	Double	0	0	8	Yes	Yes	No	No
MHSIZE	MHSIZE	Double	0	0	8	Yes	Yes	No	No
BRVSIZE	BRVSIZE	Double	0	0	8	Yes	Yes	No	No
VACSF	VACSF	Double	0	0	8	Yes	Yes	No	No
VACMF	VACMF	Double	0	0	8	Yes	Yes	No	No
VACMH	VACMH	Double	0	0	8	Yes	Yes	No	No
VACBRVS	VACBRVS	Double	0	0	8	Yes	Yes	No	No
NOVEHICLE	NOVEHICLE	Integer	0	0	4	Yes	Yes	No	No
AVGVEHICLE	AVGVEHICLE	Double	0	0	8	Yes	Yes	No	No
AVGVEHOWN	AVGVEHOWN	Double	0	0	8	Yes	Yes	No	No
AVGVEHREN	AVGVEHREN	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID

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CensusSF3PBGTB

Alias	CensusSF3PBGTB
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
RPC	RPC	String	0	0	7	Yes	Yes	No	No
COUNTY	COUNTY	String	0	0	7	Yes	Yes	No	No
TRACT	TRACT	String	0	0	7	Yes	Yes	No	No
BLKGRP	BLKGRP	String	0	0	6	Yes	Yes	No	No
BGID	BGID	String	0	0	13	Yes	Yes	No	No
AREALAND	AREALAND	Double	0	0	8	Yes	Yes	No	No
AREAWATER	AREAWATER	Double	0	0	8	Yes	Yes	No	No
DENSITY	DENSITY	Single	0	0	4	Yes	Yes	No	No
POP100	POP100	Integer	0	0	4	Yes	Yes	No	No
HU100	HU100	Integer	0	0	4	Yes	Yes	No	No
WHITENH	WHITENH	Integer	0	0	4	Yes	Yes	No	No
BLACKNH	BLACKNH	Integer	0	0	4	Yes	Yes	No	No
OTHERNH	OTHERNH	Integer	0	0	4	Yes	Yes	No	No
HISPANIC	HISPANIC	Integer	0	0	4	Yes	Yes	No	No
BLACKNH_1	BLACKNH_1	Double	0	0	8	Yes	Yes	No	No
OTHERNH_1	OTHERNH_1	Double	0	0	8	Yes	Yes	No	No
HISPANIC_1	HISPANIC_1	Double	0	0	8	Yes	Yes	No	No
AGE_5	AGE_5	Integer	0	0	4	Yes	Yes	No	No
AGE5TO17	AGE5TO17	Integer	0	0	4	Yes	Yes	No	No
AGE18TO24	AGE18TO24	Integer	0	0	4	Yes	Yes	No	No

AGE25TO34	AGE25TO34	Integer	0	0	4	Yes	Yes	No	No
AGE35TO44	AGE35TO44	Integer	0	0	4	Yes	Yes	No	No
AGE45TO54	AGE45TO54	Integer	0	0	4	Yes	Yes	No	No
AGE55TO64	AGE55TO64	Integer	0	0	4	Yes	Yes	No	No
AGE65TO74	AGE65TO74	Integer	0	0	4	Yes	Yes	No	No
AGE75TO84	AGE75TO84	Integer	0	0	4	Yes	Yes	No	No
AGE85_	AGE85_	Integer	0	0	4	Yes	Yes	No	No
AGE_56	AGE_56	Double	0	0	8	Yes	Yes	No	No
AGE_18	AGE_18	Double	0	0	8	Yes	Yes	No	No
AGE65_	AGE65_	Double	0	0	8	Yes	Yes	No	No
AGE851	AGE851	Double	0	0	8	Yes	Yes	No	No
FAMILYPOP	FAMILYPOP	Integer	0	0	4	Yes	Yes	No	No
NONFAMPOP	NONFAMPOP	Integer	0	0	4	Yes	Yes	No	No
LIVEALONE	LIVEALONE	Integer	0	0	4	Yes	Yes	No	No
GQINST	GQINST	Integer	0	0	4	Yes	Yes	No	No
GQNONINST	GQNONINST	Integer	0	0	4	Yes	Yes	No	No
NONFAM	NONFAM	Double	0	0	8	Yes	Yes	No	No
GQ	GQ	Double	0	0	8	Yes	Yes	No	No
GQINST_1	GQINST_1	Double	0	0	8	Yes	Yes	No	No
ALONE65_	ALONE65_	Integer	0	0	4	Yes	Yes	No	No
ALONE651	ALONE651	Double	0	0	8	Yes	Yes	No	No
SPEAKENG	SPEAKENG	Integer	0	0	4	Yes	Yes	No	No
SPEAKSPA	SPEAKSPA	Integer	0	0	4	Yes	Yes	No	No
SPEAKOTH	SPEAKOTH	Integer	0	0	4	Yes	Yes	No	No
LINGISOSPA	LINGISOSPA	Integer	0	0	4	Yes	Yes	No	No
LINGISOOTH	LINGISOOTH	Integer	0	0	4	Yes	Yes	No	No
LINGISO	LINGISO	Double	0	0	8	Yes	Yes	No	No
NATIVEFL	NATIVEFL	Integer	0	0	4	Yes	Yes	No	No
NATIVEUS	NATIVEUS	Integer	0	0	4	Yes	Yes	No	No
NATIVENUS	NATIVENUS	Integer	0	0	4	Yes	Yes	No	No
FORBORNCIT	FORBORNCIT	Integer	0	0	4	Yes	Yes	No	No
FORBORNNCI	FORBORNNCI	Integer	0	0	4	Yes	Yes	No	No
FOREIGN	FOREIGN	Double	0	0	8	Yes	Yes	No	No
NCITIZEN	NCITIZEN	Double	0	0	8	Yes	Yes	No	No
CIVILPOP5_	CIVILPOP5_	Double	0	0	8	Yes	Yes	No	No
DISAB5TO15	DISAB5TO15	Integer	0	0	4	Yes	Yes	No	No
DISAB16TO2	DISAB16TO2	Integer	0	0	4	Yes	Yes	No	No
DISAB21TO6	DISAB21TO6	Integer	0	0	4	Yes	Yes	No	No
DISAB65TO7	DISAB65TO7	Integer	0	0	4	Yes	Yes	No	No
DISAB75_	DISAB75_	Integer	0	0	4	Yes	Yes	No	No
WDISABILI	WDISABILI	Double	0	0	8	Yes	Yes	No	No
DISAB65_	DISAB65_	Double	0	0	8	Yes	Yes	No	No
LABORFORCE	LABORFORCE	Integer	0	0	4	Yes	Yes	No	No
ARMEDFORCE	ARMEDFORCE	Integer	0	0	4	Yes	Yes	No	No
EMPLOYED	EMPLOYED	Integer	0	0	4	Yes	Yes	No	No
UNEMPLOYED	UNEMPLOYED	Integer	0	0	4	Yes	Yes	No	No
NLABFORCE	NLABFORCE	Integer	0	0	4	Yes	Yes	No	No
UNEMP	UNEMP	Double	0	0	8	Yes	Yes	No	No
LABFORCE	LABFORCE	Double	0	0	8	Yes	Yes	No	No

MEDIANHHY	MEDIANHHY	Integer	0	0	4	Yes	Yes	No	No
PERCAPITAY	PERCAPITAY	Integer	0	0	4	Yes	Yes	No	No
POVDETERM	POVDETERM	Double	0	0	8	Yes	Yes	No	No
BELOWPOV	BELOWPOV	Integer	0	0	4	Yes	Yes	No	No
POV_18	POV_18	Integer	0	0	4	Yes	Yes	No	No
POV65_	POV65_	Integer	0	0	4	Yes	Yes	No	No
BELOWPOV_1	BELOWPOV_1	Double	0	0	8	Yes	Yes	No	No
POV_18_19	POV_18_19	Double	0	0	8	Yes	Yes	No	No
POV651	POV651	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID

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CFI_DBO_Communications

Alias	CFI_DBO_Communications	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:7608.98002580315	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID

FDO_SHAPE	No	No	SHAPE

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CFI_DBO_Community_Resources

Alias	CFI_DBO_Community_Resources	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:3470.43173272789	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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CFI_DBO_Correctional_Facilities

Alias	CFI_DBO_Correctional_Facilities	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:13320.802636646	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain

									Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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CFI_DBO_Education

Alias	CFI_DBO_Education	**Geometry:**Point
Dataset Type	FeatureClass	**Average Number of Points:**0
		Has M: No
FeatureType	Simple	**Has Z:**No
		Grid Size:3713.77464476619

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	50	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	Yes	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	Yes	No	No

Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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CFI_DBO_Emergency_Services

Alias	CFI_DBO_Emergency_Services	**Geometry:**	Point
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	4709.30104760713

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields

FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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CFI_DBO_Energy

Alias	CFI_DBO_Energy	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:2748.02741356148	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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CFI_DBO_Hazardous_Materials

Alias	CFI_DBO_Hazardous_Materials	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:2203.64557863511	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
Facility_Desc	Facility_Desc	String	0	0	255	Yes	Yes	No	No
USNG2	USNG2	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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CFI_DBO_HealthCare_Facilities

Alias	CFI_DBO_HealthCare_Facilities	**Geometry:**	Point
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	2356.19630372499

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No

Zip	Zip	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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CFI_DBO_Infrastructure

Alias	CFI_DBO_Infrastructure	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
		Has Z: No	
FeatureType	Simple	**Grid Size:**2267.93362136666	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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CFI_DBO_Logistics

Alias	CFI_DBO_Logistics	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No	
FeatureType	Simple	**Has Z:**No **Grid Size:**8111.88461463039	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	50	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	Yes	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
Status	Status	String	0	0	16	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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CFI_DBO_Military

Alias	CFI_DBO_Military	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No	
FeatureType	Simple	**Has Z:**No	

Grid Size:13113.8541844632

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	50	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	Yes	No	No
Name	Name	String	0	0	128	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	35	Yes	Yes	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
USNG2	USNG2	String	0	0	50	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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CFI_DBO_Shelters

Alias	CFI_DBO_Shelters	**Geometry:**	Point
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	5307.69436755381

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
RedCrossNSS_ID	RedCrossNSS_ID	Integer	0	0	4	Yes	Yes	No	No
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	50	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No

City	City	String	0	0	20	Yes	Yes	No	No
Countyid	Countyid	String	0	0	4	Yes	Yes	No	No
County	County	String	0	0	24	Yes	Yes	No	No
Zip5	Zip5	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	64	Yes	Yes	No	No
Editdate	Editdate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
ARC_4496	ARC_4496	String	0	0	8	Yes	Yes	No	No
General_	General	String	0	0	3	Yes	Yes	No	No
SpecialNeeds	SpecialNeeds	String	0	0	3	Yes	Yes	No	No
PetFriendly	PetFriendly	String	0	0	3	Yes	Yes	No	No
SHELTER_TYPE	SHELTER_TYPE	String	0	0	36	Yes	Yes	No	No
Status	Status	String	0	0	32	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS
ARC_4496	False	BOOLEAN
General_		BOOLEAN
SpecialNeeds		BOOLEAN
PetFriendly		BOOLEAN
SHELTER_TYPE		SHELTER_TYPE
Status		STATUS

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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CFI_DBO_Transportation

Alias	CFI_DBO_Transportation	**Geometry:**	Point
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
		Has Z:	No
FeatureType	Simple	**Grid Size:**	10052.9544554282

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
GnisID	GnisID	Double	0	0	8	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No

Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	Yes	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	Yes	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
County		COUNTY_FIPS

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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DOT_Detail_Rds

Alias	DOT_Detail_Rds	**Geometry:**	Polyline
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	590

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
DYNAMAP_ID	DYNAMAP_ID	Double	0	0	8	Yes	Yes	No	No
L_F_ADD	L_F_ADD	String	0	0	11	Yes	Yes	No	No
L_T_ADD	L_T_ADD	String	0	0	11	Yes	Yes	No	No
R_F_ADD	R_F_ADD	String	0	0	11	Yes	Yes	No	No
R_T_ADD	R_T_ADD	String	0	0	11	Yes	Yes	No	No
PREFIX	PREFIX	String	0	0	2	Yes	Yes	No	No
PRETYPE	PRETYPE	String	0	0	10	Yes	Yes	No	No
NAME	NAME	String	0	0	50	Yes	Yes	No	No
TYPE	TYPE	String	0	0	6	Yes	Yes	No	No
SUFFIX	SUFFIX	String	0	0	2	Yes	Yes	No	No
FCC	FCC	String	0	0	3	Yes	Yes	No	No
POSTAL_L	POSTAL_L	String	0	0	5	Yes	Yes	No	No
POSTAL_R	POSTAL_R	String	0	0	5	Yes	Yes	No	No
ACC	ACC	String	0	0	1	Yes	Yes	No	No
NAME_TYPE	NAME_TYPE	String	0	0	1	Yes	Yes	No	No
SHIELD	SHIELD	String	0	0	2	Yes	Yes	No	No
HWY_NUM	HWY_NUM	String	0	0	5	Yes	Yes	No	No

SEG_LEN	SEG_LEN	Single	0	0	4	Yes	Yes	No	No
SPEED	SPEED	Small Integer	0	0	2	Yes	Yes	No	No
ONE_WAY	ONE_WAY	String	0	0	2	Yes	Yes	No	No
F_ZLEV	F_ZLEV	Small Integer	0	0	2	Yes	Yes	No	No
T_ZLEV	T_ZLEV	Small Integer	0	0	2	Yes	Yes	No	No
FT_COST	FT_COST	Double	0	0	8	Yes	Yes	No	No
TF_COST	TF_COST	Double	0	0	8	Yes	Yes	No	No
FT_DIR	FT_DIR	String	0	0	2	Yes	Yes	No	No
TF_DIR	TF_DIR	String	0	0	2	Yes	Yes	No	No
NAME_FLAG	NAME_FLAG	Small Integer	0	0	2	Yes	Yes	No	No
STATUS	STATUS	String	0	0	1	Yes	Yes	No	No
CLASS	CLASS	Small Integer	0	0	2	Yes	Yes	No	No
PRT_NAME	PRT_NAME	String	0	0	45	Yes	Yes	No	No
ALTNAME	ALTNAME	String	0	0	40	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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EvacRoutes_2008

Alias	EvacRoutes_2008	**Geometry:**Polyline	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:550	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
JOIN_COUNT	JOIN_COUNT	Integer	0	0	4	Yes	Yes	No	No
DYNAMAP_ID	DYNAMAP_ID	Double	0	0	8	Yes	Yes	No	No
L_F_ADD	L_F_ADD	String	0	0	11	Yes	Yes	No	No
L_T_ADD	L_T_ADD	String	0	0	11	Yes	Yes	No	No
R_F_ADD	R_F_ADD	String	0	0	11	Yes	Yes	No	No
R_T_ADD	R_T_ADD	String	0	0	11	Yes	Yes	No	No
PREFIX	PREFIX	String	0	0	2	Yes	Yes	No	No
PRETYPE	PRETYPE	String	0	0	10	Yes	Yes	No	No
NAME	NAME	String	0	0	50	Yes	Yes	No	No
TYPE	TYPE	String	0	0	6	Yes	Yes	No	No
SUFFIX	SUFFIX	String	0	0	2	Yes	Yes	No	No

FCC	FCC	String	0	0	3	Yes	Yes	No	No
POSTAL_L	POSTAL_L	String	0	0	5	Yes	Yes	No	No
POSTAL_R	POSTAL_R	String	0	0	5	Yes	Yes	No	No
ACC	ACC	String	0	0	1	Yes	Yes	No	No
NAME_TYPE	NAME_TYPE	String	0	0	1	Yes	Yes	No	No
SHIELD	SHIELD	String	0	0	2	Yes	Yes	No	No
HWY_NUM	HWY_NUM	String	0	0	5	Yes	Yes	No	No
SEG_LEN	SEG_LEN	Double	0	0	8	Yes	Yes	No	No
SPEED	SPEED	Small Integer	0	0	2	Yes	Yes	No	No
ONE_WAY	ONE_WAY	String	0	0	2	Yes	Yes	No	No
F_ZLEV	F_ZLEV	Small Integer	0	0	2	Yes	Yes	No	No
T_ZLEV	T_ZLEV	Small Integer	0	0	2	Yes	Yes	No	No
FT_COST	FT_COST	Double	0	0	8	Yes	Yes	No	No
TF_COST	TF_COST	Double	0	0	8	Yes	Yes	No	No
FT_DIR	FT_DIR	String	0	0	2	Yes	Yes	No	No
TF_DIR	TF_DIR	String	0	0	2	Yes	Yes	No	No
NAME_FLAG	NAME_FLAG	Small Integer	0	0	2	Yes	Yes	No	No
STATUS	STATUS	String	0	0	1	Yes	Yes	No	No
CLASS	CLASS	Small Integer	0	0	2	Yes	Yes	No	No
PRT_NAME	PRT_NAME	String	0	0	45	Yes	Yes	No	No
ALTNAME	ALTNAME	String	0	0	40	Yes	Yes	No	No
LANES	LANES	Small Integer	0	0	2	Yes	Yes	No	No
CONTRA	CONTRA	Small Integer	0	0	2	Yes	Yes	No	No
CAPACITY	CAPACITY	Integer	0	0	4	Yes	Yes	No	No
IN_USE	IN_USE	String	0	0	10	Yes	Yes	No	No
U_TYPE	U_TYPE	String	0	0	15	Yes	Yes	No	No
ROADWAY	ROADWAY	String	0	0	8	Yes	Yes	No	No
ROAD_SIDE	ROAD_SIDE	String	0	0	1	Yes	Yes	No	No
BEGIN_POST	BEGIN_POST	Double	0	0	8	Yes	Yes	No	No
END_POST	END_POST	Double	0	0	8	Yes	Yes	No	No
LANE_CNT	LANE_CNT	Double	0	0	8	Yes	Yes	No	No
SHAPE_LENG	SHAPE_LENG	Double	0	0	8	Yes	Yes	No	No
AZIM	AZIM	Double	0	0	8	Yes	Yes	No	No
CARDINAL	CARDINAL	String	0	0	3	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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EvacZones

Alias	EvacZones	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
		Has Z: No	
FeatureType	Simple	**Grid Size:**1800	
		Grid Size:18000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
Evac	Evac	String	0	0	2	Yes	Yes	No	No
tmp_lev	tmp_lev	String	0	0	4	Yes	Yes	No	No
Orig_ID	Orig_ID	Integer	0	0	4	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Evac		Evac Zones

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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Fire_Danger

Alias	Fire_Danger	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
		Has Z: No	
FeatureType	Simple	**Grid Size:**14000	
		Grid Size:56000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
ID	ID	Double	0	0	8	Yes	Yes	No	No
GRIDCODE	GRIDCODE	Double	0	0	8	Yes	Yes	No	No
Lower	Lower	Small Integer	0	0	2	Yes	Yes	No	No
Mid	Mid	Small Integer	0	0	2	Yes	Yes	No	No
Upper	Upper	Small Integer	0	0	2	Yes	Yes	No	No
Describe	Describe	String	0	0	25	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID

FDO_Shape	No	No	Shape

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Fire_Interface

Alias	Fire_Interface	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:3000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID_1	OBJECTID_1	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
OBJECTID	OBJECTID	Integer	0	0	4	Yes	Yes	No	No
AREA	AREA	Double	0	0	8	Yes	Yes	No	No
PERIMETER	PERIMETER	Double	0	0	8	Yes	Yes	No	No
FLWUI_	FLWUI_	Integer	0	0	4	Yes	Yes	No	No
FLWUI_ID	FLWUI_ID	Integer	0	0	4	Yes	Yes	No	No
BLK00	BLK00	String	0	0	18	Yes	Yes	No	No
ZSUM11PC	ZSUM11PC	Single	0	0	4	Yes	Yes	No	No
ZSUM21PC	ZSUM21PC	Single	0	0	4	Yes	Yes	No	No
ZSUM22PC	ZSUM22PC	Single	0	0	4	Yes	Yes	No	No
ZSUM23PC	ZSUM23PC	Single	0	0	4	Yes	Yes	No	No
ZSUM31PC	ZSUM31PC	Single	0	0	4	Yes	Yes	No	No
ZSUM32PC	ZSUM32PC	Single	0	0	4	Yes	Yes	No	No
ZSUM33PC	ZSUM33PC	Single	0	0	4	Yes	Yes	No	No
ZSUM41PC	ZSUM41PC	Single	0	0	4	Yes	Yes	No	No
ZSUM42PC	ZSUM42PC	Single	0	0	4	Yes	Yes	No	No
ZSUM43PC	ZSUM43PC	Single	0	0	4	Yes	Yes	No	No
ZSUM51PC	ZSUM51PC	Single	0	0	4	Yes	Yes	No	No
ZSUM61PC	ZSUM61PC	Single	0	0	4	Yes	Yes	No	No
ZSUM71PC	ZSUM71PC	Single	0	0	4	Yes	Yes	No	No
ZSUM81PC	ZSUM81PC	Single	0	0	4	Yes	Yes	No	No
ZSUM82PC	ZSUM82PC	Single	0	0	4	Yes	Yes	No	No
ZSUM85PC	ZSUM85PC	Single	0	0	4	Yes	Yes	No	No
ZSUM91PC	ZSUM91PC	Single	0	0	4	Yes	Yes	No	No
ZSUM92PC	ZSUM92PC	Single	0	0	4	Yes	Yes	No	No
WATER00	WATER00	Small Integer	0	0	2	Yes	Yes	No	No
HDEN00	HDEN00	Double	0	0	8	Yes	Yes	No	No
SHDEN00	SHDEN00	Double	0	0	8	Yes	Yes	No	No
PDEN00	PDEN00	Double	0	0	8	Yes	Yes	No	No
HHDEN00	HHDEN00	Double	0	0	8	Yes	Yes	No	No
ALLOCHDEN9	ALLOCHDEN9	Double	0	0	8	Yes	Yes	No	No
ALLOCSHDEN	ALLOCSHDEN	Double	0	0	8	Yes	Yes	No	No
ALLOCPDEN9	ALLOCPDEN9	Double	0	0	8	Yes	Yes	No	No
ALLOCHHDEN	ALLOCHHDEN	Double	0	0	8	Yes	Yes	No	No
FOREST	FOREST	Single	0	0	4	Yes	Yes	No	No
VEGETATION	VEGETATION	Single	0	0	4	Yes	Yes	No	No
WUIALLOCHD	WUIALLOCHD	String	0	0	25	Yes	Yes	No	No
WUIHDEN00	WUIHDEN00	String	0	0	25	Yes	Yes	No	No

WUICODE90	WUICODE90	Double	0	0	8	Yes	Yes	No	No
WUICODE00	WUICODE00	Double	0	0	8	Yes	Yes	No	No
STATE	STATE	String	0	0	3	Yes	Yes	No	No
ZSUM12PC	ZSUM12PC	Single	0	0	4	Yes	Yes	No	No
ZSUM83PC	ZSUM83PC	Single	0	0	4	Yes	Yes	No	No
ZSUM84PC	ZSUM84PC	Single	0	0	4	Yes	Yes	No	No
SHAPE_Leng	SHAPE_Leng	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID_1	Yes	Yes	OBJECTID_1
FDO_Shape	No	No	Shape

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Fire_LOC

Alias	Fire_LOC	**Geometry:**	Polygon
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
		Has Z:	No
FeatureType	Simple	**Grid Size:**	700
		Grid Size:	11900

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
ID	ID	Double	0	0	8	Yes	Yes	No	No
GRIDCODE	GRIDCODE	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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Hazus_Wind50

Alias	Hazus_Wind50	**Geometry:**	Polygon
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	290000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No

ID	ID	Double	0	0	8	Yes	Yes	No	No
GRIDCODE	GRIDCODE	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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Major_Rds

Alias	Major_Rds	**Geometry:**	Polyline
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	580

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID_1	OBJECTID_1	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
OBJECTID	OBJECTID	Integer	0	0	4	Yes	Yes	No	No
DYNAMAP_ID	DYNAMAP_ID	Double	0	0	8	Yes	Yes	No	No
L_F_ADD	L_F_ADD	String	0	0	11	Yes	Yes	No	No
L_T_ADD	L_T_ADD	String	0	0	11	Yes	Yes	No	No
R_F_ADD	R_F_ADD	String	0	0	11	Yes	Yes	No	No
R_T_ADD	R_T_ADD	String	0	0	11	Yes	Yes	No	No
PREFIX	PREFIX	String	0	0	2	Yes	Yes	No	No
PRETYPE	PRETYPE	String	0	0	10	Yes	Yes	No	No
NAME	NAME	String	0	0	50	Yes	Yes	No	No
TYPE	TYPE	String	0	0	6	Yes	Yes	No	No
SUFFIX	SUFFIX	String	0	0	2	Yes	Yes	No	No
FCC	FCC	String	0	0	3	Yes	Yes	No	No
POSTAL_L	POSTAL_L	String	0	0	5	Yes	Yes	No	No
POSTAL_R	POSTAL_R	String	0	0	5	Yes	Yes	No	No
ACC	ACC	String	0	0	1	Yes	Yes	No	No
NAME_TYPE	NAME_TYPE	String	0	0	1	Yes	Yes	No	No
SHIELD	SHIELD	String	0	0	2	Yes	Yes	No	No
HWY_NUM	HWY_NUM	String	0	0	5	Yes	Yes	No	No
SEG_LEN	SEG_LEN	Single	0	0	4	Yes	Yes	No	No
SPEED	SPEED	Small Integer	0	0	2	Yes	Yes	No	No
ONE_WAY	ONE_WAY	String	0	0	2	Yes	Yes	No	No
F_ZLEV	F_ZLEV	Small Integer	0	0	2	Yes	Yes	No	No
T_ZLEV	T_ZLEV	Small Integer	0	0	2	Yes	Yes	No	No
FT_COST	FT_COST	Double	0	0	8	Yes	Yes	No	No
TF_COST	TF_COST	Double	0	0	8	Yes	Yes	No	No

FT_DIR	FT_DIR	String	0	0	2	Yes	Yes	No	No
TF_DIR	TF_DIR	String	0	0	2	Yes	Yes	No	No
NAME_FLAG	NAME_FLAG	Small Integer	0	0	2	Yes	Yes	No	No
STATUS	STATUS	String	0	0	1	Yes	Yes	No	No
Shape_Leng	Shape_Leng	Double	0	0	8	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID_1	Yes	Yes	OBJECTID_1
FDO_Shape	No	No	Shape

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Mobile_Homes

Alias	Mobile_Homes	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:398.890596116674	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
COUNTY	COUNTY	String	0	0	16	Yes	Yes	No	No
PARCELID	PARCELID	String	0	0	30	Yes	Yes	No	No
LUCODE	LUCODE	String	0	0	5	Yes	Yes	No	No
LUDESC	LUDESC	String	0	0	50	Yes	Yes	No	No
SITE_ADDR	SITE_ADDR	String	0	0	50	Yes	Yes	No	No
UNIT	UNIT	String	0	0	5	Yes	Yes	No	No
CITY	CITY	String	0	0	16	Yes	Yes	No	No
ZIP	ZIP	String	0	0	5	Yes	Yes	No	No
OWNER	OWNER	String	0	0	20	Yes	Yes	No	No
MH_TYPE	MH_TYPE	Small Integer	0	0	2	Yes	Yes	No	No
X_COORD	X_COORD	Double	0	0	8	Yes	Yes	No	No
Y_COORD	Y_COORD	Double	0	0	8	Yes	Yes	No	No
TAZ_ID	TAZ_ID	Integer	0	0	4	Yes	Yes	No	No
FEAT_ID	FEAT_ID	String	0	0	9	Yes	Yes	No	No
bldg	bldg	Small Integer	0	0	2	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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NHD_Area

Alias	NHD_Area	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: Yes	
		Has Z: Yes	
FeatureType	Simple	**Grid Size:**120000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
COMID	COMID	Integer	0	0	4	Yes	Yes	No	No
FDATE	FDATE	Date	0	0	8	Yes	Yes	No	No
RESOLUTION	RESOLUTION	Integer	0	0	4	Yes	Yes	No	No
GNIS_ID	GNIS_ID	String	0	0	10	Yes	Yes	No	No
GNIS_NAME	GNIS_NAME	String	0	0	65	Yes	Yes	No	No
AREASQKM	AREASQKM	Double	0	0	8	Yes	Yes	No	No
ELEVATION	ELEVATION	Double	0	0	8	Yes	Yes	No	No
FTYPE	FTYPE	Integer	0	0	4	Yes	Yes	No	No
FCODE	FCODE	Integer	0	0	4	Yes	Yes	No	No
SHAPE_LENG	SHAPE_LENG	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
FTYPE		Water Code Types

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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NHD_Lakes

Alias	NHD_Lakes	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
		Has Z: Yes	
FeatureType	Simple	**Grid Size:**520	
		Grid Size:3120	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
ComID	ComID	Integer	0	0	4	Yes	No	No	No
FDate	FDate	Date	0	0	8	Yes	Yes	No	No
Resolution	Resolution	Integer	0	0	4	Yes	No	No	No
GNIS_ID	GNIS_ID	String	0	0	10	Yes	Yes	No	No
GNIS_Name	GNIS_Name	String	0	0	65	Yes	Yes	No	No
AreaSqKm	AreaSqKm	Double	0	0	8	Yes	Yes	No	No
Elevation	Elevation	Double	0	0	8	Yes	Yes	No	No

ReachCode	ReachCode	String	0	0	14	Yes	Yes	No	No
FType	FType	Integer	0	0	4	Yes	No	No	No
FCode	FCode	Integer	0	0	4	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
ComID	0	-
Resolution	2	Resolution
Elevation		ElevationRange
FType		Water Code Types
FCode	39004	-

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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NHD_Rivers

Alias	NHD_Rivers	**Geometry:**Polyline	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: Yes	
		Has Z: Yes	
FeatureType	Simple	**Grid Size:**970	
		Grid Size:3880	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
ComID	ComID	Integer	0	0	4	Yes	Yes	No	No
FDate	FDate	Date	0	0	8	Yes	Yes	No	No
Resolution	Resolution	Integer	0	0	4	Yes	Yes	No	No
GNIS_ID	GNIS_ID	String	0	0	10	Yes	Yes	No	No
GNIS_Name	GNIS_Name	String	0	0	65	Yes	Yes	No	No
LengthKM	LengthKM	Double	0	0	8	Yes	Yes	No	No
ReachCode	ReachCode	String	0	0	14	Yes	Yes	No	No
FlowDir	FlowDir	Integer	0	0	4	Yes	Yes	No	No
WBAreaComI	WBAreaComI	Integer	0	0	4	Yes	Yes	No	No
FType	FType	Integer	0	0	4	Yes	Yes	No	No
FCode	FCode	Integer	0	0	4	Yes	Yes	No	No
Enabled	Enabled	Small Integer	0	0	2	Yes	Yes	No	No
Shape_Leng	Shape_Leng	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
FType		FlowLine Ftype

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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Quick_Land

Alias	Quick_Land	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:76000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
AREA	AREA	Double	0	0	8	Yes	Yes	No	No
PERIMETER	PERIMETER	Double	0	0	8	Yes	Yes	No	No
BODY	BODY	Double	0	0	8	Yes	Yes	No	No

CNTY_LINE_	CNTY_LINE_	Double	0	0	8	Yes	Yes	No	No
COUNTY	COUNTY	String	0	0	22	Yes	Yes	No	No
TYPE	TYPE	String	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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Reg_FIRM

Alias	Reg_FIRM	**Geometry:**Polygon
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No
FeatureType	Simple	**Has Z:**No **Grid Size:**18000

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FLD_ZONE	FLD_ZONE	String	0	0	55	Yes	Yes	No	No
InPoly_FID	InPoly_FID	Integer	0	0	4	Yes	Yes	No	No
SimPlyFlag	SimPlyFlag	Small Integer	0	0	2	Yes	Yes	No	No
FloodPlain	FloodPlain	String	0	0	24	Yes	Yes	No	No
description	description	String	0	0	38	Yes	Yes	No	No
Sq_Miles	Sq_Miles	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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Reg_POR

Alias	Reg_POR	**Geometry:**Point
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No
FeatureType	Simple	**Has Z:**No **Grid Size:**6331.69536003103

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed

OBJECTID_12	OBJECTID_12	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
OBJECTID	OBJECTID	Integer	0	0	4	Yes	Yes	No	No
POR_ID	POR_ID	Integer	0	0	4	Yes	Yes	No	No
NAME	NAME	String	0	0	55	Yes	Yes	No	No
TIME_ID	TIME_ID	String	0	0	15	Yes	Yes	No	No
DEM_ELEV	DEM_ELEV	Double	0	0	8	Yes	Yes	No	No
C1D	C1D	Double	0	0	8	Yes	Yes	No	No
C2D	C2D	Double	0	0	8	Yes	Yes	No	No
C3D	C3D	Double	0	0	8	Yes	Yes	No	No
C4D	C4D	Double	0	0	8	Yes	Yes	No	No
C5D	C5D	Double	0	0	8	Yes	Yes	No	No
C1SRG	C1SRG	Double	0	0	8	Yes	Yes	No	No
C2SRG	C2SRG	Double	0	0	8	Yes	Yes	No	No
C3SRG	C3SRG	Double	0	0	8	Yes	Yes	No	No
C4SRG	C4SRG	Double	0	0	8	Yes	Yes	No	No
C5SRG	C5SRG	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
In_Evac	In_Evac	String	0	0	2	Yes	Yes	No	No

Subtype Name	Default Value	Domain

ObjectClass

Index Name	Ascending	Unique	Fields
FDO_OBJECTID_12	Yes	Yes	OBJECTID_12
FDO_Shape	No	No	Shape

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Reg_Spot

Alias	Reg_Spot	**Geometry:**Point
Dataset Type	FeatureClass	**Average Number of Points:**0
		Has M: No
FeatureType	Simple	**Has Z:**No
		Grid Size:2332.36578717911

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
C5SPOT	C5SPOT	Double	0	0	8	Yes	Yes	No	No
DATE_STAMP	DATE_STAMP	Date	0	0	8	Yes	Yes	No	No
NOTES	NOTES	String	0	0	42	Yes	Yes	No	No
RASTERVALU	RASTERVALU	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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SAD_Data_jn

Alias	SAD_Data_jn
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
CENSUSTAZ	CENSUSTAZ	Double	0	0	8	Yes	Yes	No	No
STFID	STFID	Double	0	0	8	Yes	Yes	No	No
REGTAZ	REGTAZ	String	0	0	8	Yes	Yes	No	No
FIPS	FIPS	String	0	0	5	Yes	Yes	No	No
ACRES	ACRES	Double	0	0	8	Yes	Yes	No	No
CETAZJN	CETAZJN	String	0	0	9	Yes	Yes	No	No
DTSB_06	DTSB_06	Double	0	0	8	Yes	Yes	No	No
PCTSO_06	PCTSO_06	Double	0	0	8	Yes	Yes	No	No
ODTSB_06	ODTSB_06	Double	0	0	8	Yes	Yes	No	No
PHTSB_06	PHTSB_06	Double	0	0	8	Yes	Yes	No	No
PTSB_06	PTSB_06	Double	0	0	8	Yes	Yes	No	No
VHTSB_06	VHTSB_06	Double	0	0	8	Yes	Yes	No	No
VTSB_06	VTSB_06	Double	0	0	8	Yes	Yes	No	No
D_MB_06	D_MB_06	Double	0	0	8	Yes	Yes	No	No
PC_MO_06	PC_MO_06	Double	0	0	8	Yes	Yes	No	No
O_MB_06	O_MB_06	Double	0	0	8	Yes	Yes	No	No
PH_MO_06	PH_MO_06	Double	0	0	8	Yes	Yes	No	No

P_MB_06	P_MB_06	Double0	0	8	Yes	Yes	No	No
VH_MB_06	VH_MB_06	Double0	0	8	Yes	Yes	No	No
V_MB_06	V_MB_06	Double0	0	8	Yes	Yes	No	No
HM_U_06	HM_U_06	Double0	0	8	Yes	Yes	No	No
HM_O_06	HM_O_06	Double0	0	8	Yes	Yes	No	No
HM_OU_06	HM_OU_06	Double0	0	8	Yes	Yes	No	No
HM_PH_06	HM_PH_06	Double0	0	8	Yes	Yes	No	No
HM_P_06	HM_P_06	Double0	0	8	Yes	Yes	No	No
HM_VH_06	HM_VH_06	Double0	0	8	Yes	Yes	No	No
HM_V_06	HM_V_06	Double0	0	8	Yes	Yes	No	No
SH_CP_06	SH_CP_06	Double0	0	8	Yes	Yes	No	No
GQ_P_06	GQ_P_06	Double0	0	8	Yes	Yes	No	No
GQ_VE_06	GQ_VE_06	Double0	0	8	Yes	Yes	No	No
DTSB_10	DTSB_10	Double0	0	8	Yes	Yes	No	No
PCTSO_10	PCTSO_10	Double0	0	8	Yes	Yes	No	No
ODTSB_10	ODTSB_10	Double0	0	8	Yes	Yes	No	No
PHTSB_10	PHTSB_10	Double0	0	8	Yes	Yes	No	No
PTSB_10	PTSB_10	Double0	0	8	Yes	Yes	No	No
VHTSB_10	VHTSB_10	Double0	0	8	Yes	Yes	No	No
VTSB_10	VTSB_10	Double0	0	8	Yes	Yes	No	No
D_MB_10	D_MB_10	Double0	0	8	Yes	Yes	No	No
PC_MO_10	PC_MO_10	Double0	0	8	Yes	Yes	No	No
O_MB_10	O_MB_10	Double0	0	8	Yes	Yes	No	No
PH_MO_10	PH_MO_10	Double0	0	8	Yes	Yes	No	No
P_MB_10	P_MB_10	Double0	0	8	Yes	Yes	No	No
VH_MB_10	VH_MB_10	Double0	0	8	Yes	Yes	No	No
V_MB_10	V_MB_10	Double0	0	8	Yes	Yes	No	No
HM_U_10	HM_U_10	Double0	0	8	Yes	Yes	No	No
HM_O_10	HM_O_10	Double0	0	8	Yes	Yes	No	No
HM_OU_10	HM_OU_10	Double0	0	8	Yes	Yes	No	No
HM_PH_10	HM_PH_10	Double0	0	8	Yes	Yes	No	No
HM_P_10	HM_P_10	Double0	0	8	Yes	Yes	No	No
HM_VH_10	HM_VH_10	Double0	0	8	Yes	Yes	No	No
HM_V_10	HM_V_10	Double0	0	8	Yes	Yes	No	No
SH_CP_10	SH_CP_10	Double0	0	8	Yes	Yes	No	No
GQ_P_10	GQ_P_10	Double0	0	8	Yes	Yes	No	No
GQ_VE_10	GQ_VE_10	String 0	0	10	Yes	Yes	No	No
DTSB_15	DTSB_15	Double0	0	8	Yes	Yes	No	No
PCTSO_15	PCTSO_15	Double0	0	8	Yes	Yes	No	No
ODTSB_15	ODTSB_15	Double0	0	8	Yes	Yes	No	No
PHTSB_15	PHTSB_15	Double0	0	8	Yes	Yes	No	No
PTSB_15	PTSB_15	Double0	0	8	Yes	Yes	No	No
VHTSB_15	VHTSB_15	Double0	0	8	Yes	Yes	No	No
VTSB_15	VTSB_15	Double0	0	8	Yes	Yes	No	No
D_MB_15	D_MB_15	Double0	0	8	Yes	Yes	No	No
PC_MO_15	PC_MO_15	Double0	0	8	Yes	Yes	No	No
O_MB_15	O_MB_15	Double0	0	8	Yes	Yes	No	No
PH_MO_15	PH_MO_15	Double0	0	8	Yes	Yes	No	No
P_MB_15	P_MB_15	Double0	0	8	Yes	Yes	No	No

VH_MB_15	VH_MB_15	Double	0	0	8	Yes	Yes	No	No
V_MB_15	V_MB_15	Double	0	0	8	Yes	Yes	No	No
HM_U_15	HM_U_15	Double	0	0	8	Yes	Yes	No	No
HM_O_15	HM_O_15	Double	0	0	8	Yes	Yes	No	No
HM_OU_15	HM_OU_15	Double	0	0	8	Yes	Yes	No	No
HM_PH_15	HM_PH_15	Double	0	0	8	Yes	Yes	No	No
HM_P_15	HM_P_15	Double	0	0	8	Yes	Yes	No	No
HM_VH_15	HM_VH_15	Double	0	0	8	Yes	Yes	No	No
HM_V_15	HM_V_15	Double	0	0	8	Yes	Yes	No	No
SH_CP_15	SH_CP_15	Double	0	0	8	Yes	Yes	No	No
GQ_P_15	GQ_P_15	Double	0	0	8	Yes	Yes	No	No
GQ_VE_15	GQ_VE_15	String	0	0	10	Yes	Yes	No	No
fix_flag	fix_flag	String	0	0	1	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
REGTAZ	Yes	No	REGTAZ

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SAD_Final

Alias	SmallAreaData	**Geometry:**	Polygon
Dataset Type	FeatureClass	**Average Number of Points:**	0
		Has M:	No
FeatureType	Simple	**Has Z:**	No
		Grid Size:	6100

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
Acres	Acres	Double	0	0	8	Yes	No	No	No
CENSUSTAZ	CENSUSTAZ	String	0	0	9	Yes	No	No	No
STFID	STFID	String	0	0	16	Yes	No	No	No
REGTAZ	REGTAZ	String	0	0	11	Yes	No	No	No
TAZ	TAZ	Small Integer	0	0	2	Yes	No	No	No
FIPS	FIPS	String	0	0	3	Yes	No	No	No
CeTAZJn	CeTAZJn	String	0	0	8	Yes	No	No	No
ModelZone	ModelZone	String	0	0	12	Yes	No	No	No
dyn_data	dyn_data	Single	0	0	4	Yes	No	No	No
Shape_Leng	Shape_Leng	Double	0	0	8	Yes	No	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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Shelter_Master

Alias	Shelter_Master
Dataset Type	Table
FeatureType	-

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
GIS_ID	GIS_ID	String	0	0	255	Yes	Yes	No	No
NAME	NAME	String	0	0	255	Yes	Yes	No	No
ADDRESS	ADDRESS	String	0	0	255	Yes	Yes	No	No
CITY	CITY	String	0	0	255	Yes	Yes	No	No
COUNTY	COUNTY	String	0	0	255	Yes	Yes	No	No
ZIP	ZIP	Double	0	0	8	Yes	Yes	No	No
BLDGS	BLDGS	String	0	0	255	Yes	Yes	No	No
REGION	REGION	Double	0	0	8	Yes	Yes	No	No
PHONE	PHONE	String	0	0	255	Yes	Yes	No	No
POC	POC	String	0	0	255	Yes	Yes	No	No
POC_PHONE	POC_PHONE	String	0	0	255	Yes	Yes	No	No
POC_EMAIL	POC_EMAIL	String	0	0	255	Yes	Yes	No	No
ALT_POC	ALT_POC	String	0	0	255	Yes	Yes	No	No
ALT_PHONE	ALT_PHONE	String	0	0	255	Yes	Yes	No	No
PET_FRIEND	PET_FRIEND	Double	0	0	8	Yes	Yes	No	No
PREMITFT2	PREMITFT2	Double	0	0	8	Yes	Yes	No	No
PREMITCAP	PREMITCAP	Double	0	0	8	Yes	Yes	No	No
EHPAFT2	EHPAFT2	Double	0	0	8	Yes	Yes	No	No
EHPACAP	EHPACAP	Double	0	0	8	Yes	Yes	No	No
RETFT2	RETFT2	Double	0	0	8	Yes	Yes	No	No
RETCAP	RETCAP	Double	0	0	8	Yes	Yes	No	No
TOTCAPGAIN	TOTCAPGAIN	Double	0	0	8	Yes	Yes	No	No
FUND_SRC	FUND_SRC	String	0	0	255	Yes	Yes	No	No
SPNFT2	SPNFT2	String	0	0	255	Yes	Yes	No	No
SPNCAP	SPNCAP	Double	0	0	8	Yes	Yes	No	No
GENPOPFT2	GENPOPFT2	String	0	0	255	Yes	Yes	No	No
GENPOPCAP	GENPOPCAP	Double	0	0	8	Yes	Yes	No	No
TOTRISKCAP	TOTRISKCAP	Double	0	0	8	Yes	Yes	No	No
HOSTGENCAP	HOSTGENCAP	Double	0	0	8	Yes	Yes	No	No
HOSTSPNCAP	HOSTSPNCAP	String	0	0	255	Yes	Yes	No	No
HOSTTOTCAP	HOSTTOTCAP	String	0	0	255	Yes	Yes	No	No
ELEVATION	ELEVATION	String	0	0	255	Yes	Yes	No	No
USNG	USNG	String	0	0	255	Yes	Yes	No	No
LAT	LAT	String	0	0	255	Yes	Yes	No	No
LON	LON	String	0	0	255	Yes	Yes	No	No
VERIFIED	VERIFIED	Double	0	0	8	Yes	Yes	No	No
CHK_METH	CHK_METH	String	0	0	255	Yes	Yes	No	No
NFIP	NFIP	String	0	0	255	Yes	Yes	No	No

IN_ZONE	IN_ZONE	String	0	0	255	Yes	Yes	No	No
IJ_Grid	IJ_Grid	String	0	0	255	Yes	Yes	No	No
SURGE1	SURGE1	String	0	0	255	Yes	Yes	No	No
SURGE2	SURGE2	String	0	0	255	Yes	Yes	No	No
SURGE3	SURGE3	String	0	0	255	Yes	Yes	No	No
SURGE4	SURGE4	String	0	0	255	Yes	Yes	No	No
SURGE5	SURGE5	String	0	0	255	Yes	Yes	No	No
SCHBRD_NUM	SCHBRD_NUM	String	0	0	255	Yes	Yes	No	No
ADA_COMPLY	ADA_COMPLY	String	0	0	255	Yes	Yes	No	No
GENERATOR	GENERATOR	String	0	0	255	Yes	Yes	No	No
KW_CAP	KW_CAP	String	0	0	255	Yes	Yes	No	No
FUEL_TYPE	FUEL_TYPE	String	0	0	255	Yes	Yes	No	No
FUEL_CAP	FUEL_CAP	String	0	0	255	Yes	Yes	No	No
ABOVE_BELO	ABOVE_BELO	String	0	0	255	Yes	Yes	No	No
KITCHEN	KITCHEN	String	0	0	255	Yes	Yes	No	No
BREAKRM	BREAKRM	String	0	0	255	Yes	Yes	No	No
COLD_STOR	COLD_STOR	String	0	0	255	Yes	Yes	No	No
SLEEPFAC	SLEEPFAC	String	0	0	255	Yes	Yes	No	No
SHOWERS	SHOWERS	String	0	0	255	Yes	Yes	No	No
RESTROOMS	RESTROOMS	String	0	0	255	Yes	Yes	No	No
COOL_ELE	COOL_ELE	String	0	0	255	Yes	Yes	No	No
COOL_PRP	COOL_PRP	String	0	0	255	Yes	Yes	No	No
COOL_NG	COOL_NG	String	0	0	255	Yes	Yes	No	No
COOK_ELE	COOK_ELE	String	0	0	255	Yes	Yes	No	No
COOK_PRP	COOK_PRP	String	0	0	255	Yes	Yes	No	No
COOK_NG	COOK_NG	String	0	0	255	Yes	Yes	No	No
MEDICAL	MEDICAL	String	0	0	255	Yes	Yes	No	No
FOOD_STORE	FOOD_STORE	String	0	0	255	Yes	Yes	No	No
MED_STORE	MED_STORE	String	0	0	255	Yes	Yes	No	No
YR_CONST	YR_CONST	Double	0	0	8	Yes	Yes	No	No
TYPE_CONST	TYPE_CONST	String	0	0	255	Yes	Yes	No	No
NORM_FUNCT	NORM_FUNCT	String	0	0	255	Yes	Yes	No	No
OCCUP_CAP	OCCUP_CAP	String	0	0	255	Yes	Yes	No	No
LOCALCAP	LOCALCAP	Double	0	0	8	Yes	Yes	No	No
UPDATE_	UPDATE_	String	0	0	255	Yes	Yes	No	No
NOTES	NOTES	String	0	0	255	Yes	Yes	No	No
IMG_VIEW	IMG_VIEW	String	0	0	255	Yes	Yes	No	No
SPECIAL	SPECIAL	Double	0	0	8	Yes	Yes	No	No
STATUS	STATUS	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID

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Shelters

Alias Shelters **Geometry:**Point

Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:6893.47146990811	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
FeatureID	FeatureID	String	0	0	16	Yes	Yes	No	No
Facility_Type	Facility_Type	String	0	0	50	Yes	Yes	No	No
Emer_Function	Emer_Function	String	0	0	50	Yes	Yes	No	No
Name	Name	String	0	0	50	Yes	Yes	No	No
Address	Address	String	0	0	40	Yes	Yes	No	No
City	City	String	0	0	20	Yes	Yes	No	No
Countyid	Countyid	String	0	0	4	Yes	Yes	No	No
County	County	String	0	0	24	Yes	Yes	No	No
Zip5	Zip5	String	0	0	5	Yes	Yes	No	No
Notes	Notes	String	0	0	64	Yes	Yes	No	No
Editdate	Editdate	Date	0	0	8	Yes	Yes	No	No
X	X	Double	0	0	8	Yes	Yes	No	No
Y	Y	Double	0	0	8	Yes	Yes	No	No
USNG	USNG	String	0	0	50	Yes	Yes	No	No
Facility_Desc	Facility_Desc	String	0	0	255	Yes	Yes	No	No
Publish	Publish	String	0	0	1	Yes	Yes	No	No
Surge	Surge	Small Integer	0	0	2	Yes	Yes	No	No
Elev	Elev	Single	0	0	4	Yes	Yes	No	No
Fire	Fire	String	0	0	1	Yes	Yes	No	No
Flood	Flood	String	0	0	3	Yes	Yes	No	No
Evac	Evac	String	0	0	1	Yes	Yes	No	No
Phase	Phase	String	0	0	5	Yes	Yes	No	No
Guide_Num	Guide_Num	Small Integer	0	0	2	Yes	Yes	No	No
Cnty_Type	Cnty_Type	String	0	0	15	Yes	Yes	No	No
NEAR_FID	NEAR_FID	Integer	0	0	4	Yes	Yes	No	No
NEAR_ANGLE	NEAR_ANGLE	Double	0	0	8	Yes	Yes	No	No
EVRoute_Mi	EVRoute_Mi	Single	0	0	4	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Facility_Type		FACILITY_TYPE
Emer_Function		EMER_FUNCTION
Countyid		COUNTY_FIPS
Facility_Desc		SHELTER_TYPE
Evac		Evac Zones

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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SLOSH_Basin

Alias	SLOSH_Basin	**Geometry:**Polygon
Dataset Type	FeatureClass	**Average Number of Points:**0
		Has M: No
FeatureType	Simple	**Has Z:**No
		Grid Size:2100

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
Poly_id	Poly_id	String	0	0	7	Yes	No	No	No
i_index	i_index	Small Integer	0	0	2	Yes	No	No	No
j_index	j_index	Small Integer	0	0	2	Yes	No	No	No
c1_mean	c1_mean	Single	0	0	4	Yes	No	No	No
c1_high	c1_high	Single	0	0	4	Yes	No	No	No
c2_mean	c2_mean	Single	0	0	4	Yes	No	No	No
c2_high	c2_high	Single	0	0	4	Yes	No	No	No
c3_mean	c3_mean	Single	0	0	4	Yes	No	No	No
c3_high	c3_high	Single	0	0	4	Yes	No	No	No
c4_mean	c4_mean	Single	0	0	4	Yes	No	No	No
c4_high	c4_high	Single	0	0	4	Yes	No	No	No
c5_mean	c5_mean	Single	0	0	4	Yes	No	No	No
c5_high	c5_high	Single	0	0	4	Yes	No	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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SurgeZones

Alias	SurgeZones	**Geometry:**Polygon
Dataset Type	FeatureClass	**Average Number of Points:**0
		Has M: No
FeatureType	Simple	**Has Z:**No
		Grid Size:16000

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
AREA	AREA	Double	0	0	8	Yes	Yes	No	No
PERIMETER	PERIMETER	Double	0	0	8	Yes	Yes	No	No
Cat	Cat	Small Integer	0	0	2	Yes	Yes	No	No

Acres	Acres	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
Cat		Surge Zones

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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Swamps

Alias	Swamps	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
		Has Z: Yes	
FeatureType	Simple	**Grid Size:**1100	
		Grid Size:9900	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
ComID	ComID	Integer	0	0	4	Yes	No	No	No
FDate	FDate	Date	0	0	8	Yes	Yes	No	No
Resolution	Resolution	Integer	0	0	4	Yes	No	No	No
GNIS_ID	GNIS_ID	String	0	0	10	Yes	Yes	No	No
GNIS_Name	GNIS_Name	String	0	0	65	Yes	Yes	No	No
AreaSqKm	AreaSqKm	Double	0	0	8	Yes	Yes	No	No
Elevation	Elevation	Double	0	0	8	Yes	Yes	No	No
ReachCode	ReachCode	String	0	0	14	Yes	Yes	No	No
FType	FType	Integer	0	0	4	Yes	No	No	No
FCode	FCode	Integer	0	0	4	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		
ComID	0	-
Resolution	2	Resolution
Elevation		ElevationRange
FType	390	Water Code Types
FCode	39004	-

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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TEA_Final

Alias	TEA_Final	**Geometry:**Polygon	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:27000	

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
IND_ID	IND_ID	String	0	0	4	Yes	No	No	No
TEA_NAME	TEA_NAME	String	0	0	50	Yes	No	No	No
Src_Type	Src_Type	String	0	0	4	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**
ObjectClass		

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE
IND_ID	Yes	No	IND_ID

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TEZ_Final

Alias	TEZ_Final	**Geometry:**Polygon
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No
FeatureType	Simple	**Has Z:**No **Grid Size:**7000

Field Name	**Alias**	**Type**	**Precn.**	**Scale**	**Length**	**Edit**	**Null**	**Req.**	**Domain Fixed**
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
SWTEZ	SWTEZ	Integer	0	0	4	Yes	Yes	No	No
RGN	RGN	Integer	0	0	4	Yes	Yes	No	No
CNTY	CNTY	Integer	0	0	4	Yes	Yes	No	No
STORM	STORM	String	0	0	7	Yes	Yes	No	No
FLOOD	FLOOD	String	0	0	7	Yes	Yes	No	No
FIRE	FIRE	String	0	0	5	Yes	Yes	No	No
PCAT1	PCAT1	Integer	0	0	4	Yes	Yes	No	No
PCAT2	PCAT2	Integer	0	0	4	Yes	Yes	No	No
PCAT3	PCAT3	Integer	0	0	4	Yes	Yes	No	No
PCAT4	PCAT4	Integer	0	0	4	Yes	Yes	No	No
PCAT5	PCAT5	Integer	0	0	4	Yes	Yes	No	No
PCAT6	PCAT6	Integer	0	0	4	Yes	Yes	No	No
DSSB_06	DSSB_06	Double	0	0	8	Yes	Yes	No	No
DMSB_06	DMSB_06	Double	0	0	8	Yes	Yes	No	No
DTSB_06	DTSB_06	Double	0	0	8	Yes	Yes	No	No
PCSSO_06	PCSSO_06	Double	0	0	8	Yes	Yes	No	No
PCMSO_06	PCMSO_06	Double	0	0	8	Yes	Yes	No	No
PCTSO_06	PCTSO_06	Double	0	0	8	Yes	Yes	No	No
ODSSB_06	ODSSB_06	Double	0	0	8	Yes	Yes	No	No
ODMSB_06	ODMSB_06	Double	0	0	8	Yes	Yes	No	No
ODTSB_06	ODTSB_06	Double	0	0	8	Yes	Yes	No	No
PHSSB_06	PHSSB_06	Double	0	0	8	Yes	Yes	No	No
PHMSB_06	PHMSB_06	Double	0	0	8	Yes	Yes	No	No
PHTSB_06	PHTSB_06	Double	0	0	8	Yes	Yes	No	No
PSSB_06	PSSB_06	Double	0	0	8	Yes	Yes	No	No
PMSB_06	PMSB_06	Double	0	0	8	Yes	Yes	No	No
PTSB_06	PTSB_06	Double	0	0	8	Yes	Yes	No	No
VHSSB_06	VHSSB_06	Double	0	0	8	Yes	Yes	No	No
VHMSB_06	VHMSB_06	Double	0	0	8	Yes	Yes	No	No
VHTSB_06	VHTSB_06	Double	0	0	8	Yes	Yes	No	No
VSSB_06	VSSB_06	Double	0	0	8	Yes	Yes	No	No
VMSB_06	VMSB_06	Double	0	0	8	Yes	Yes	No	No
VTSB_06	VTSB_06	Double	0	0	8	Yes	Yes	No	No
D_MB_06	D_MB_06	Double	0	0	8	Yes	Yes	No	No
PC_MO_06	PC_MO_06	Double	0	0	8	Yes	Yes	No	No
O_MB_06	O_MB_06	Double	0	0	8	Yes	Yes	No	No
PH_MO_06	PH_MO_06	Double	0	0	8	Yes	Yes	No	No
P_MB_06	P_MB_06	Double	0	0	8	Yes	Yes	No	No

VH_MB_06	VH_MB_06	Double	0	0	8	Yes	Yes	No	No
V_MB_06	V_MB_06	Double	0	0	8	Yes	Yes	No	No
HM_U_06	HM_U_06	Double	0	0	8	Yes	Yes	No	No
HM_O_06	HM_O_06	Double	0	0	8	Yes	Yes	No	No
HM_OU_06	HM_OU_06	Double	0	0	8	Yes	Yes	No	No
HM_PH_06	HM_PH_06	Double	0	0	8	Yes	Yes	No	No
HM_P_06	HM_P_06	Double	0	0	8	Yes	Yes	No	No
HM_VH_06	HM_VH_06	Double	0	0	8	Yes	Yes	No	No
HM_V_06	HM_V_06	Double	0	0	8	Yes	Yes	No	No
SH_CP_06	SH_CP_06	Double	0	0	8	Yes	Yes	No	No
DSSB_10	DSSB_10	Double	0	0	8	Yes	Yes	No	No
DMSB_10	DMSB_10	Double	0	0	8	Yes	Yes	No	No
DTSB_10	DTSB_10	Double	0	0	8	Yes	Yes	No	No
PCSSO_10	PCSSO_10	Double	0	0	8	Yes	Yes	No	No
PCMSO_10	PCMSO_10	Double	0	0	8	Yes	Yes	No	No
PCTSO_10	PCTSO_10	Double	0	0	8	Yes	Yes	No	No
ODSSB_10	ODSSB_10	Double	0	0	8	Yes	Yes	No	No
ODMSB_10	ODMSB_10	Double	0	0	8	Yes	Yes	No	No
ODTSB_10	ODTSB_10	Double	0	0	8	Yes	Yes	No	No
PHSSB_10	PHSSB_10	Double	0	0	8	Yes	Yes	No	No
PHMSB_10	PHMSB_10	Double	0	0	8	Yes	Yes	No	No
PHTSB_10	PHTSB_10	Double	0	0	8	Yes	Yes	No	No
PSSB_10	PSSB_10	Double	0	0	8	Yes	Yes	No	No
PMSB_10	PMSB_10	Double	0	0	8	Yes	Yes	No	No
PTSB_10	PTSB_10	Double	0	0	8	Yes	Yes	No	No
VHSSB_10	VHSSB_10	Double	0	0	8	Yes	Yes	No	No
VHMSB_10	VHMSB_10	Double	0	0	8	Yes	Yes	No	No
VHTSB_10	VHTSB_10	Double	0	0	8	Yes	Yes	No	No
VSSB_10	VSSB_10	Double	0	0	8	Yes	Yes	No	No
VMSB_10	VMSB_10	Double	0	0	8	Yes	Yes	No	No
VTSB_10	VTSB_10	Double	0	0	8	Yes	Yes	No	No
D_MB_10	D_MB_10	Double	0	0	8	Yes	Yes	No	No
PC_MO_10	PC_MO_10	Double	0	0	8	Yes	Yes	No	No
O_MB_10	O_MB_10	Double	0	0	8	Yes	Yes	No	No
PH_MO_10	PH_MO_10	Double	0	0	8	Yes	Yes	No	No
P_MB_10	P_MB_10	Double	0	0	8	Yes	Yes	No	No
VH_MB_10	VH_MB_10	Double	0	0	8	Yes	Yes	No	No
V_MB_10	V_MB_10	Double	0	0	8	Yes	Yes	No	No
HM_U_10	HM_U_10	Double	0	0	8	Yes	Yes	No	No
HM_O_10	HM_O_10	Double	0	0	8	Yes	Yes	No	No
HM_OU_10	HM_OU_10	Double	0	0	8	Yes	Yes	No	No
HM_PH_10	HM_PH_10	Double	0	0	8	Yes	Yes	No	No
HM_P_10	HM_P_10	Double	0	0	8	Yes	Yes	No	No
HM_VH_10	HM_VH_10	Double	0	0	8	Yes	Yes	No	No
HM_V_10	HM_V_10	Double	0	0	8	Yes	Yes	No	No
SH_CP_10	SH_CP_10	Double	0	0	8	Yes	Yes	No	No
DSSB_15	DSSB_15	Double	0	0	8	Yes	Yes	No	No
DMSB_15	DMSB_15	Double	0	0	8	Yes	Yes	No	No
DTSB_15	DTSB_15	Double	0	0	8	Yes	Yes	No	No

PCSSO_15	PCSSO_15	Double	0	0	8	Yes	Yes	No	No
PCMSO_15	PCMSO_15	Double	0	0	8	Yes	Yes	No	No
PCTSO_15	PCTSO_15	Double	0	0	8	Yes	Yes	No	No
ODSSB_15	ODSSB_15	Double	0	0	8	Yes	Yes	No	No
ODMSB_15	ODMSB_15	Double	0	0	8	Yes	Yes	No	No
ODTSB_15	ODTSB_15	Double	0	0	8	Yes	Yes	No	No
PHSSB_15	PHSSB_15	Double	0	0	8	Yes	Yes	No	No
PHMSB_15	PHMSB_15	Double	0	0	8	Yes	Yes	No	No
PHTSB_15	PHTSB_15	Double	0	0	8	Yes	Yes	No	No
PSSB_15	PSSB_15	Double	0	0	8	Yes	Yes	No	No
PMSB_15	PMSB_15	Double	0	0	8	Yes	Yes	No	No
PTSB_15	PTSB_15	Double	0	0	8	Yes	Yes	No	No
VHSSB_15	VHSSB_15	Double	0	0	8	Yes	Yes	No	No
VHMSB_15	VHMSB_15	Double	0	0	8	Yes	Yes	No	No
VHTSB_15	VHTSB_15	Double	0	0	8	Yes	Yes	No	No
VSSB_15	VSSB_15	Double	0	0	8	Yes	Yes	No	No
VMSB_15	VMSB_15	Double	0	0	8	Yes	Yes	No	No
VTSB_15	VTSB_15	Double	0	0	8	Yes	Yes	No	No
D_MB_15	D_MB_15	Double	0	0	8	Yes	Yes	No	No
PC_MO_15	PC_MO_15	Double	0	0	8	Yes	Yes	No	No
O_MB_15	O_MB_15	Double	0	0	8	Yes	Yes	No	No
PH_MO_15	PH_MO_15	Double	0	0	8	Yes	Yes	No	No
P_MB_15	P_MB_15	Double	0	0	8	Yes	Yes	No	No
VH_MB_15	VH_MB_15	Double	0	0	8	Yes	Yes	No	No
V_MB_15	V_MB_15	Double	0	0	8	Yes	Yes	No	No
HM_U_15	HM_U_15	Double	0	0	8	Yes	Yes	No	No
HM_O_15	HM_O_15	Double	0	0	8	Yes	Yes	No	No
HM_OU_15	HM_OU_15	Double	0	0	8	Yes	Yes	No	No
HM_PH_15	HM_PH_15	Double	0	0	8	Yes	Yes	No	No
HM_P_15	HM_P_15	Double	0	0	8	Yes	Yes	No	No
HM_VH_15	HM_VH_15	Double	0	0	8	Yes	Yes	No	No
HM_V_15	HM_V_15	Double	0	0	8	Yes	Yes	No	No
SH_CP_15	SH_CP_15	Double	0	0	8	Yes	Yes	No	No
D_UNIV	D_UNIV	Small Integer	0	0	2	Yes	Yes	No	No
SPEC_GEN	SPEC_GEN	Small Integer	0	0	2	Yes	Yes	No	No
ZIND	ZIND	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_1	EAZ_1	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_2	EAZ_2	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_3	EAZ_3	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_4	EAZ_4	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_5	EAZ_5	Small Integer	0	0	2	Yes	Yes	No	No

EAZ_6	EAZ_6	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_7	EAZ_7	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_8	EAZ_8	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_9	EAZ_9	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_10	EAZ_10	Small Integer	0	0	2	Yes	Yes	No	No
EAZ_11	EAZ_11	Small Integer	0	0	2	Yes	Yes	No	No
AREA	AREA	Double	0	0	8	Yes	Yes	No	No
Shape_Leng	Shape_Leng	Double	0	0	8	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape
SWTEZ	Yes	No	SWTEZ

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Tornado_Touchdown

Alias	Tornado_Touchdown	**Geometry:**Polyline	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:190000	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	No
Shape	Shape	Geometry	0	0	0	Yes	Yes	Yes	No
EventID	EventID	Integer	0	0	4	Yes	Yes	No	No
FID_1	FID_1	Integer	0	0	4	Yes	Yes	No	No
ONETOR_COU	ONETOR_COU	Double	0	0	8	Yes	Yes	No	No
YEAR_COUNT	YEAR_COUNT	Double	0	0	8	Yes	Yes	No	No
YEAR_	YEAR_	Double	0	0	8	Yes	Yes	No	No
MONTH_	MONTH_	Double	0	0	8	Yes	Yes	No	No
DAY_	DAY_	Double	0	0	8	Yes	Yes	No	No
DATE_	DATE_	Date	0	0	8	Yes	Yes	No	No
TIME_	TIME_	Double	0	0	8	Yes	Yes	No	No
TIME_ZONE	TIME_ZONE	Double	0	0	8	Yes	Yes	No	No
STATE	STATE	String	0	0	254	Yes	Yes	No	No
FIPS	FIPS	Double	0	0	8	Yes	Yes	No	No
STATE_NUMB	STATE_NUMB	Double	0	0	8	Yes	Yes	No	No
F_SCALE	F_SCALE	Double	0	0	8	Yes	Yes	No	No
INJURIES	INJURIES	Double	0	0	8	Yes	Yes	No	No

FATALITIES	FATALITIES	Double	0	0	8	Yes	Yes	No	No
LOSS	LOSS	Double	0	0	8	Yes	Yes	No	No
CROP_LOSS	CROP_LOSS	Double	0	0	8	Yes	Yes	No	No
SLAT	SLAT	Double	0	0	8	Yes	Yes	No	No
SLON	SLON	Double	0	0	8	Yes	Yes	No	No
ELAT	ELAT	Double	0	0	8	Yes	Yes	No	No
ELON	ELON	Double	0	0	8	Yes	Yes	No	No
LENGTH	LENGTH	Double	0	0	8	Yes	Yes	No	No
WIDTH	WIDTH	Double	0	0	8	Yes	Yes	No	No
NS	NS	Double	0	0	8	Yes	Yes	No	No
SN	SN	Double	0	0	8	Yes	Yes	No	No
SG	SG	Double	0	0	8	Yes	Yes	No	No
F1	F1	Double	0	0	8	Yes	Yes	No	No
F2	F2	Double	0	0	8	Yes	Yes	No	No
F3	F3	Double	0	0	8	Yes	Yes	No	No
F4	F4	Double	0	0	8	Yes	Yes	No	No

Subtype Name	**Default Value**	**Domain**

ObjectClass

Index Name	**Ascending**	**Unique**	**Fields**
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_Shape	No	No	Shape

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Vulnerable_CFI_302

Alias	CFI_Haz_302	**Geometry:**Point	
Dataset Type	FeatureClass	**Average Number of Points:**0	
		Has M: No	
FeatureType	Simple	**Has Z:**No	
		Grid Size:12351.0510319158	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
PRIME	PRIME	Integer	0	0	4	Yes	No	No	No
FacilityNa	FacilityNa	String	0	0	100	Yes	No	No	No
SICCode	SICCode	String	0	0	4	Yes	No	No	No
SICCode2	SICCode2	String	0	0	50	Yes	No	No	No
NAICSCode	NAICSCode	String	0	0	6	Yes	No	No	No
RCRACode	RCRACode	String	0	0	20	Yes	No	No	No
RCRACode2	RCRACode2	String	0	0	50	Yes	No	No	No
NPDESCode	NPDESCode	String	0	0	20	Yes	No	No	No
NPDESCode2	NPDESCode2	String	0	0	50	Yes	No	No	No
UICCode	UICCode	String	0	0	20	Yes	No	No	No
UICCode2	UICCode2	String	0	0	50	Yes	No	No	No
DunBradstr	DunBradstr	String	0	0	50	Yes	No	No	No
DunBrads_1	DunBrads_1	String	0	0	50	Yes	No	No	No
TRICode	TRICode	String	0	0	20	Yes	No	No	No
EPACode	EPACode	String	0	0	50	Yes	No	No	No
EPACode2	EPACode2	String	0	0	50	Yes	No	No	No
Address	Address	String	0	0	50	Yes	No	No	No
City	City	String	0	0	50	Yes	No	No	No
State	State	String	0	0	2	Yes	No	No	No
Zipcode	Zipcode	String	0	0	12	Yes	No	No	No
County	County	String	0	0	50	Yes	No	No	No
LEPC	LEPC	Integer	0	0	4	Yes	No	No	No
Latitude	Latitude	Double	0	0	8	Yes	No	No	No
Longitude	Longitude	Double	0	0	8	Yes	No	No	No
InactiveDa	InactiveDa	Date	0	0	8	Yes	Yes	No	No
ActiveDate	ActiveDate	Date	0	0	8	Yes	Yes	No	No
SalePendin	SalePendin	Small Integer	0	0	2	Yes	No	No	No
ArchiveBox	ArchiveBox	String	0	0	50	Yes	No	No	No
Sec304	Sec304	Small Integer	0	0	2	Yes	No	No	No
Sec302	Sec302	Small Integer	0	0	2	Yes	No	No	No
Date_	Date_	Date	0	0	8	Yes	Yes	No	No
PaymentID	PaymentID	Integer	0	0	4	Yes	No	No	No
Retraction	Retraction	Date	0	0	8	Yes	Yes	No	No
Sec311	Sec311	Small Integer	0	0	2	Yes	No	No	No

Sec313	Sec313	Small Integer	0	0	2	Yes	No	No	No
Sec112r	Sec112r	Small Integer	0	0	2	Yes	No	No	No
Date1	Date1	Date	0	0	8	Yes	Yes	No	No
rLevel	rLevel	String	0	0	50	Yes	No	No	No
rExemptor	rExemptor	String	0	0	50	Yes	No	No	No
OriginalDa	OriginalDa	Date	0	0	8	Yes	Yes	No	No
ProgramLev	ProgramLev	Integer	0	0	4	Yes	No	No	No
DeRegistra	DeRegistra	Date	0	0	8	Yes	Yes	No	No
Parent	Parent	String	0	0	75	Yes	No	No	No
ParentD_B	ParentD_B	String	0	0	21	Yes	No	No	No
Comments	Comments	String	0	0	254	Yes	No	No	No
SercCode	SercCode	String	0	0	33	Yes	No	No	No
FirstLette	FirstLette	String	0	0	1	Yes	No	No	No
HASiteVisi	HASiteVisi	Date	0	0	8	Yes	Yes	No	No
NOAFlag	NOAFlag	Small Integer	0	0	2	Yes	No	No	No
PlotSource	PlotSource	String	0	0	50	Yes	No	No	No
USNG	USNG	String	0	0	22	Yes	No	No	No
Surge	Surge	Small Integer	0	0	2	Yes	No	No	No
Evac	Evac	String	0	0	2	Yes	No	No	No
Flood	Flood	String	0	0	5	Yes	No	No	No
Fire	Fire	String	0	0	2	Yes	No	No	No
Elev	Elev	Single	0	0	4	Yes	No	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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Vulnerable_CFI_Health

Alias	Vulnerable_CFI_Health	**Geometry:**Point
Dataset Type	FeatureClass	**Average Number of Points:**0 **Has M:**No
FeatureType	Simple	**Has Z:**No **Grid Size:**2356.196303725

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	No	No	No
GnisID	GnisID	Double	0	0	8	Yes	No	No	No
CFI_Type	Facility_T	String	0	0	50	Yes	No	No	No
Emer_Funct	Emer_Funct	String	0	0	50	Yes	No	No	No

Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	No	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	No	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No
EditorName	EditorName	String	0	0	50	Yes	No	No	No
X	X	Double	0	0	8	Yes	No	No	No
Y	Y	Double	0	0	8	Yes	No	No	No
USNG	USNG	String	0	0	50	Yes	No	No	No
DEM_Elev	DEM_Elev	Single	0	0	4	Yes	No	No	No
Surge	Surge	Small Integer	0	0	2	Yes	No	No	No
Evac	Evac	String	0	0	2	Yes	No	No	No
Flood	Flood	String	0	0	5	Yes	No	No	No
Fire	Fire	String	0	0	1	Yes	No	No	No
Detail	Detail	String	0	0	46	Yes	No	No	No
Facility_Type	Facility_Type	String	0	0	10	Yes	Yes	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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Vulnerable_CFI_Other

Alias	CFI_Other	**Geometry:** Point	
Dataset Type	FeatureClass	**Average Number of Points:** 0	
		Has M: No	
		Has Z: No	
FeatureType	Simple	**Grid Size:** 1628.42238604318	

Field Name	Alias	Type	Precn.	Scale	Length	Edit	Null	Req.	Domain Fixed
OBJECTID	OBJECTID	OID	0	0	4	No	No	Yes	Yes
SHAPE	SHAPE	Geometry	0	0	0	Yes	Yes	Yes	Yes
FeatureID	FeatureID	String	0	0	16	Yes	No	No	No
GnisID	GnisID	Double	0	0	8	Yes	No	No	No
CFI_Type	Facility_T	String	0	0	50	Yes	No	No	No
Emer_Funct	Emer_Funct	String	0	0	50	Yes	No	No	No
Name	Name	String	0	0	128	Yes	No	No	No
Address	Address	String	0	0	40	Yes	No	No	No
City	City	String	0	0	35	Yes	No	No	No
County	County	String	0	0	4	Yes	No	No	No
Zip	Zip	String	0	0	5	Yes	No	No	No
Notes	Notes	String	0	0	128	Yes	No	No	No
EditDate	EditDate	Date	0	0	8	Yes	Yes	No	No

EditorName	EditorName	String	0	0	50	Yes	No	No	No
X	X	Double	0	0	8	Yes	No	No	No
Y	Y	Double	0	0	8	Yes	No	No	No
USNG	USNG	String	0	0	50	Yes	No	No	No
DEM_Elev	DEM_Elev	Single	0	0	4	Yes	No	No	No
Evac	Evac	String	0	0	2	Yes	No	No	No
Surge	Surge	Small Integer	0	0	2	Yes	No	No	No
Fire	Fire	String	0	0	1	Yes	No	No	No
Flood	Flood	String	0	0	6	Yes	No	No	No
Detail	Detail	String	0	0	26	Yes	No	No	No

Subtype Name	Default Value	Domain
ObjectClass		

Index Name	Ascending	Unique	Fields
FDO_OBJECTID	Yes	Yes	OBJECTID
FDO_SHAPE	No	No	SHAPE

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Spatial References

Dimension	Minimum	Precision
Lines		
X	-5120900	10000
Y	-9998100	
M	-100000	10000
Z	-100000	10000

Coordinate System Description
PROJCS["NAD_1983_UTM_Zone_17N",GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",500000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-81.0],PARAMETER["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0.0],UNIT["Meter",1.0]],VERTCS["NAVD_1988",VDATUM["North_American_Vertical_Datum_1988"],PARAMETER["Vertical_Shift",0.0],PARAMETER["Direction",1.0],UNIT["Meter",1.0]]

Dimension	Minimum	Precision
Points		
X	-5120900	10000
Y	-9998100	
M	-100000	10000
Z	-100000	10000

Coordinate System Description
PROJCS["NAD_1983_UTM_Zone_17N",GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",500000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-81.0],PARAMETER["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0.0],UNIT["Meter",1.0]],VERTCS["NAVD_1988",VDATUM["North_American_Vertical_Datum_1988"],PARAMETER["Vertical_Shift",0.0],PARAMETER["Direction",1.0],UNIT["Meter",1.0]]

Dimension	Minimum	Precision
Polygons		
X	-5120900	10000
Y	-9998100	
M	-100000	10000
Z	-100000	10000

Coordinate System Description
PROJCS["NAD_1983_UTM_Zone_17N",GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",500000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-

81.0],PARAMETER["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0.0],UNIT["Meter",1.0]],VERTCS["NAVD_1988",VDATUM["North_American_Vertical_Datum_1988"],PARAMETER["Vertical_Shift",0.0],PARAMETER["Direction",1.0],UNIT["Meter",1.0]]		
Source_CriticalFacilities		
X	-5120900	10000
Y	-9998100	
M	-100000	10000
Z	-100000	10000
Coordinate System Description PROJCS["NAD_1983_UTM_Zone_17N",GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",500000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-81.0],PARAMETER["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0.0],UNIT["Meter",1.0]],VERTCS["NAVD_1988",VDATUM["North_American_Vertical_Datum_1988"],PARAMETER["Vertical_Shift",0.0],PARAMETER["Direction",1.0],UNIT["Meter",1.0]]		

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Appendix A

Evacuation Transportation Model Data Dictionary

File Name: BTC.dbf
File Type: dBase file
Scenario Specific: No
I/O: Input

Attribute	Definition
TIME	Sequential numbers of half-hour time segments over a 96 hour period: starting segment is assumed to represent 7:00 AM on an average Monday
FC1IN	Capacity adjustment factors for rural interstates inside of evacuating counties
FC2IN	Capacity adjustment factors for rural other principal arterials inside of evacuating counties
FC6IN	Capacity adjustment factors for rural minor arterials inside of evacuating counties
FC7IN	Capacity adjustment factors for rural major collectors inside of evacuating counties
FC8IN	Capacity adjustment factors for rural minor collectors inside of evacuating counties
FC9IN	Capacity adjustment factors for rural local streets inside of evacuating counties
FC11IN	Capacity adjustment factors for urban interstates inside of evacuating counties
FC12IN	Capacity adjustment factors for urban non-interstate freeways inside of evacuating counties
FC14IN	Capacity adjustment factors for urban other principal arterials inside of evacuating counties
FC16IN	Capacity adjustment factors for urban minor arterials inside of evacuating counties
FC17IN	Capacity adjustment factors for urban collectors inside of evacuating counties
FC19IN	Capacity adjustment factors for urban local streets inside of evacuating counties

Attribute	Definition
FC1OUT	Capacity adjustment factors for rural interstates outside of evacuating counties
FC2OUT	Capacity adjustment factors for rural other principal arterials outside of evacuating counties
FC6OUT	Capacity adjustment factors for rural minor arterials outside of evacuating counties
FC7OUT	Capacity adjustment factors for rural major collectors outside of evacuating counties
FC8OUT	Capacity adjustment factors for rural minor collectors outside of evacuating counties
FC9OUT	Capacity adjustment factors for rural local streets outside of evacuating counties
FC11OUT	Capacity adjustment factors for urban interstates outside of evacuating counties
FC12OUT	Capacity adjustment factors for urban non-interstate freeways outside of evacuating counties
FC14OUT	Capacity adjustment factors for urban other principal arterials outside of evacuating counties
FC17OUT	Capacity adjustment factors for urban collectors outside of evacuating counties
FC19OUT	Capacity adjustment factors for urban local streets outside of evacuating counties
FC99	Capacity adjustments for centroid connectors

File Name: CNTRFLW.dbf
File Type: dBase file
Scenario Specific: Yes
I/O: Input

Attribute	Definition
CPLAN	Code number indicating the specific reverse lane operations plan being referenced: 1=I-10 Westbound from Jacksonville, 2=SR 528 Westbound from Brevard County, 3=Florida Turnpike Northbound from Palm Beach County, 4=I-4 Eastbound from Tampa, 5=I-75 (Alligator Alley) Westbound from Broward County, 6=I-75 (Alligator Alley) Eastbound from Collier County, 7=I-75 Northbound from Tampa
ACTV	Code indicating whether a particular reverse lane operations plan is active: 1=Active, 0=Inactive

File Name: Control.dbf
File Type: dBase file
Scenario Specific: Yes
I/O: Input

Attribute	Definition
CNTY	County numeric codes specifically developed for this model.
EVAC	Binary code determining whether or not an evacuation order is given: 1=evacuate, 0=do not evacuate
PCT100RP	Binary code determining whether or not to use 100% response rates for an evacuation: 1=100% response, 0=response rates from the SRESP behavioral survey
STRMCAT	Evacuation event level: 1=Level A, 2=Level B, 3=Level C, 4=Level D, 5=Level E
RESPONSE	Response curve to be used for the evacuation scenario: 1=6 hours, 2=9 hours, 3=12 hours, 4=18 hours, 5=24 hours, 6=36 hours
NOGO	Binary code determining whether the county is an acceptable out-of-county destination for evacuation trips: 1=Prohibit out-of-county destinations, 0=allow out-of-county destinations
TRINCL	Binary code determining whether to include tourist population in the evacuation: 1=Include tourists, 0=do not include tourists
TROVRD	Binary code determining whether to override default tourist occupancy rates: 1=override default rates, 0=use default rates included in the zone data
TRRTE	Percent occupancy of tourist dwelling units to be used if default rates are overridden: values range from 0-100 in increments of 5
PHASE	Determines when a particular county begins its evacuation relative to hour one of the evacuation event: 1=hour 1, 2=hour 3, 3=hour 6, 4=hour 9, 5=hour 12, 6=hour 15, 7=hour 18, 8=hour 21, 9=hour 24, 10=hour 27

File Name: Network
File Type: GeoDatabase feature
Scenario Specific: Yes
I/O: Input

Attribute	Definition
A	A node number
B	B node number
SHAPE_LENGTH	Length of shape feature in meters
UID	Unique identification number
ONEWAY	Whether facility is one-way coded: 1=one-way, 0=two-way
ROAD_NAME	Name of road
STATE	Name of State
DISTRICT_1	FDOT district numbers; out of state links are numbered 10 and above
FTYPE_06	Facility types for 2006
ATYPE_06	Area types for 2006
LANE_06	Number of lanes for 2006
COUNTY_TXT	County name
COUNTY_NUM	County code number developed for this model
RPC_TXT	Region name
RPC_NUM	Region code number developed for this model
EVAC_RTE	Whether the link is part of an evacuation route: 1=evacuation route, 0=not an evacuation route
CAP	Place holder for hourly lane capacities
DENSITY	Vehicles per lane per mile at standstill conditions (This attribute is overridden by a hard coded default in the

Attribute	Definition
	model)
CONTRA_PLN	Number identifying the one-way flow operations plan that the link belongs to
CONTRA_LNS	Lanes available under one-way flow operations: -1 =no lanes available, >0 =1.66 adjustment to standard capacity during one-way flow operations
FTYPE_15	Facility types for 2015
ATYPE_15	Area types for 2015
LANE_15	Number of lanes for 2015
FTYPE_10	Facility types for 2010
ATYPE_10	Area types for 2010
LANE_10	Number of lanes for 2010
RGN_1	Identifies links present in the regional assignment model for the Apalachee region: 1=link is included, 0=link is not included
RGN_2	Identifies links present in the regional assignment model for the Central Florida region: 1=link is included, 0=link is not included
RGN_3	Identifies links present in the regional assignment model for the East Central Florida region: 1=link is included, 0=link is not included
RGN_4	Identifies links present in the regional assignment model for the North Central Florida region: 1=link is included, 0=link is not included
RGN_5	Identifies links present in the regional assignment model for the Northeast Florida region: 1=link is included, 0=link is not included
RGN_6	Identifies links present in the regional assignment model for the South Florida region: 1=link is included, 0=link is not included
RGN_7	Identifies links present in the regional assignment model for the Southwest Florida region: 1=link is included,

Attribute	Definition
	0=link is not included
RGN_8	Identifies links present in the regional assignment model for the Tampa Bay region: 1=link is included, 0=link is not included
RGN_9	Identifies links present in the regional assignment model for the Treasure Coast region: 1=link is included, 0=link is not included
RGN_10	Identifies links present in the regional assignment model for the West Florida region: 1=link is included, 0=link is not included
RGN_11	Identifies links present in the regional assignment model for the Withlacoochee region: 1=link is included, 0=link is not included
EZONE	Identifies the evacuation zone that the link is in: 1=Zone A, 2=Zone B, 3=Zone C, 4=Zone D, 5=Zone E, 6=inland of evacuation zones
FLKEYCAP	Hourly lane capacity for links in the Florida Keys
FLKEYBAK	Indicates whether the link should use the background traffic curves for US 1 in the Florida Keys: 1=use Florida Keys specific curve, 0=do not use Florida Keys specific curve
MSEG	Segment ID number consistent with segments of US 1 in Monroe County identified in the FDOT memo dated xxxxx (see Apendix X)
MMKEYCAP	Hourly lane capacity for links in the Florida Keys found in the Miller Model (these are here for comparative purposes only)
MMKEYLN	Number of lanes for links in the Florida Keys found in the Miller Model (these are here for comparative purposes only)

File Name: LOADED.NET
File Type: Cube Binary Network
Scenario Specific: Yes
I/O: Output

Attribute	Definition
A	A node number
B	B node number
UID	Unique identification number
ONEWAY	Whether facility is one-way coded: 1=one-way, 0=two-way
SPEED	Place holder for free-flow speeds
ROAD_NAME	Name of road
STATE	Name of State
DISTRICT_1	FDOT district numbers
FTYPE_06	Facility types for 2006
ATYPE_06	Area types for 2006
LANE_06	Number of lanes for 2006
COUNTY_TXT	County name
COUNTY_NUM	County code number developed for this model
RPC_TXT	Region name
RPC_NUM	Region code number developed for this model
EVAC_RTE	Whether the link is part of an evacuation route: 1=evacuation route, 0=not an evacuation route
CAP	Hourly lane capacity
DENSITY	Vehicles per lane per mile at standstill conditions (This attribute is overridden by a hard coded default in the model)

Attribute	Definition
CONTRA_PLN	Number identifying the one-way flow operations plan that the link belongs to
CONTRA_LNS	Lanes available under one-way flow operations: -1 =no lanes available, >0 =1.66 adjustment to standard capacity during one-way flow operations
FTYPE_15	Facility types for 2015
ATYPE_15	Area types for 2015
LANE_15	Number of lanes for 2015
FTYPE_10	Facility types for 2010
ATYPE_10	Area types for 2010
LANE_10	Number of lanes for 2010
DISTANCE	Distance in miles
RGN_1	Identifies links present in the regional assignment model for the Apalachee region: 1=link is included, 0=link is not included
RGN_2	Identifies links present in the regional assignment model for the Central Florida region: 1=link is included, 0=link is not included
RGN_3	Identifies links present in the regional assignment model for the East Central Florida region: 1=link is included, 0=link is not included
RGN_4	Identifies links present in the regional assignment model for the North Central Florida region: 1=link is included, 0=link is not included
RGN_5	Identifies links present in the regional assignment model for the Northeast Florida region: 1=link is included, 0=link is not included
RGN_6	Identifies links present in the regional assignment model for the South Florida region: 1=link is included, 0=link is not included
RGN_7	Identifies links present in the regional assignment model

Attribute	Definition
	for the Southwest Florida region: 1=link is included, 0=link is not included
RGN_8	Identifies links present in the regional assignment model for the Tampa Bay region: 1=link is included, 0=link is not included
RGN_9	Identifies links present in the regional assignment model for the Treasure Coast region: 1=link is included, 0=link is not included
RGN_10	Identifies links present in the regional assignment model for the West Florida region: 1=link is included, 0=link is not included
RGN_11	Identifies links present in the regional assignment model for the Withlacoochee region: 1=link is included, 0=link is not included
EZONE	Identifies the evacuation zone that the link is in: 1=Zone A, 2=Zone B, 3=Zone C, 4=Zone D, 5=Zone E, 6=inland of evacuation zones
FLKEYCAP	Hourly lane capacity for links in the Florida Keys
FLKEYBAK	Indicates whether the link should use the background traffic curves for US 1 in the Florida Keys: 1=use Florida Keys specific curve, 0=do not use Florida Keys specific curve
MSEG	Segment ID number consistent with segments of US 1 in Monroe County identified in the FDOT memo dated xxxxx (see Apendix X)
MMKEYCAP	Hourly lane capacity for links in the Florida Keys found in the Miller Model (these are here for comparative purposes only)
MMKEYLN	Number of lanes for links in the Florida Keys found in the Miller Model (these are here for comparative purposes only)
FFTIME	Free flow travel time in minutes
UROADFACTOR	Capacity adjustment factor used to establish a new capacity for use in the model's volume delay function to set the tolerance travelers have for congestion before

Attribute	Definition
	diverting to seek a faster route
CONFAC	Capacity conversion factor used to convert hourly capacities to daily capacities
BPRCOEFFICIENT	The coefficient of the Bureau of Public Roads volume delay function (this attribute is disregarded in the model)
BPREXPONENT	The exponent of the Bureau of Public Roads volume delay function (this attribute is disregarded in the model)
FC	Functional class
TIME_16	Average event congested travel time in minutes
VC_16	Volume-to-capacity ratio (not a valid attribute in AVENUE assignments)
CSPD_16	Average event congested speed
VDT_16	Event vehicle-miles traveled
VHT_16	Event vehicle-hours traveled
VSMP_16	Event total evacuation vehicles
TIMES*_16	Travel time in minutes per time segment (the * represents the time segment and ranges from 1-196 in sequential order)
SPEEDS*_16	Speed per time segment (the * represents the time segment and ranges from 1-196 in sequential order)
VS*_16	Number of vehicles for all volume sets entering the link per time segment (the * represents the time segment and ranges from 1-196 in sequential order)
QUEUEVS*_16	Number of vehicles queuing on the link per time segment (the * represents the time segment and ranges from 1-196 in sequential order)
BLOCKVS*_16	Number of vehicles in the queue remaining on the link after the simulation has ended per time segment (should be 0)(the * represents the time segment and ranges from 1-196 in sequential order)
VITS*_16	Number of vehicles passing through or queuing on the

Attribute	Definition
	link per time segment (the * represents the time segment and ranges from 1-196 in sequential order)
V1S*_16	Number of vehicles for volume set 1 (the model only uses one volume set) entering the link per time segment (the * represents the time segment and ranges from 1-196 in sequential order)

File Name: MasterResponse.dbf
File Type: dBase file
Scenario Specific: No
I/O: Input

Attribute	Definition
HOUR	Number of half-hour time segment for a 36 hour period
6HR	Factors for a 6 hour response curve
9HR	Factors for a 9 hour response curve
12HR	Factors for a 12 hour response curve
18HR	Factors for an 18 hour response curve
24HR	Factors for a 24 hour response curve
36HR	Factors for a 36 hour response curve

File Name: OOCMaster.dbf
File Type: dBase file
Scenario Specific: No
I/O: Input

Attribute	Definition
RGN	Region code number specific to this model
SHLTR	Percent of out-of-county trips destined for public shelter
FRFAM	Percent of out-of-county trips destined for friends and family
HOTMOT	Percent of out-of-county trips destined for hotel/motel
OTHER	Percent of out-of-county trips destined for other destinations
NOGO	Attribute not used

File Name: PA_DIST_*.dbf
File Type: dBase file
Scenario Specific: Yes
I/O: Output

Attribute	Definition
OBJECTID	Record number
Z	TEZ number
FFICP	Friends and family in-county productions
PSICP	Public shelter in-county productions
HMICP	Hotel/motel in-county productions
OTICP	Other in-county productions
FFOCP	Friends and family out-of-county productions
PSOCP	Public shelter out-of -county productions
HMOCP	Hotel/motel out-of -county productions
OTOCP	Other out-of -county productions
RGN	Region code
CNTY	County code
FFICA	Friends and family in-county attractions
PSICA	Public shelter in-county attractions
HMICA	Hotel/motel in-county attractions
OTICA	Other in-county attractions
FFOCA	Friends and family out-of-county attractions
PSOCA	Public shelter out-of -county attractions
HMOCA	Hotel/motel out-of -county attractions
OTOCA	Other out-of -county attractions

File Name: Shelters
File Type: GeoDatabase Feature
Scenario Specific: Yes
I/O: Input

Attribute	**Definition**
OBJECTID	Record number
NAME	Name of shelter
ADDRESS	Street address where shelter is located
CITY	City where shelter is located
ZIP	Five digit ZIP code
CAPACITY	Amount of people that can take refuge at the shelter given in terms of beds
STATUS	Code indicating the type of shelter: 1=Primary shelter, 2=Other shelter
SWTEZ	The number of the TEZ in which the shelter is located
COUNTY	Code indicating the county in which the shelter is located
TYPE	Text indicating whether the shelter is PRIMARY or OTHER
CNTY_NAME	Name of the county in which the shelter is located
Active	Code indicating whether the shelter is open or closed: 1=Open, 0=Closed

File Name: TEZ
File Type: GeoDatabase Feature
Scenario Specific: Yes
I/O: Input

Attribute	Definition
OBJECTID	Record number
SWTEZ	TEZ number
RGN	Region code
CNTY	County code
STORM	Percent of households in a storm surge area (attribute is not used)
FLOOD	Percent of households in an inland flood area (attribute is not used in the model)
FIRE	Percent of households in an area expected to be affected by forest fire (attribute is not used in the model)
PCAT1	Percent of households in evacuation zone A
PCAT2	Percent of households in evacuation zone B
PCAT3	Percent of households in evacuation zone C
PCAT4	Percent of households in evacuation zone D
PCAT5	Percent of households in evacuation zone E
PCAT6	Percent of households not located in an evacuation zone
DSSB_06	Number of site-built dwelling units 2006 – single family
DMSB_06	Number of site-built dwelling units 2006 – multi-family
DTSB_06	Number of site-built dwelling units 2006 – total
PCSSO_06	Percent of site-built dwelling units occupied during 2006 – single family
PCMSO_06	Percent of site-built dwelling units occupied during 2006 – multi-family
PCTSO_06	Percent of site-built dwelling units occupied during 2006 – total

Attribute	Definition
ODSSB_06	Number of occupied site-built dwelling units 2006 – single family
ODMSB_06	Number of occupied site-built dwelling units 2006 – multi-family
ODTSB_06	Number of occupied site-built dwelling units 2006 – total
PHSSB_06	Persons per occupied site-built dwelling unit 2006 – single family
PHMSB_06	Persons per occupied site-built dwelling unit 2006 – multi-family
PHTSB_06	Persons per occupied site-built dwelling unit 2006 – total
PSSB_06	Population in occupied site-built dwelling units 2006 – single family
PMSB_06	Population in occupied site-built dwelling units 2006 – multi-family
PTSB_06	Population in occupied site-built dwelling units 2006 – total
VHSSB_06	Vehicles per occupied site-built dwelling unit 2006 – single family
VHMSB_06	Vehicles per occupied site-built dwelling unit 2006 – multi-family
VHTSB_06	Vehicles per occupied site-built dwelling unit 2006 – total
VSSB_06	Number of vehicles in occupied site-built dwelling units 2006 – single family
VMSB_06	Number of vehicles in occupied site-built dwelling units 2006 – multi-family
VTSB_06	Number of vehicles in occupied site-built dwelling units 2006 – total
D_MB_06	Number of mobile homes 2006
PC_MO_06	Percent of mobile homes occupied during 2006
O_MB_06	Number of occupied mobile homes 2006
PH_MO_06	Persons per occupied mobile home 2006
P_MB_06	Population in occupied mobile homes 2006
VH_MB_06	Vehicles per occupied mobile home 2006
V_MB_06	Number of vehicles in occupied mobile homes 2006
HM_U_06	Number of hotel-motel units 2006

Attribute	Definition
HM_O_06	Hotel-motel occupancy rates 2006
HM_OU_06	Number of occupied hotel-motel units 2006
HM_PH_06	Persons per occupied hotel-motel unit 2006
HM_P_06	Population in occupied hotel-motel units 2006
HM_VH_06	Vehicles per occupied hotel-motel unit 2006
HM_V_06	Number of vehicles in occupied hotel-motel units 2006
SH_CP_06	Shelter capacity (number of persons) 2006
DSSB_10	Number of site-built dwelling units 2010 – single family
DMSB_10	Number of site-built dwelling units 2010 – multi-family
DTSB_10	Number of site-built dwelling units 2010 – total
PCSSO_10	Percent of site-built dwelling units occupied during 2010 – single family
PCMSO_10	Percent of site-built dwelling units occupied during 2010 – multi-family
PCTSO_10	Percent of site-built dwelling units occupied during 2010 – total
ODSSB_10	Number of occupied site-built dwelling units 2010 – single family
ODMSB_10	Number of occupied site-built dwelling units 2010 – multi-family
ODTSB_10	Number of occupied site-built dwelling units 2010 – total
PHSSB_10	Persons per occupied site-built dwelling unit 2010 – single family
PHMSB_10	Persons per occupied site-built dwelling unit 2010 – multi-family
PHTSB_10	Persons per occupied site-built dwelling unit 2010 – total
PSSB_10	Population in occupied site-built dwelling units 2010 – single family
PMSB_10	Population in occupied site-built dwelling units 2010 – multi-family
PTSB_10	Population in occupied site-built dwelling units 2010 – total
VHSSB_10	Vehicles per occupied site-built dwelling unit 2010 – single family
VHMSB_10	Vehicles per occupied site-built dwelling unit 2010 – multi-family

Attribute	Definition
VHTSB_10	Vehicles per occupied site-built dwelling unit 2010 – total
VSSB_10	Number of vehicles in occupied site-built dwelling units 2010 – single family
VMSB_10	Number of vehicles in occupied site-built dwelling units 2010 – multi-family
VTSB_10	Number of vehicles in occupied site-built dwelling units 2010 – total
D_MB_10	Number of mobile homes 2010
PC_MO_10	Percent of mobile homes occupied during 2010
O_MB_10	Number of occupied mobile homes 2010
PH_MO_10	Persons per occupied mobile home 2010
P_MB_10	Population in occupied mobile homes 2010
VH_MB_10	Vehicles per occupied mobile home 2010
V_MB_10	Number of vehicles in mobile homes 2010
HM_U_10	Number of hotel-motel units 2010
HM_O_10	Hotel-motel occupancy rates 2010
HM_OU_10	Number of occupied hotel-motel units 2010
HM_PH_10	Persons per occupied hotel-motel unit 2010
HM_P_10	Population in occupied hotel-motel units 2010
HM_VH_10	Vehicles per occupied hotel-motel unit 2010
HM_V_10	Number of vehicles in occupied hotel-motel units 2010
SH_CP_10	Shelter capacity (number of persons) 2010
DSSB_15	Number of site-built dwelling units 2015 – single family
DMSB_15	Number of site-built dwelling units 2015 – multi-family
DTSB_15	Number of site-built dwelling units 2015 – total
PCSSO_15	Percent of site-built dwelling units occupied during 2015 – single family

Attribute	Definition
PCMSO_15	Percent of site-built dwelling units occupied during 2015 – multi-family
PCTSO_15	Percent of site-built dwelling units occupied during 2015 – total
ODSSB_15	Number of occupied site-built dwelling units 2015 – single family
ODMSB_15	Number of occupied site-built dwelling units 2015 – multi-family
ODTSB_15	Number of occupied site-built dwelling units 2015 – total
PHSSB_15	Persons per occupied site-built dwelling unit 2015 – single family
PHMSB_15	Persons per occupied site-built dwelling unit 2015 – multi-family
PHTSB_15	Persons per occupied site-built dwelling unit 2015 – total
PSSB_15	Population in occupied site-built dwelling units 2015 – single family
PMSB_15	Population in occupied site-built dwelling units 2015 – multi-family
PTSB_15	Population in occupied site-built dwelling units 2015 – total
VHSSB_15	Vehicles per occupied site-built dwelling unit 2015 – single family
VHMSB_15	Vehicles per occupied site-built dwelling unit 2015 – multi-family
VHTSB_15	Vehicles per occupied site-built dwelling unit 2015 – total
VSSB_15	Number of vehicles in occupied site-built dwelling units 2015 – single family
VMSB_15	Number of vehicles in occupied site-built dwelling units 2015 – multi-family
PC_MO_15	Percent of mobile homes occupied during 2015
O_MB_15	Number of occupied mobile homes 2015
PH_MO_15	Persons per occupied mobile home 2015
P_MB_15	Population in occupied mobile homes 2015
VH_MB_15	Vehicles per occupied mobile home 2015
V_MB_15	Number of vehicles in mobile homes 2015
HM_U_15	Number of hotel-motel units 2015
HM_O_15	Hotel-motel occupancy rates 2015

Attribute	Definition
HM_OU_15	Number of occupied hotel-motel units 2015
HM_PH_15	Persons per occupied hotel-motel unit 2015
HM_P_15	Population in occupied hotel-motel units 2015
HM_VH_15	Vehicles per occupied hotel-motel unit 2015
HM_V_15	Number of vehicles in occupied hotel-motel units 2015
SH_CP_15	Shelter capacity (number of persons) 2015
D_UNIV	Number of college dormitory rooms
EAZ_1	EAZ number used to aggregate assignment zones for the Apalachee region model
EAZ_2	EAZ number used to aggregate assignment zones for the Central Florida region model
EAZ_3	EAZ number used to aggregate assignment zones for the East Central Florida region model
EAZ_4	EAZ number used to aggregate assignment zones for the North Central Florida region model
EAZ_5	EAZ number used to aggregate assignment zones for the Northeast Florida region model
EAZ_6	EAZ number used to aggregate assignment zones for the South Florida region model
EAZ_7	EAZ number used to aggregate assignment zones for the Southwest Florida region model
EAZ_8	EAZ number used to aggregate assignment zones for the Tampa Bay region model
EAZ_9	EAZ number used to aggregate assignment zones for the Treasure Coast region model
EAZ_10	EAZ number used to aggregate assignment zones for the West Florida region model
EAZ_11	EAZ number used to aggregate assignment zones for the Withlacoochee region model

File Name: TripRatesMaster.dbf
File Type: dBase file
Scenario Specific: No
I/O: Input

Attribute	Definition
CNTY	County code number
HOME	Determines whether home type is site-built or mobile home: 1=site-built, 2=mobile home
RATE	Determines the type of rate described in the CAT1 through CAT5 columns: 1=evacuation rate, 2=public shelter destination rate, 3=out-of-county destination rate, 4=vehicle use rate, 5=friends and family destination rate, 6=hotel/motel destination rate, 7=other destination rate
ZNCAT	Evacuation zone category: 1=Zone A, 2=Zone B, 3=Zone C, 4=Zone D, 5=Zone E
CAT1	Rates taking affect during an evacuation Level A event (expressed as hundredths [e.g 55=0.55])
CAT2	Rates taking affect during an evacuation Level B event (expressed as hundredths [e.g 55=0.55])
CAT3	Rates taking affect during an evacuation Level C event (expressed as hundredths [e.g 55=0.55])
CAT4	Rates taking affect during an evacuation Level D event (expressed as hundredths [e.g 55=0.55])
CAT5	Rates taking affect during an evacuation Level E event (expressed as hundredths [e.g 55=0.55])
IND	Indexing code not used by the model

Appendix B

Traffic Flow Rates for Emergency Evacuation in the Florida Keys

Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

1000 NW 111th Avenue
Miami, Florida 33172

STEPHANIE C. KOPELOUSOS
SECRETARY

June 18, 2010

Craig Diamond
Florida Department of Community Affairs
Division of Community Planning
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Re: Traffic Flow Rates for Emergency Evacuation in the Florida Keys

Dear Mr. Diamond:

Pursuant to your request, the Florida Department of Transportation (FDOT) was asked to provide Traffic Flow Rates for Emergency Evacuation in the Florida Keys for the Florida Department of Community Affairs' (DCA) update of the 2001 Florida Keys evacuation model. Based on our analysis, FDOT has identified "Maximum Sustainable Traffic Flow Rates per Functional Evacuation Lane" for hurricane evacuation purposes for use when conducting evacuation traffic analyses on US-1 in the Florida Keys. Please see the attached tables recommended for use in evacuation planning analyses in the Florida Keys. Table 2A identifies the existing lane configuration of US-1. Table 2B provides the maximum flow rates that could be reasonably sustained under extended periods of time for evacuation-level of demand per each segment identified.

The efforts undertaken to determine these rates included a site-specific capacity study in which traffic flow data were collected and analyzed under a variety of demand conditions. A comprehensive review of traffic conditions that have occurred during other hurricane evacuations in Florida, specifically the Florida Keys, as well as in the State of Louisiana, was also conducted.

Our studies incorporated data over a 10-year period since the original 2001 Keys Evacuation Study was conducted. Most importantly, this data includes observational studies of actual hurricane evacuations that have added to our understanding of traffic operations under mass evacuation demand conditions.

Should you have any questions or require additional information, please do not hesitate to contact me, or Ms. Barbara Culhane, AICP, Senior Project Manager, at (305) 470-5200.

Sincerely,

Aileen Boucle, AICP
District Six PLEMO Administrator

CC: Sandy Meyer, DEM
Rebecca Jetton, DCA
Jeff Alexander, NERFC
Richard Ogburn, SFRPC
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Debora Rivera, FDOT
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Omar Meitin, FDOT
Barbara Culhane, FDOT
Phil Steinmiller, FDOT

TABLE 2A
Roadway Configuration on US Highway 1 (Overseas Highway) and CR 905/Card Sound Road in the Florida Keys, Monroe County, Florida

Area	Milemarkers		Location/Description	Year 2010 Configuration
	From	To		
Lower Keys	2.0	4.0	Key West to Stock Island	4L
Lower Keys	4.0	9.0	Stock Island to Big Coppitt Key	4LD
Lower Keys	9.0	17.0	Big Coppitt Key to Sugarloaf Key	2L
Lower Keys	17.0	22.0	Sugarloaf Key to Cudjoe Key	2L
Lower Keys	22.0	24.0	Cudjoe Key to Summerland Key Cove Airport	2L
Lower Keys	24.0	25.0	Summerland Key Cove Airport to Summerland Key	3L
Lower Keys	25.0	30.0	Summerland Key to Big Pine Key	2L
Lower Keys	30.0	34.0	Big Pine Key to West Summerland Keys	2L
Lower Keys	34.0	35.2	West Summerland Keys to Spanish Harbor Keys	2L
Lower Keys	35.2	36.5	Spanish Harbor Keys to Bahia Honda Bridge	4LD
Lower Keys	36.5	37.5	Bahia Honda Bridge to Bahia Honda Key	2L
Middle Keys	37.5	47.0	Bahia Honda Key to Hog Key	2L
Middle Keys	47.0	48.0	Hog Key to Boot Key	2L
Middle Keys	48.0	50.2	Boot Key to Marathon	4L
Middle Keys	50.2	50.8	Marathon to Marathon Shores	5L
Middle Keys	50.8	54.0	Marathon Shores to Key Colonial Beach	4LD
Middle Keys	54.0	54.5	Key Colonial Beach to Deer Key	4LD
Middle Keys	54.5	58.0	Deer Key to Grassy Key	2L
Upper Keys	58.0	74.0	Grassy Key to Matecumbe Harbor	2L
Upper Keys	74.0	80.0	Matecumbe Harbor to Teatable Key	2L
Upper Keys	80.0	83.5	Teatable Key to Islamorada	3L
Upper Keys	83.5	85.6	Islamorada to Windley Key	2L
Upper Keys	85.6	90.0	Windley Key to Plantation Key	2L
Upper Keys	90.0	100.0	Tavernier Key to Newport Key	4LD
Upper Keys	100.0	105.0	Newport Key to Sexton Cove	4LD
Upper Keys	105.0	106.3	Sexton Cove to Rattlesnake Key	4LD
Upper Keys	106.3	126.5	Rattlesnake Key to Card Sound Rd	2L/4L
South Dade	126.5	HEFT	Card Sound Rd to HEFT	4LD
Upper Keys	106.3	Int CR 905 / CR 905 A	Lake Surprise to Crocodile Lake	2L
Upper Keys	Ocean Reef	Int CR 905 / CR 905 A	Tanglefish Key to Crocodile Lake	2L
Upper Keys	Int CR 905 / CR 905 A	US 1	Crocodile Lake to South Miami-Dade	2L

LEGEND

- 2L Two-lane facility
- 2L/4L Two lanes with short four-lane sections for passing purposes
- 3L Three-lane facility (center lane is a two-way left-turn lane)
- 4L Four-lane undivided facility
- 4LD Four-lane divided facility
- 5L Five-lane facility (center lane is a two-way left-turn lane)

TABLE 2B

Maximum Sustainable Traffic Flow Rates per Functional Evacuation Lane for Hurricane Evacuation Purposes US Highway 1 (Overseas Highway) and CR 905/Card Sound Road in the Florida Keys, Monroe County, Florida

Area	Milemarkers		Location/Description	Suggested Maximum Sustainable Flow Rate per Hour per Functional Evacuation Lane
	From	To		
Lower Keys	2.0	4.0	Key West to Stock Island	900
Lower Keys	4.0	9.0	Stock Island to Big Coppitt Key	900
Lower Keys	9.0	17.0	Big Coppitt Key to Sugarloaf Key	1,100
Lower Keys	17.0	22.0	Sugarloaf Key to Cudjoe Key	1,100
Lower Keys	22.0	24.0	Cudjoe Key to Summerland Key Cove Airport	1,100
Lower Keys	24.0	25.0	Summerland Key Cove Airport to Summerland Key	1,100
Lower Keys	25.0	30.0	Summerland Key to Big Pine Key	1,100
Lower Keys	30.0	34.0	Big Pine Key to West Summerland Keys	1,050
Lower Keys	34.0	35.2	West Summerland Keys to Spanish Harbor Keys	1,100
Lower Keys	35.2	36.5	Spanish Harbor Keys to Bahia Honda Bridge	1,100
Lower Keys	36.5	37.5	Bahia Honda Bridge to Bahia Honda Key	1,100
Middle Keys	37.5	47.0	Bahia Honda Key to Hog Key	1,200
Middle Keys	47.0	48.0	Hog Key to Boot Key	1,100
Middle Keys	48.0	50.2	Boot Key to Marathon	900
Middle Keys	50.2	50.8	Marathon to Marathon Shores	900
Middle Keys	50.8	54.0	Marathon Shores to Key Colonial Beach	900
Middle Keys	54.0	54.5	Key Colonial Beach to Deer Key	900
Middle Keys	54.5	58.0	Deer Key to Grassy Key	1,100
Upper Keys	58.0	74.0	Grassy Key to Matecumbe Harbor	1,100
Upper Keys	74.0	80.0	Matecumbe Harbor to Teatable Key	1,100
Upper Keys	80.0	83.5	Teatable Key to Islamorada	1,100
Upper Keys	83.5	85.6	Islamorada to Windley Key	1,100
Upper Keys	85.6	90.0	Windley Key to Plantation Key	1,100
Upper Keys	90.0	100.0	Tavernier Key to Newport Key	900
Upper Keys	100.0	105.0	Newport Key to Sexton Cove	900
Upper Keys	105.0	106.3	Sexton Cove to Rattlesnake Key	900
Upper Keys	106.3	126.5	Rattlesnake Key to Card Sound Rd	1,200
South Dade	126.5	HEFT	Card Sound Rd to HEFT	900
Upper Keys	106.3	Int CR 905 / CR 905 A	Lake Surprise to Crocodile Lake	1,100
Upper Keys	Ocean Reef	Int CR 905 / CR 905 A	Tanglefish Key to Crocodile Lake	1,100
Upper Keys	Int CR 905 / CR 905 A	US 1	Crocodile Lake to South Miami-Dade	1,100

NOTES

A Functional Evacuation Lane has a pavement width of at least 10 feet

The above flow rates are maximum values that are expected to be sustained for extended periods (more than 8 hours). During night conditions, these flow rates may be lower than the ones shown above.

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Appendix C

Evacuation Transportation Model County and Region Codes

County Codes for the SRESP Evacuation Model

Code	County
1	Calhoun
2	Franklin
3	Gadsden
4	Gulf
5	Jackson
6	Jefferson
7	Leon
8	Liberty
9	Wakulla
10	DeSoto
11	Hardee
12	Highlands
13	Okeechobee
14	Polk
15	Brevard
16	Lake
17	Orange
18	Osceola
19	Seminole
20	Volusia
21	Alachua
22	Bradford
23	Columbia
24	Dixie
25	Gilchrist
26	Hamilton
27	Lafayette
28	Madison
29	Suwannee
30	Taylor
31	Union
32	Baker
33	Clay
34	Duval
35	Flagler
36	Nassau
37	Putnam
38	St Johns
74	Camden, GA
75	Glynn, GA
39	Broward

Code	County
40	Miami-Dade
41	Monroe
68	Key West
69	Lower Keys
70	Middle Keys
71	Upper Keys
42	Charlotte
43	Collier
44	Glades
45	Hendry
46	Lee
47	Sarasota
48	Hillsborough
49	Manatee
50	Pasco
51	Pinellas
52	Indian River
53	Martin
54	Palm Beach
55	St Lucie
56	Bay
57	Escambia
58	Holmes
59	Okaloosa
60	Santa Rosa
61	Walton
62	Washington
72	Baldwin, AL
73	Mobile, AL
63	Citrus
64	Hernando
65	Levy
66	Marion
67	Sumter

Region Codes for the SRESP Evacuation Model

Code	Region
1	Apalachee
2	Central
3	East Central
4	North Central
5	Northeast
6	South
7	Southwest
8	Tampa Bay
9	Treasure Coast
10	West
11	Withlacoochee

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