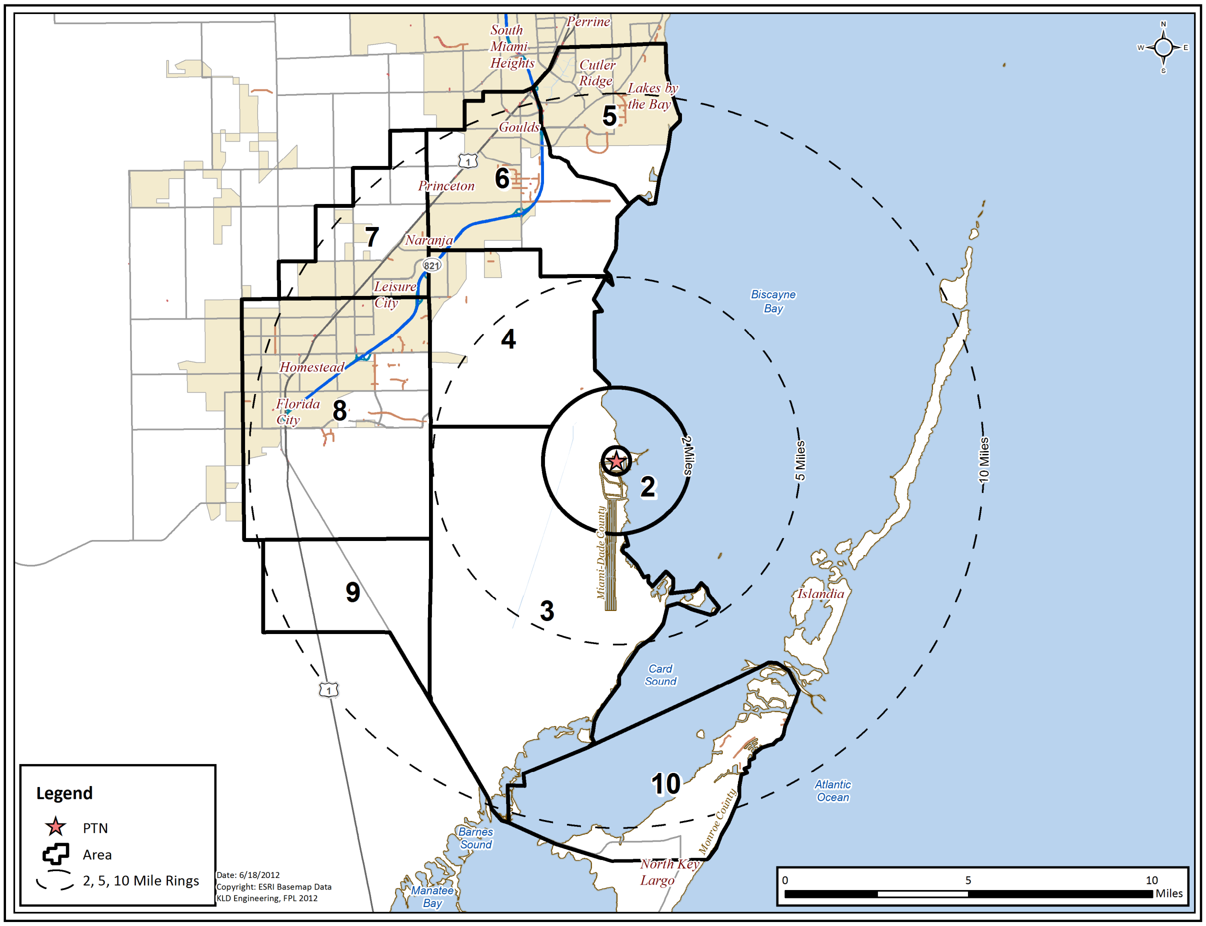
Supplemental Information 1

Turkey Point Nuclear Power Plant Evacuation Time Estimate

Turkey Point Nuclear Power Plant

Development of Evacuation Time Estimates



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April 15, 2015 **Corrected Final Report, Revision 4** **KLD TR – 509**

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EXECUTIVE SUMMARY

This report describes the analyses undertaken and the results obtained by a study to develop Evacuation Time Estimates (ETE) for the Turkey Point Nuclear Power Plant (PTN) located approximately 25 miles south of Miami, Florida. ETE are part of the required planning basis and provide Florida Power & Light Company (FPL) and State and local governments with site-specific information needed for protective action decision-making.

In the performance of this effort, guidance is provided by documents published by Federal Governmental agencies. Most important of these are:

- Criteria for Development of Evacuation Time Estimate Studies, NUREG/CR-7002, December 2011.
- Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654/FEMA-REP-1, Rev. 1, November 1980.
- Development of Evacuation Time Estimates for Nuclear Power Plants, NUREG/CR-6863, January 2005.
- 10CFR50, Appendix E – "Emergency Planning and Preparedness for Production and Utilization Facilities"

<u>Overview of Project Activities</u>

This project began in April 2008 with Revision 0 of the ETE report (KLD Technical Report 428) completed in April 2009. Requests for additional information (RAIs) were generated by the NRC during their review of Revision 0. Responses to the RAIs were submitted to the NRC and incorporated into Revision 1 of the ETE report completed in September 2010. Revision 2 of the ETE report was completed in August 2011 and incorporated RAI responses generated by the NRC's review of Revision 1 in April 2011. In February 2012, the study was updated to address the new NRC emergency planning rule and ETE guidance published in December 2011. The 2012 effort resulted in a new report (Technical Report 509 – TR-509 – Revision 3 for this project) which incorporated data from the previous studies, and is applicable for the operational Units 3 & 4 and the proposed Units 6 & 7. This report (Revision 4 to TR-509) incorporates RAI responses submitted to the NRC based on their review of Revision 3, as well as new evacuation regions and ETE sensitivity studies requested by Miami-Dade County.

The major activities performed during this project are briefly described in chronological sequence:

- Attended "kick-off" meetings with FPL personnel and emergency management personnel representing state and county governments.
- Accessed U.S. Census Bureau data files for the year 2010. Studied Geographical Information Systems (GIS) maps of the area in the vicinity of the PTN, then conducted a

detailed field survey of the highway network.

- Synthesized this information to create an analysis network representing the highway system topology and capacities within the emergency planning zone (EPZ), plus a shadow region covering the region between the EPZ boundary and approximately 15 miles radially from the plant.
- Designed and sponsored a telephone survey of residents within the EPZ to gather focused data needed for this ETE study that were not contained within the census database. The survey instrument was reviewed and modified by the licensee and offsite response organization (ORO) personnel prior to the survey.
- In 2009, a comprehensive data gathering was undertaken with the assistance of the emergency management agencies (EMAs) for Miami-Dade and Monroe Counties to identify employee, transient and special facility data for the EPZ in support of the ETE study for the combined license application (COLA). The data gathered were reviewed and updated accordingly by the county EMAs. Telephone calls to specific facilities supplemented the data provided.
- The traffic demand and trip-generation rates of evacuating vehicles were estimated from the gathered data. The trip generation rates reflected the estimated mobilization time (i.e., the time required by evacuees to prepare for the evacuation trip) computed using the results of the telephone survey of EPZ residents.
- Following federal guidelines, the EPZ is subdivided into 10 areas. These areas are then grouped within circular areas or "keyhole" configurations (circles plus radial sectors) that define a total of 23 evacuation regions.
- The time-varying external circumstances are represented as evacuation scenarios, each described in terms of the following factors: (1) Season (Summer, Winter); (2) Day of Week (Midweek, Weekend); (3) Time of Day (Midday, Evening); and (4) Weather (Good or Rain). One special event scenario – NASCAR championship race at the Homestead-Miami Speedway – was considered. One roadway impact scenario was considered wherein a single lane was closed on the Florida Turnpike northbound for the duration of the evacuation.
- Staged evacuation was considered for those regions wherein the 5 mile radius and sectors downwind to the EPZ boundary were evacuated.
- As per NUREG/CR-7002, the planning basis for the calculation of ETE is:
    - A rapidly escalating accident at the PTN that quickly assumes the status of General Emergency such that the advisory to evacuate (ATE) is virtually coincident with the siren alert, and no early protective actions have been implemented.
    - While an unlikely accident scenario, this planning basis will yield ETE, measured as the elapsed time from the ATE until the stated percentage of the population

exits the impacted Region, that represent "upper bound" estimates. This conservative planning basis is applicable for all initiating events.

- If the emergency occurs while schools are in session, the ETE study assumes that the children will be evacuated by bus directly to reception centers or host schools located outside the EPZ. Parents, relatives, and neighbors are advised to not pick up their children at school prior to the arrival of the buses dispatched for that purpose. The ETE for schoolchildren are calculated separately.
- Evacuees who do not have access to a private vehicle will either ride-share with relatives, friends or neighbors, or be evacuated by buses provided as specified in the county evacuation plans. Those in special facilities will likewise be evacuated with public transit, as needed: bus, van, or ambulance, as required. Separate ETE are calculated for the transit-dependent evacuees, for homebound special needs population, and for those evacuated from special facilities.

Computation of ETE

A total of 276 ETEs were computed for the evacuation of the general public. Each ETE quantifies the aggregate evacuation time estimated for the population within one of the 23 evacuation regions to evacuate from that Region, under the circumstances defined for one of the 12 evacuation scenarios (23 x 12 = 276). Separate ETE are calculated for transit-dependent evacuees, including schoolchildren for applicable scenarios.

Except for region R03, which is the evacuation of the entire EPZ, only a portion of the people within the EPZ would be advised to evacuate. That is, the advisory to evacuate applies only to those people occupying the specified impacted region. It is assumed that 100 percent of the people within the impacted region will evacuate in response to this advisory. The people occupying the remainder of the EPZ outside the impacted region may be advised to take shelter.

The computation of ETE assumes that 20% of the population within the EPZ but outside the impacted region, will elect to "voluntarily" evacuate. In addition, 20% of the population in the shadow region will also elect to evacuate. These voluntary evacuees could impede those who are evacuating from within the impacted region. The impedance that could be caused by voluntary evacuees is considered in the computation of ETE for the impacted region.

Staged evacuation is considered wherein those people within the 5-mile region evacuate immediately, while those beyond 5 miles, but within the EPZ, shelter-in-place. Once 90% of the 5-mile region is evacuated, those people beyond 5 miles begin to evacuate. Note that the federal guidance suggests staged evacuation of the 2-mile regions and sectors downwind to 5 miles. However, Miami-Dade and Monroe Counties only consider keyhole evacuations wherein the 5-mile region and sectors downwind to the EPZ boundary evacuate. As per federal guidance, 20% of people beyond 5 miles will evacuate (non-compliance) even though they are advised to shelter-in-place.

The computational procedure is outlined as follows:

- A link-node representation of the highway network is coded. Each link represents a unidirectional length of highway; each node usually represents an intersection or merge point. The capacity of each link is estimated based on the field survey observations and on established traffic engineering procedures.
- The evacuation trips are generated at locations called "zonal centroids" located within the EPZ and shadow region. The trip generation rates vary over time reflecting the mobilization process, and from one location (centroid) to another depending on population density and on whether a centroid is within, or outside, the impacted area.
- The evacuation model computes the routing patterns for evacuating vehicles that are compliant with federal guidelines (outbound relative to the location of the PTN), then simulates the traffic flow movements over space and time. This simulation process estimates the rate that traffic flow exits the impacted region.

The ETE statistics provide the elapsed times for 90 percent and 100 percent, respectively, of the population within the impacted region, to evacuate from within the impacted region. These statistics are presented in tabular and graphical formats. The 90th percentile ETE have been identified as the values that should be considered when making protective action decisions because the 100th percentile ETE are prolonged by those relatively few people who take longer to mobilize. This is referred to as the "evacuation tail" in Section 4.0 of NUREG/CR-7002.

The use of a public outreach (information) program to emphasize the need for evacuees to minimize the time needed to prepare to evacuate (secure the home, assemble needed clothes, medicines, etc.) should also be considered.

Traffic Management

This study references the comprehensive traffic management plans provided by Miami-Dade and Monroe Counties, and identifies critical intersections.

Selected Results

A compilation of selected information is presented on the following pages in the form of Figures and Tables extracted from the body of the report; these are described below.

- Figure 6-1 displays a map of the PTN EPZ showing the layout of the 10 areas that comprise, in aggregate, the EPZ.
- Table 3-1 presents the estimates of permanent resident population in each Area based on the 2010 Census data.
- Table 6-1 defines each of the 23 evacuation regions in terms of their respective groups of Areas.
- Table 6-2 lists the evacuation scenarios considered.
- Tables 7-1 and 7-2 are compilations of ETE. These data are the times needed to clear the indicated regions of 90 and 100 percent of the population occupying these regions, respectively. These computed ETE include consideration of mobilization time and of estimated voluntary evacuations from other regions within the EPZ and from the Shadow Region.

- Tables 7-3 and 7-4 present ETE for the 5-mile region for un-staged and staged evacuations for the 90th and 100th percentiles, respectively.
- Table 8-7 presents ETE for the schoolchildren in good weather.
- Table 8-10 presents ETE for the transit-dependent population in good weather.
- Figure H-8 presents an example of an evacuation region (region R08) to be evacuated under the circumstances defined in Table 6-1. Maps of all regions are provided in Appendix H.

Conclusions

- General population ETE were computed for 276 unique cases – a combination of 23 unique Evacuation Regions and 12 unique evacuation scenarios. Table 7-1 and Table 7-2 document these ETE for the 90th and 100th percentiles. These ETE range from 1:20 (hr:min) to 8:20 at the 90th percentile and 2:00 to 11:45 at the 100th percentile.
- Inspection of Table 7-1 and Table 7-2 indicates that the ETE for the 100th percentile are significantly longer than those for the 90th percentile. This is the result of the congestion within the EPZ. When the roadway system becomes congested, traffic exits the EPZ at rates somewhat below capacity until some evacuation routes have cleared. As more routes clear, the aggregate rate of egress slows since many vehicles have already left the EPZ. Towards the end of the process, relatively few evacuation routes service the remaining demand. See Figures 7-8 through 7-19.
- Inspection of Tables 7-1 through 7-4 indicates that staged evacuation would be beneficial for evacuating the population within the 5-mile region of PTN. The ETE for the 5-mile region are significantly longer when evacuating additional areas beyond 5 miles due to the routing of vehicles from beyond 5 miles into the 5-mile region to access the Florida Turnpike. Although staged evacuation is disadvantageous to those beyond 5 miles, it does expedite the evacuation of those evacuees from within the 5-mile region.
- Comparison of scenarios 8 (winter, weekend, midday) and 11 (winter, weekend, midday, NASCAR race) in Table 7-2 indicates that the special event has a material effect (increases of as much as 2 hours and 30 minutes) on the 100th percentile ETE for regions that evacuate beyond 5 miles from the plant. See Section 7.5 for additional discussion.
- Comparison of scenarios 1 and 12 in Table 7-1 indicates that the roadway closure – one lane northbound on the Florida Turnpike from the interchange with US 1 to the interchange with the Don Shula Expressway – does have a material impact on 90th percentile ETE for keyhole regions with wind toward the north and west (Regions R07 through R11) and for the full EPZ (Region R03), with up to 1 hour and 20 minute increases in ETE. See Section 7.5 for additional discussion.
- U.S. Highway 1, Krome Ave, and the Florida Turnpike northbound are the most congested evacuation routes. The last location in the EPZ to exhibit traffic congestion is Krome Ave. All congestion within the EPZ clears by 9 hours and 40 minutes after the ATE. See Section 7.3 and Figures 7-3 through 7-7.

- Separate ETE were computed for schools, medical facilities, transit-dependent persons, homebound special needs persons and correctional facilities. The average single-wave ETE for these facilities are comparable to the general population ETE at the 90th percentile. See Section 8.
- Table 8-5 summarizes the transportation resources that are required to evacuate the transit-dependent population. If a second wave of transportation resources is required, the average two-wave ETE for buses do exceed the general population ETE for region R03 at the 90th percentile. See Sections 8.4 and 8.5.
- The current traffic management plans for Miami-Dade and Monroe Counties are sufficient and this study has not identified any necessary changes to the plans.
- The general population ETE at the 90th and 100th percentiles are insensitive to reductions in the base trip generation time of 8 hours due to the traffic congestion within the EPZ. See Table M-1.
- The general population ETE is sensitive to increased shadow evacuation. Tripling the shadow evacuation percentage increases 90th percentile and 100th percentile ETE by 55 minutes and 1 hour and 40 minutes, respectively. See Table M-2.
- The ETE for the full EPZ (Region R03) is sensitive to changes in population growth. A full ETE update would be needed for population growth of 6% or more between decennial Censuses. See Table M-3.
- Because of the planned traffic treatments to be implemented during the construction of Units 6 and 7, the ETE for the two-mile region is not materially impacted – 15 minute decreases for the 90th percentile ETE. However, the 90th and 100th percentile ETE for the full EPZ increases by 3:10 and 3:40, respectively, due to the significant increase in permanent resident and shadow populations due to the extrapolation to year 2019. See Table M-4.
- The 90th and 100th percentile ETE for boaters in the Biscayne Bay within regions R01, R02 and R03 are comparable to the vehicular ETE for their respective regions in Table 7-1 and Table 7-2. See Section 7.5.
- At the request of Miami-Dade County, sensitivity studies were considered wherein contraflow was implemented on Krome Ave, the Miami-Dade Busway, and the Florida Turnpike. The ETE for the full EPZ is reduced at the 90th and 100th percentiles (see Table M-5) as follows:
    - Miami-Dade Busway only: Reduction of 55 and 65 minutes, respectively
    - Krome Avenue only: Reduction of 20 and 90 minutes, respectively
    - Florida Turnpike only: Reduction of 70 and 65 minutes, respectively
    - Miami-Dade Busway, Krome Avenue and Florida Turnpike: Reduction of 115 and 90 minutes, respectively.
- When considering the NRC recommendation to use the 90th percentile ETE for making protective action decisions and the manpower/equipment needed to implement contraflow, the contraflow of the Florida Turnpike only would be the most beneficial contraflow option. See Table M-6.

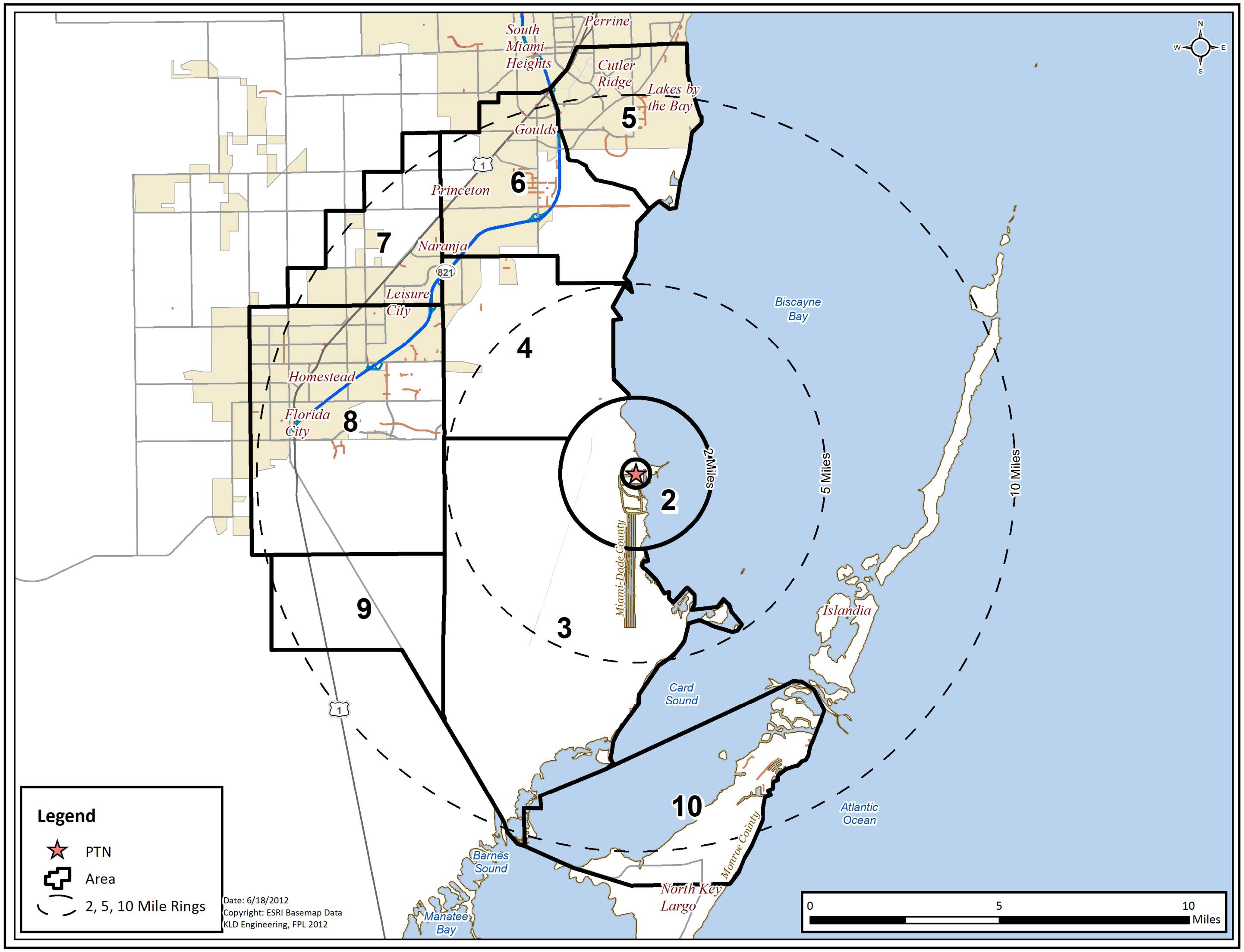


Figure 6-1. PTN EPZ Areas

Table 3-1. EPZ Permanent Resident Population

Area	2000 Population	2010 Population
1	0	0
2	0	0
3	0	0
4	5,217	7,506
5	33,753	44,816
6	29087	43,313
7	15,288	20,153
8	55,982	89,322
9	409	116
10	932	1,103
TOTAL	**140,668**	**206,329**
EPZ Population Growth:		**46.68%**

Table 6-1. Description of Evacuation Regions

Region	Description	Area										EAS Message
		1	2	3	4	5	6	7	8	9	10	
R01	2-Mile Ring	x	x									E14/E15
R02	5-Mile Ring	x	x	x	x							E16/E17
R03	Full EPZ	x	x	x	x	x	x	x	x	x	x	E29
Evacuate 5-Mile Radius and Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area**										
		1	2	3	4	5	6	7	8	9	10	**EAS Message**
R04	N	x	x	x	x	x	x	x				E23/E27
R05	NNE	x	x	x	x	x	x					E24/E28
N/A	NE, ENE, E, ESE, SE, SSE, S	**Refer to Region R02**										5 & 9
R06	SSW	x	x	x	x					x		E25
R07	SW, WSW	x	x	x	x				x	x		E20
R08	W	x	x	x	x			x	x	x		N/A
R09	WNW, NW	x	x	x	x		x	x	x			E22/E26
R10	NNW	x	x	x	x	x	x	x	x			N/A
Site Specific Region												
Region	**Wind Direction Towards:**	**Area**										
		1	2	3	4	5	6	7	8	9	10	**EAS Message**
R11	-	x	x	x	x		x	x	x	x		N/A
Staged Evacuation - 5-Mile Radius Evacuates, then Evacuate Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area**										
		1	2	3	4	5	6	7	8	9	10	**EAS Message**
R12	Full EPZ	x	x	x	x	x	x	x	x	x	x	N/A
R13	N	x	x	x	x	x	x	x				N/A
R14	NNE	x	x	x	x	x	x					N/A
N/A	NE, ENE, E, ESE, SE, SSE, S	**Refer to Region R02**										N/A
R15	SSW	x	x	x	x					x		N/A
R16	SW, WSW	x	x	x	x				x	x		N/A
R17	W	x	x	x	x			x	x	x		N/A
R18	WNW, NW	x	x	x	x		x	x	x			N/A
R19	NNW	x	x	x	x	x	x	x	x			N/A
R20	-	x	x	x	x		x	x	x	x		N/A
Additional Miami-Dade County Requested Regions												
Region	**Wind Direction Towards:**	**Area**										
		1	2	3	4	5	6	7	8	9	10	**EAS Message**
R21	-	x	x	x						x		E18
R22	-	x	x	x					x	x		E19
R23	-	x	x	x	x			x	x			E21
Shelter-in-Place until 90% ETE for R02, then Evacuate				Area(s) Shelter-in-Place					Area(s) Evacuate			

Table 6-2. Evacuation Scenario Definitions

Scenario	Season[1]	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, Weekend	Evening	Good	None
11	Winter	Weekend	Midday	Good	NASCAR Race at Homestead-Miami Speedway
12	Summer	Midweek	Midday	Good	Roadway Impact – Lane Closure on Florida Turnpike NB

[1] Winter assumes that school is in session (also applies to spring and autumn). Summer assumes that school is not in session.

Table 7-1. Time to Clear the Indicated Area of *90* Percent of the Affected Population

	Summer		Summer		Summer	Winter		Winter		Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Region	Midday		Midday		Evening	Midday		Midday		Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather	Rain	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	1:35	1:35	1:20	1:20	1:20	1:35	1:35	1:20	1:20	1:20	1:20	1:35
R02	3:10	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:20	3:05
R03	6:40	7:20	6:00	6:20	5:45	6:45	7:25	6:00	6:30	5:45	8:20	8:00
5-Mile Region and Keyhole to EPZ Boundary												
R04	4:25	4:55	4:05	4:25	3:50	4:25	4:45	4:10	4:30	4:00	4:25	4:45
R05	4:05	4:25	3:45	4:00	3:45	4:10	4:25	3:55	4:05	3:40	4:10	4:30
R06	2:30	2:30	2:20	2:25	2:40	2:30	2:35	2:20	2:25	2:35	2:20	2:25
R07	5:05	5:20	4:25	4:35	4:20	5:10	5:35	4:30	4:40	4:25	6:45	6:00
R08	6:00	6:20	5:15	5:25	4:40	6:05	6:35	5:15	5:45	5:00	7:45	7:10
R09	6:35	6:35	5:40	6:10	5:25	6:35	7:05	5:50	6:15	5:25	8:05	7:50
R10	6:40	6:40	6:10	6:25	5:40	6:40	7:30	6:10	7:00	5:50	8:35	7:55
Site Specific Regions												
R11	6:35	7:05	5:40	6:05	5:20	6:40	7:00	5:50	6:15	5:35	8:10	7:40
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	7:30	7:50	7:20	7:50	7:20	7:25	8:00	7:20	7:45	7:20	N/A	8:05
R13	6:05	6:20	6:00	6:15	6:00	6:00	6:15	6:00	6:15	6:10		6:10
R14	5:55	6:10	6:00	6:10	6:00	5:55	6:05	6:00	6:10	5:55		6:05
R15	4:25	4:25	4:20	4:25	4:30	4:20	4:20	4:20	4:20	4:25		4:20
R16	6:10	6:20	6:15	6:25	6:05	6:10	6:30	6:05	6:20	6:05		6:35
R17	7:05	7:15	6:50	7:15	7:10	6:55	7:15	6:50	7:10	6:55		7:30
R18	7:20	7:40	7:15	7:40	7:15	7:10	7:50	7:15	7:40	7:15		8:05
R19	7:30	7:55	7:20	7:45	7:20	7:30	8:05	7:25	7:50	7:25		8:10
R20	7:20	7:40	7:20	7:45	7:20	7:10	7:50	7:15	7:40	7:15		8:10
Site Specific Regions												
R21	2:20	2:20	2:20	2:25	2:20	2:20	2:25	2:15	2:20	2:20	2:20	2:25
R22	5:00	5:10	4:15	4:30	4:05	4:55	5:25	4:20	4:35	4:05	6:45	5:55
R23	6:10	6:20	5:15	5:30	4:55	6:10	6:35	5:15	5:40	4:55	8:05	6:55

Table 7-2. Time to Clear the Indicated Area of *100* Percent of the Affected Population

	Summer		Summer		Summer	Winter		Winter		Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Region	Midday		Midday		Evening	Midday		Midday		Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather	Rain	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	2:10	2:10	2:00	2:05	2:00	2:10	2:10	2:00	2:05	2:00	2:00	2:10
R02	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R03	9:40	10:30	8:55	9:55	8:15	9:40	11:00	9:15	10:00	8:35	11:45	11:10
5-Mile Region and Keyhole to EPZ Boundary												
R04	8:10	8:10	8:05	8:05	8:05	8:10	8:10	8:05	8:05	8:05	8:05	8:10
R05	8:10	8:10	8:05	8:05	8:05	8:10	8:10	8:05	8:05	8:05	8:05	8:10
R06	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R07	8:10	8:55	8:05	8:10	8:05	8:10	9:10	8:05	8:15	8:05	10:15	8:50
R08	8:50	9:40	8:15	8:45	8:05	8:35	9:40	8:15	9:05	8:05	10:55	9:35
R09	9:35	10:15	8:15	9:15	8:05	9:35	10:25	8:50	9:20	8:20	11:00	10:35
R10	9:35	10:30	8:50	9:55	8:15	9:35	11:00	9:05	10:00	8:35	11:45	10:40
Site Specific Regions												
R11	9:35	10:15	8:15	9:30	8:10	9:35	10:30	8:50	9:30	8:25	11:15	10:45
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	10:35	11:25	10:10	10:45	9:55	10:20	12:05	9:50	10:55	9:50		11:25
R13	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10		8:10
R14	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10		8:10
R15	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10		8:10
R16	9:15	9:55	9:05	9:45	8:45	9:05	10:10	9:05	9:35	8:55	N/A	9:55
R17	9:50	10:00	9:40	10:35	9:25	10:00	10:40	9:25	10:25	9:25		10:00
R18	9:55	11:10	9:55	10:25	9:40	10:10	10:55	10:00	10:40	9:35		10:35
R19	10:35	11:25	10:10	10:55	10:05	10:15	12:00	10:15	10:40	9:55		11:00
R20	9:55	11:10	9:55	10:25	10:00	10:10	10:55	10:10	10:55	9:35		10:55
Site Specific Regions												
R21	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R22	8:25	9:10	8:05	8:05	8:05	8:15	9:35	8:05	8:10	8:05	9:50	9:25
R23	8:50	9:25	8:35	8:55	8:05	8:40	9:45	8:05	9:25	8:05	11:20	9:30

Table 7-3. Time to Clear 90 Percent of the 5-Mile Region

	Summer		Summer		Summer	Winter		Winter		Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Region	Midday		Midday		Evening	Midday		Midday		Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather	Rain	Good Weather	Special Event	Roadway Impact
Unstaged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R02	3:10	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:20	3:05
R03	5:50	6:30	5:10	5:30	4:45	5:55	6:30	5:20	5:40	4:45	7:45	7:20
R04	3:20	3:20	3:00	3:05	3:20	3:25	3:25	3:05	3:10	3:15	2:55	3:20
R05	3:20	3:20	3:10	3:10	3:20	3:20	3:20	3:00	3:05	3:20	2:30	3:20
R06	3:15	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:25	3:10
R07	4:35	4:45	4:00	4:10	3:45	4:40	5:15	4:05	4:15	3:40	6:30	5:40
R08	5:00	5:30	4:30	4:30	3:45	5:10	5:45	4:20	4:45	3:55	7:10	6:20
R09	5:40	5:55	4:45	5:15	4:30	5:40	6:00	5:00	5:25	4:25	7:30	7:00
R10	5:55	6:25	5:20	5:40	4:45	6:00	6:30	5:25	6:00	4:50	8:05	7:15
R11	3:10	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:20	3:05
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	6:35	7:00	6:35	6:50	6:35	6:40	7:05	6:35	6:50	6:30	N/A	7:30
R13	4:40	4:50	4:40	4:55	4:40	4:45	4:50	4:40	4:55	4:45		4:55
R14	4:30	4:35	4:35	4:35	4:35	4:30	4:30	4:35	4:35	4:35		4:35
R15	4:30	4:35	4:30	4:30	4:35	4:30	4:30	4:30	4:35	4:30		4:30
R16	5:50	6:00	6:05	6:05	5:50	5:50	6:10	5:55	6:00	5:50		6:25
R17	6:10	6:25	6:05	6:20	6:20	6:05	6:20	6:05	6:15	6:15		6:50
R18	6:25	6:50	6:30	6:40	6:30	6:15	7:00	6:30	6:40	6:20		7:30
R19	6:40	7:05	6:35	7:00	6:40	6:40	7:10	6:30	6:55	6:45		7:35
R20	6:25	6:40	6:30	6:40	6:35	6:30	6:50	6:30	6:40	6:30		7:30

Table 7-4. Time to Clear 100 Percent of the 5-Mile Region

	Summer		Summer		Summer	Winter		Winter		Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Region	Midday		Midday		Evening	Midday		Midday		Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather	Rain	Good Weather	Special Event	Roadway Impact
Unstaged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R02	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R03	8:05	8:05	8:05	8:05	8:05	8:05	8:20	8:05	8:05	8:05	9:35	8:50
R04	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R06	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R07	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:10	8:05
R08	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	9:10	8:05
R09	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	9:25	8:20
R10	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	10:00	8:40
R11	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	8:05	8:30	8:05	8:15	8:05	8:05	8:30	8:05	8:10	8:05	N/A	8:35
R13	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R14	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R15	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R16	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R17	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R18	8:05	8:10	8:05	8:05	8:05	8:05	8:20	8:05	8:05	8:05		8:40
R19	8:05	8:30	8:05	8:05	8:05	8:05	8:45	8:05	8:05	8:05		9:00
R20	8:05	8:10	8:05	8:10	8:05	8:10	8:20	8:05	8:05	8:05		8:40

Table 8-7. School Evacuation Time Estimates – Good Weather

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to H.S. (mi.)	Travel Time from EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
MIAMI-DADE COUNTY SCHOOLS									
Air Base Elementary	105	15	10.4	6.1	103	**3:45**	3.5	5	**3:50**
Aspira South Youth Leadership Charter School	105	15	7.9	10.6	45	**2:45**	12.3	17	**3:05**
Avocado Elementary School	105	15	11.3	2.5	276	**6:40**	2.9	4	**6:40**
Balere Language Academy	105	15	0.9	3.6	15	**2:15**	12.3	17	**2:35**
Barrington Academy	105	15	2.9	1.5	114	**3:55**	25.5	34	**4:30**
Bel-Aire Elementary School	105	15	1	38.3	2	**2:05**	6.9	10	**2:15**
Campbell Drive Elementary School	105	15	10.8	4.6	142	**4:25**	5.4	8	**4:30**
Campbell Drive Middle School	105	15	12.1	2.7	265	**6:25**	5.4	8	**6:35**
Caribbean Elementary School	105	15	2.7	6.5	25	**2:25**	8.1	11	**2:40**
Centennial Middle School	105	15	2.5	8.3	19	**2:20**	5.2	7	**2:30**
Chapman Elementary School	105	15	7.6	14.0	33	**2:35**	1.4	2	**2:35**
Coconut Palm K-8 Academy	105	15	4.8	2.5	115	**3:55**	2.3	4	**4:00**
Cooper, Neva King Educational Center	105	15	4.3	3.1	84	**3:25**	13.4	18	**3:45**
Coral Reef Montessori Academy Charter School	105	15	1.5	1.6	56	**3:00**	12.3	17	**3:15**
Corporate Academy South	105	15	13.8	7.9	106	**3:50**	2.3	4	**3:50**
Cutler Ridge Elementary School	105	15	1.9	3.1	37	**2:40**	2.3	4	**2:45**
Cutler Ridge Middle School	105	15	1.2	5.4	14	**2:15**	2.3	4	**2:20**
Florida City Elementary	105	15	3.7	3.1	72	**3:15**	20.3	28	**3:40**
Gateway Environmental K-8	105	15	12.5	2.7	282	**6:45**	5.4	8	**6:50**
Goulds Elementary School	105	15	3.8	1.6	139	**4:20**	2.6	4	**4:25**
Gulfstream Elementary School	105	15	2.5	2.9	52	**2:55**	2.3	4	**3:00**
Homestead Middle	105	15	2.9	1.5	115	**3:55**	15.5	21	**4:20**
Homestead Senior	105	15	12.3	2.6	0	**2:00**	12.2	17	**2:20**

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to H.S. (mi.)	Travel Time from EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
Keys Gate Charter School	105	15	11.2	11.2	60	**3:00**	12.3	17	**3:20**
Lawrence Academy	105	15	5.3	3.1	105	**3:45**	23.0	31	**4:20**
Leisure City K-8 Center	105	15	9.1	1.8	303	**7:05**	2.4	4	**7:10**
Mandarin Lakes K-8 Academy	105	15	7.8	5.7	82	**3:25**	8.4	12	**3:35**
MAST @ Homestead	105	15	10.2	3.3	186	**5:10**	12.3	17	**5:25**
Mays Middle School	105	15	1.8	1.6	67	**3:10**	2.3	4	**3:15**
Miami Community Charter School	105	15	3.6	3.1	70	**3:10**	25.0	34	**3:45**
Migrant Educational Program	105	15	10.8	3.4	192	**5:15**	5.3	8	**5:20**
Naranja Elementary School	105	15	7.3	2.1	211	**5:35**	5.3	8	**5:40**
Peskoe Elementary School	105	15	8.7	10.6	50	**2:50**	4.6	7	**3:00**
Pine Villa Elementary School	105	15	2.3	2.8	50	**2:50**	2.3	4	**2:55**
Redland Elementary[(a)]	105	15	10.3	2.4	261	**6:25**	20.8	28	**6:50**
Redland Middle	105	15	0.0	6.7	1	**2:05**	20.2	27	**2:30**
Redondo Elementary[(a)]	105	15	12.3	2.6	286	**6:50**	2.3	4	**6:50**
Saunders, Laura C. Elementary	105	15	3.8	1.5	150	**4:30**	15.3	21	**4:55**
South Dade Senior High School	105	15	2.3	1.5	90	**3:30**	16.3	22	**3:55**
West Homestead Elementary[(a)]	105	15	13.7	2.1	388	**8:30**	3.3	5	**8:35**
Whigham, Dr. E.L. Elementary	105	15	2.8	8.4	21	**2:25**	6.3	9	**2:30**
Whispering Pines Elementary	105	15	0.8	6.0	8	**2:10**	5.1	7	**2:15**
					Maximum for EPZ:	**8:30**		**Maximum:**	**8:35**
					Average for EPZ:	**3:55**		**Average:**	**4:10**

(a) According to Miami-Dade County, Redland Elementary, Redondo Elementary, and West Homestead Elementary are outside of the EPZ, but are nonetheless evacuated because they are close to the EPZ boundary.

Table 8-10. Transit-Dependent Evacuation Time Estimates – Good Weather

Route Number	Bus Number	One-Wave						Two-Wave						
		Mobilization (min)	Route Length (miles)	Speed (mph)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)	Distance to R. C. (miles)	Travel Time to R. C. (min)	Unload (min)	Driver Rest (min)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)
33030	1-16	180	18.8	29.5	38	30	**4:10**	7.8	10	5	10	35	30	**5:40**
	17-32	200	18.8	30.0	38	30	**4:30**	7.8	10	5	10	35	30	**6:00**
	33-48	220	18.8	31.8	36	30	**4:50**	7.8	10	5	10	35	30	**6:20**
33032	1-33	180	14.0	20.6	41	30	**4:15**	7.8	10	5	10	41	30	**5:50**
	33-67	200	14.0	21.4	39	30	**4:30**	7.8	10	5	10	34	30	**6:00**
33033	1-19	160	19.3	23.7	49	30	**4:00**	7.8	10	5	10	51	30	**5:50**
	20-39	180	19.3	26.6	44	30	**4:15**	7.8	10	5	10	51	30	**6:05**
	40-59	200	19.3	26.7	43	30	**4:35**	7.8	10	5	10	49	30	**6:20**
	60-79	220	19.3	27.3	42	30	**4:55**	7.8	10	5	10	48	30	**6:40**
	80-95	240	19.3	27.6	42	30	**5:15**	7.8	10	5	10	47	30	**6:55**
33034 #1	1-13	180	19.9	41.7	29	30	**4:00**	7.8	10	5	10	36	30	**5:35**
	14-26	200	19.9	42.6	28	30	**4:20**	7.8	10	5	10	36	30	**5:50**
33034 #2	1-13	180	16.6	47.5	21	30	**3:55**	7.8	10	5	10	31	30	**5:20**
	14-26	200	16.6	47.5	21	30	**4:15**	7.8	10	5	10	31	30	**5:40**
33157	1-15	180	9.7	18.9	31	30	**4:05**	7.8	10	5	10	36	30	**5:35**
	16-31	200	9.7	19.3	30	30	**4:25**	7.8	10	5	10	36	30	**5:55**
	32-48	220	9.7	19.7	30	30	**4:40**	7.8	10	5	10	34	30	**6:10**
						Maximum ETE:	**5:15**						**Maximum ETE:**	**6:55**
						Average ETE:	**4:25**						**Average ETE:**	**6:00**

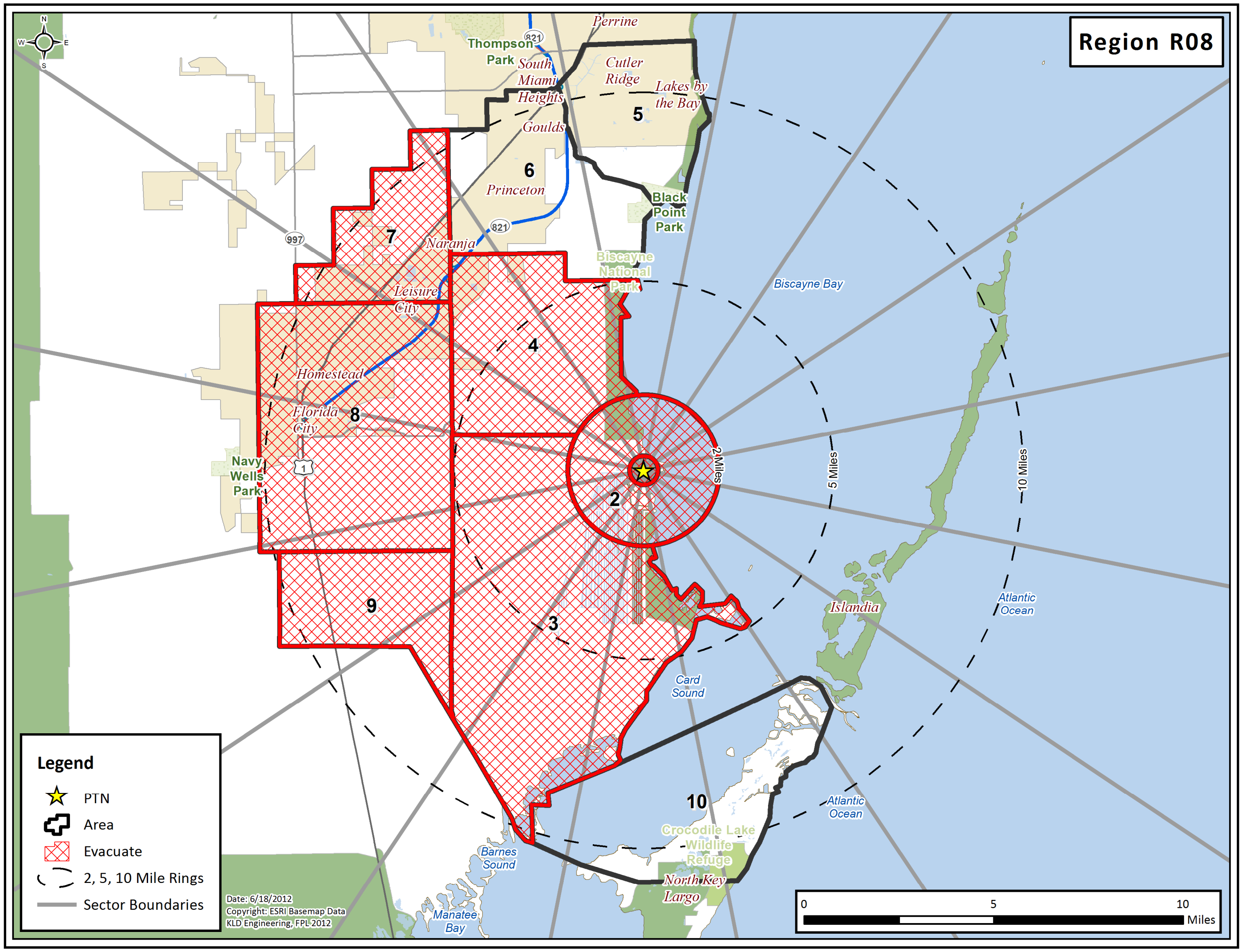


Figure H-8. Region R08

1 INTRODUCTION

This report describes the analyses undertaken and the results obtained by a study to develop evacuation time estimates (ETE) for the Turkey Point Nuclear Power Plant (PTN), located in Miami-Dade County, Florida. ETE provide State and local governments with site-specific information needed for Protective Action decision-making.

In the performance of this effort, guidance is provided by documents published by federal governmental agencies. Most important of these are:

- Criteria for Development of Evacuation Time Estimate Studies, NUREG/CR-7002, December 2011.
- Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654/FEMA REP 1, Rev. 1, November 1980.
- Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones, NUREG/CR-1745, November 1980.
- Development of Evacuation Time Estimates for Nuclear Power Plants, NUREG/CR-6863, January 2005.

The work effort reported herein was supported and guided by local stakeholders who contributed suggestions, critiques, and the local knowledge base required. Table 1-1 presents a summary of stakeholders and interactions.

1.1 Overview of the ETE Process

The following outline presents a brief description of the work effort in chronological sequence:

1. Information Gathering:
    a. Defined the scope of work in discussions with representatives from Florida Power & Light Company (FPL) and Bechtel Power Corporation (Bechtel).
    b. Attended meetings with emergency planners from Miami-Dade County, Monroe County, and the Florida Division of Emergency Management to identify issues to be addressed and resources available.
    c. Conducted a detailed field survey of the highway system and of area traffic conditions within the EPZ and shadow region.
    d. Obtained demographic data from the 2010 census, and state and local agencies.
    e. Conducted a random sample telephone survey of EPZ residents.
    f. Conducted a data collection effort to identify and describe schools, special facilities, major employers, transportation providers, and other important information.

2. Estimated distributions of trip generation times representing the time required by various population groups (permanent residents, employees, and transients) to prepare (mobilize) for the evacuation trip. These estimates are primarily based upon the random sample telephone survey.

3. Defined evacuation scenarios. These scenarios reflect the variation in demand, in trip generation distribution and in highway capacities, associated with different seasons, day of week, time of day and weather conditions.

4. Reviewed the existing traffic management plan to be implemented by local and state police in the event of an incident at the plant. Traffic control is applied at specified traffic control points (TCP) located within the EPZ.

5. Used existing areas to define evacuation regions. The EPZ is partitioned into 10 areas along jurisdictional and geographic boundaries. "Regions" are groups of contiguous areas for which ETE are calculated. The configurations of these regions reflect wind direction and the radial extent of the impacted area. Each region, other than those that approximate circular areas, approximates a "key-hole section" within the EPZ as recommended by NUREG/CR-7002.

6. Estimated demand for transit services for persons at "Special Facilities" and for transit-dependent persons at home.

7. Prepared the input streams for the DYNEV II system.

    a. Estimated the evacuation traffic demand, based on the available information derived from Census data, and from data provided by local and state agencies, Florida Power & Light Company and from the telephone survey.

    b. Applied the procedures specified in the 2010 Highway Capacity Manual[1] (HCM) to the data acquired during the field survey, to estimate the capacity of all highway segments comprising the evacuation routes.

    c. Developed the link-node representation of the evacuation network, which is used as the basis for the computer analysis that calculates the ETE.

    d. Calculated the evacuating traffic demand for each region and for each scenario.

    e. Specified selected candidate destinations for each "origin" (location of each "source" where evacuation trips are generated over the mobilization time) to support evacuation travel consistent with outbound movement relative to the location of the Turkey Point Nuclear Power Plant.

8. Executed the DYNEV II model to determine optimal evacuation routing and compute ETE for all residents, transients and employees ("general population") with access to private vehicles. Generated a complete set of ETE for all specified regions and scenarios.

9. Documented ETE in formats in accordance with NUREG/CR-7002.

[1] Highway Capacity Manual (HCM 2010), Transportation Research Board, National Research Council, 2010.

10. Calculated the ETE for all transit activities including those for special facilities (schools, medical facilities, etc.), for the transit-dependent population and for homebound special needs population.

1.2 The Turkey Point Nuclear Power Plant

The Turkey Point Nuclear Power Plant is located along the shores of Biscayne Bay in Miami-Dade County, Florida. The site is approximately 25 miles south of Miami, FL. The EPZ consists of parts of Miami-Dade and Monroe Counties in Florida. Figure 1-1 displays the area surrounding the PTN. This map identifies the communities in the area and the major roads.

1.3 Preliminary Activities

These activities are described below.

Field Surveys of the Highway Network

KLD personnel drove the entire highway system within the EPZ and the shadow region which consists of the area between the EPZ boundary and approximately 15 miles radially from the plant. The characteristics of each section of highway were recorded. These characteristics are shown in Table 1-2.

Video and audio recording equipment were used to capture a permanent record of the highway infrastructure. No attempt was made to meticulously measure such attributes as lane width and shoulder width; estimates of these measures based on visual observation and recorded images were considered appropriate for the purpose of estimating the capacity of highway sections. For example, Exhibit 15-7 in the HCM 2010 indicates that a reduction in lane width from 12 feet (the "base" value) to 10 feet can reduce free flow speed (FFS) by 1.1 mph – not a material difference – for two-lane highways. Exhibit 15-30 in the HCM 2010 shows little sensitivity for the estimates of service volumes at level of service (LOS) E (near capacity), with respect to FFS, for two-lane highways.

The data from the audio and video recordings were used to create detailed geographical information systems (GIS) shapefiles and databases of the roadway characteristics and of the traffic control devices observed during the road survey; this information was referenced while preparing the input stream for the DYNEV II System.

As documented on page 15-5 of the HCM 2010, the capacity of a two-lane highway is 1700 passenger cars per hour in one direction. For freeway sections, a value of 2250 vehicles per hour per lane is assigned, as per Exhibit 11-17 of the HCM 2010. The road survey has identified several segments which are characterized by adverse geometrics on two-lane highways which are reflected in reduced values for both capacity and speed. These estimates are consistent with the service volumes for LOS E presented in HCM 2010 Exhibit 15-30. These links may be identified by reviewing Appendix K. Link capacity is an input to DYNEV II which computes the ETE. Further discussion of roadway capacity is provided in Section 4 of this report.

Traffic signals are either pre-timed (signal timings are fixed over time and do not change with the traffic volume on competing approaches), or are actuated (signal timings vary over time based on the changing traffic volumes on competing approaches). Actuated signals require detectors to provide the traffic data used by the signal controller to adjust the signal timings. These detectors are typically magnetic loops in the roadway, or video cameras mounted on the signal masts and pointed toward the intersection approaches. If detectors were observed on the approaches to a signalized intersection during the road survey, detailed signal timings were not collected as the timings vary with traffic volume. TCPs at locations which have control devices are represented as actuated signals in the DYNEV II system.

If no detectors were observed, the signal control at the intersection was considered pre-timed, and detailed signal timings were gathered for several signal cycles. These signal timings were input to the DYNEV II system used to compute ETE, as per NUREG/CR-7002 guidance.

Figure 1-2 presents the link-node analysis network that was constructed to model the evacuation roadway network in the EPZ and shadow region. The directional arrows on the links and the node numbers have been removed from Figure 1-2 to clarify the figure. The detailed figures provided in Appendix K depict the analysis network with directional arrows shown and node numbers provided. The observations made during the field survey were used to calibrate the analysis network.

Telephone Survey

A telephone survey was undertaken in 2009 to gather information needed for the evacuation study. Appendix F presents the survey instrument, the procedures used and tabulations of data compiled from the survey returns.

These data were utilized to develop estimates of vehicle occupancy to estimate the number of evacuating vehicles during an evacuation and to estimate elements of the mobilization process. This database was also referenced to estimate the number of transit-dependent residents.

Computing the Evacuation Time Estimates

The overall study procedure is outlined in Appendix D. Demographic data were obtained from several sources, as detailed later in this report. These data were analyzed and converted into vehicle demand data. The vehicle demand was loaded onto appropriate "source" links of the analysis network using GIS mapping software. The DYNEV II system was then used to compute ETE for all regions and scenarios.

Analytical Tools

The DYNEV II System that was employed for this study is comprised of several integrated computer models. One of these is the DYNEV (DYnamic Network EVacuation) macroscopic simulation model, a new version of the IDYNEV model that was developed by KLD under contract with the Federal Emergency Management Agency (FEMA).

DYNEV II consists of four sub-models:

- A macroscopic traffic simulation model (for details, see Appendix C).
- A trip distribution (TD), model that assigns a set of candidate destination (D) nodes for each "origin" (O) located within the analysis network, where evacuation trips are "generated" over time. This establishes a set of O-D tables.
- A dynamic traffic assignment (DTA), model which assigns trips to paths of travel (routes) which satisfy the O-D tables, over time. The TD and DTA models are integrated to form the DTRAD (Dynamic Traffic Assignment and Distribution) model, as described in Appendix B.
- A myopic traffic diversion model which diverts traffic to avoid intense, local congestion, if possible.

Another software product developed by KLD, named UNITES (UNIfied Transportation Engineering System) was used to expedite data entry and to automate the production of output tables.

The dynamics of traffic flow over the network are graphically animated using the software product, EVAN (EVacuation ANimator), developed by KLD. EVAN is GIS based, and displays statistics such as LOS, vehicles discharged, average speed, and percent of vehicles evacuated, output by the DYNEV II System. The use of a GIS framework enables the user to zoom in on areas of congestion and query road name, town name and other geographical information.

The procedure for applying the DYNEV II System within the framework of developing ETE is outlined in Appendix D. Appendix A is a glossary of terms.

For the reader interested in an evaluation of the original model, I-DYNEV, the following references are suggested:

- NUREG/CR-4873 – Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code
- NUREG/CR-4874 – The Sensitivity of Evacuation Time Estimates to Changes in Input Parameters for the I-DYNEV Computer Code

The evacuation analysis procedures are based upon the need to:

- Route traffic along paths of travel that will expedite their travel from their respective points of origin to points outside the EPZ.
- Restrict movement toward the plant to the extent practicable, and disperse traffic demand so as to avoid focusing demand on a limited number of highways.
- Move traffic in directions that are generally outbound, relative to the location of the Turkey Point Nuclear Power Plant.

DYNEV II provides a detailed description of traffic operations on the evacuation network. This description enables the analyst to identify bottlenecks and to develop countermeasures that are designed to represent the behavioral responses of evacuees. The effects of these countermeasures may then be tested with the model.

1.4 Comparison with Prior ETE Study

Table 1-3 presents a comparison of the present ETE study with the 2011 study. The major factors contributing to the differences between the ETE values obtained in this study and those of the previous study can be summarized as follows:

- An increase in permanent resident population.
- Trip-generation rates are based on a new methodology.
- Dynamic evacuation modeling.

Table 1-1. Stakeholder Interaction

Stakeholder	Nature of Stakeholder Interaction
Florida Power & Light Company	Attended meetings to define data requirements, set up contacts with local government agencies, discuss ETE methodology and review ETE results. Reviewed and commented on draft ETE report.
Miami-Dade County and Monroe County Offices of Emergency Management	Attended meetings to define data requirements, set up contacts with local government agencies and transient facilities, discuss ETE methodology and review ETE results. Provided county radiological emergency plans, special facility data, and major employment data. Reviewed and commented on draft ETE report.
Florida Division of Emergency Management	Provided the State of Florida Radiological Emergency Preparedness Annex. Attended meetings to define data requirements, discuss ETE methodology and review results. Reviewed and commented on draft ETE Report.
Local and State Police Agencies	Provided existing traffic management plans.

Table 1-2. Highway Characteristics

- Number of lanes
- Lane width
- Shoulder type & width
- Interchange geometries
- Lane channelization & queuing capacity (including turn bays/lanes)
- Geometrics: curves, grades (>4%)
- Posted speed
- Actual free speed
- Abutting land use
- Control devices
- Intersection configuration (including roundabouts where applicable)
- Traffic signal type
- Unusual characteristics: Narrow bridges, sharp curves, poor pavement, flood warning signs, inadequate delineations, toll booths, etc.

Table 1-3. ETE Study Comparisons

Topic	Previous ETE Study	Current ETE Study
Resident Population Basis	2000 US Census Data extrapolated to 2009 using Census county growth rates. Population = 187,374	ArcGIS software using 2010 US Census blocks; area ratio method used. Population = 206,329
Resident Population Vehicle Occupancy	3.13 persons/household, 1.37 evacuating vehicles/household yielding: 2.28 persons/vehicle	3.13 persons/household, 1.37 evacuating vehicles/household yielding: 2.28 persons/vehicle.
Employee Population	Total employees commuting into the EPZ obtained from the journey-to-work Florida edition website, based on analysis of commuter travel patterns from the 2000 census. Employees extrapolated to 2009 using Miami-Dade County employment growth rate. 20,367 employees commuting into the EPZ.	1.09 employees per vehicle based on telephone survey results. Employees = 20,472
Transit-Dependent Population	Census data used to provide an estimate of the number of people without access to personal transportation. Transient-Dependents = 7,789 An additional 135 homebound special needs persons needed special transportation to evacuate (59 required a bus, 49 required a wheelchair-accessible vehicle, and 27 required an ambulance).	Estimates based upon U.S. Census data and the results of the telephone survey. A total of 8,732 people who do not have access to a vehicle, requiring 291 buses to evacuate. An additional 128 homebound special needs persons needed special transportation to evacuate (53 required a bus, 44 required a wheelchair-accessible vehicle, and 31 required an ambulance).
Transient Population	Transient estimates based upon information provided about transient attractions in EPZ, supplemented by observations of the facilities during the road survey and from aerial photography. Transients = 26,007	Transient estimates based upon information provided about transient attractions in EPZ, supplemented by observations of the facilities during the road survey and from aerial photography. Transients = 33,075

Topic	Previous ETE Study	Current ETE Study
Special Facilities Population	Special facility population based on information provided by Miami-Dade County Office of Emergency Management & Homeland Security, from internet searches, and from direct phone calls to the facilities. Special Facility Population = 1,208 Vehicles originating at special facilities = 1,070	Special facility population based on information provided by each county within the EPZ. Current census = 1,360 Buses Required = 50 Wheelchair Bus Required = 45 Ambulances Required = 11
School Population	School population based on information provided by each county within the EPZ. Public School enrollment = 32,219 Vehicles originating at public schools = 724 Private School enrollment = 5,432 Vehicles originating at private schools = 63	School population based on information provided by each county within the EPZ. School enrollment = 38,108 Buses required = 615
Voluntary evacuation from within EPZ in areas outside region to be evacuated	35-50% voluntary evacuation within the EPZ, but not within the evacuation region.	20 percent of the population within the EPZ, but not within the evacuation region (see Figure 2-1)
Shadow Evacuation	Defined as the area to the north between Coral Reef Drive (152nd Street) and the EPZ boundary and the area to the west between the eastern boundary of the Everglades National Park and the EPZ boundary.	20% of people outside of the EPZ within the shadow region (see Figure 7-2)
Network Size	Not Defined.	1,582 links; 827 nodes
Roadway Geometric Data	Field surveys conducted in 2008. Road capacities based on 2000 HCM.	Field surveys conducted in February 2012. Roads and intersections were video archived. Road capacities based on 2010 HCM.
School Evacuation	Direct evacuation to designated reception center/host school.	Direct evacuation to designated reception center/host school.
Ridesharing	50 percent of transit-dependent persons will evacuate with a neighbor or friend.	50 percent of transit-dependent persons will evacuate with a neighbor or friend.

Topic	Previous ETE Study	Current ETE Study
Trip Generation for Evacuation	Based on residential telephone survey of specific pre-trip mobilization activities within the Turkey Point EPZ: Residents with commuters returning leave between 30 minutes and 6 hours. Residents without commuters in household leave between 15 minutes and 4 hours. Employees and transients leave between 15 minutes and 2 hours. All times measured from the advisory to evacuate.	Based on residential telephone survey of specific pre-trip mobilization activities: Residents with commuters returning leave between 30 and 8 hours. Residents without commuters returning leave between 15 and 6 hours, 30 minutes. Employees and transients leave between 15 minutes and 2 hours All times measured from the advisory to evacuate.
Weather	Normal, or Rain. The capacity and free flow speed of all links in the network are reduced by 10% in the event of rain.	Normal, or Rain. The capacity and free flow speed of all links in the network are reduced by 10% in the event of rain.
Modeling	IDYNEV	DYNEV II System – Version 4.0.19.2
Special Events	Construction Special event population = 3,983 additional employees Homestead-Miami Speedway Special Event Population = 100,000 additional transients	Homestead-Miami Speedway Special event population = 100,000 additional transients
Evacuation Cases	12 regions and 11 scenarios producing 132 unique cases.	23 regions (central sector wind direction and each adjacent sector technique used) and 12 scenarios producing 276 unique cases.
Evacuation Time Estimates Reporting	ETE reported for 50th, 90th, 95th, and 100th percentile. Results presented by region and scenario.	ETE reported for 90th and 100th percentile population. Results presented by region and scenario.
Evacuation Time Estimates for the entire EPZ	Winter Midweek Midday, Good Weather: 9:30 Summer Midweek, Midday, Good Weather: 9:15	Winter Midweek Midday, Good Weather: 9:40 Summer Midweek, Midday, Good Weather: 9:40

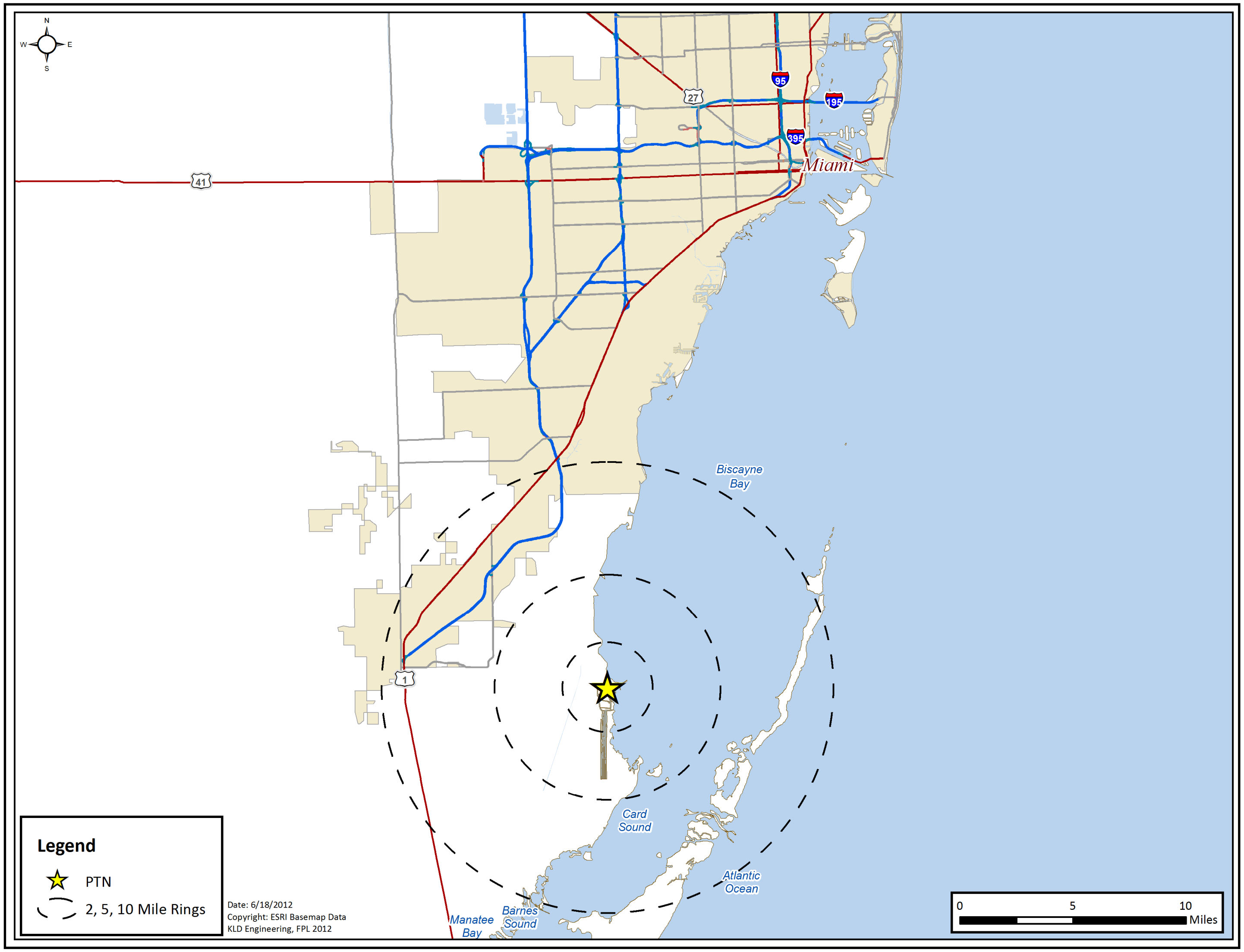


Figure 1-1. Turkey Point Location

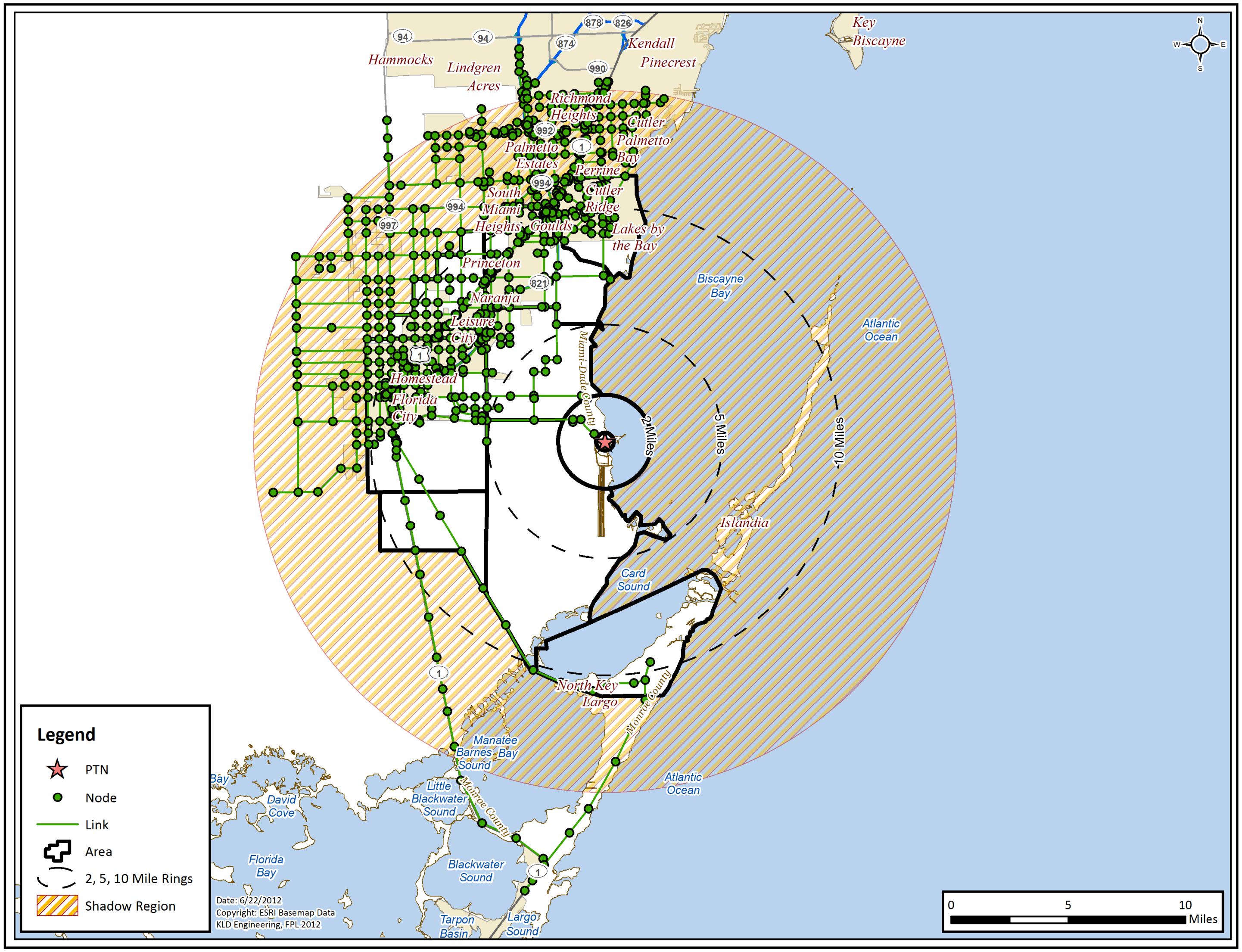


Figure 1-2. PTN Link-Node Analysis Network

2 STUDY ESTIMATES AND ASSUMPTIONS

This section presents the estimates and assumptions utilized in the development of the evacuation time estimates.

2.1 Data Estimates

1. Population estimates are based upon Census 2010 data.
2. Estimates of employees who reside outside the EPZ and commute to work within the EPZ are based upon data obtained from the journey-to-work Florida Edition website[1], supplemented by data provided by Miami-Dade County and through direct phone calls to facilities. Considering that nearly all employers (excluding the Turkey Point Nuclear Power Plant) are along the US Highway 1 corridor, and therefore in close proximity to other major employers in their respective municipality, it was assumed that employment for each municipality would be evenly divided among the major employers, unless specific data was provided by a major employer.
3. Population estimates at special facilities are based on available data from Miami-Dade and Monroe County emergency management offices and from phone calls to specific facilities.
4. Roadway capacity estimates are based on field surveys and the application of the Highway Capacity Manual 2010.
5. Population mobilization times are based on a statistical analysis of data acquired from a random sample telephone survey of EPZ residents (see Section 5 and Appendix F).
6. The relationship between resident population and evacuating vehicles is developed from the telephone survey. Average values of 3.13 persons per household and 1.37 evacuating vehicles per household are used. The relationship between persons and vehicles for special facilities is as follows:
    a. Employees: 1.09 employees per vehicle (telephone survey results) for all major employers.
    b. Parks: Vehicle occupancy varies based upon data gathered from local transient facilities.
    c. Special Events: Assumed parking lots for the NASCAR Race at Homestead-Miami Speedway are filled to capacity.

[1] http://www.j2w.usf.edu/default.asp?l=f

2.2 Study Methodological Assumptions

1. ETE are presented for the evacuation of the 90th and 100th percentiles of population for each region and for each scenario. The percentile ETE is defined as the elapsed time from the advisory to evacuate issued to a specific region of the EPZ, to the time that region is clear of the indicated percentile of evacuees. A region is defined as a group of areas that is issued an advisory to evacuate. A scenario is a combination of circumstances, including time of day, day of week, season, and weather conditions.
2. The ETE are computed and presented in tabular format and graphically, in a format compliant with NUREG/CR-7002.
3. Evacuation movements (paths of travel) are generally outbound relative to the plant to the extent permitted by the highway network. All major evacuation routes are used in the analysis.
4. Regions are defined by the underlying "keyhole" or circular configurations as specified in Section 1.4 of NUREG/CR-7002. These regions, as defined, display irregular boundaries reflecting the geography of the areas included within these underlying configurations.
5. As indicated in Figure 2-2 of NUREG/CR-7002, 100% of people within the impacted "keyhole" evacuate. 20% of those people within the EPZ, not within the impacted keyhole, will voluntarily evacuate. 20% of those people within the shadow region will voluntarily evacuate. See Figure 2-1 for a graphical representation of these evacuation percentages. Sensitivity studies explore the effect on ETE of increasing the percentage of voluntary evacuees in the shadow region (see Appendix M).
6. A total of 12 "scenarios" representing different temporal variations (season, time of day, day of week) and weather conditions are considered. These scenarios are outlined in Table 2-1.
7. Scenario 12 considers the closure of a single lane northbound on the Florida Turnpike from the interchange with US 1 in Florida City to the end of the analysis-network at the interchange with the Don Shula Expressway.
8. The models of the I-DYNEV System were recognized as state of the art by the Atomic Safety & Licensing Board (ASLB) in past hearings. (Sources: Atomic Safety & Licensing Board Hearings on Seabrook and Shoreham; Urbanik[2]). The models have continuously been refined and extended since those hearings and were independently validated by a consultant retained by the NRC. The new DYNEV II model incorporates the latest technology in traffic simulation and in dynamic traffic assignment.

[2] Urbanik, T., et. al. Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code, NUREG/CR-4873, Nuclear Regulatory Commission, June, 1988.

2.3 Study Assumptions

1. The planning basis assumption for the calculation of ETE is a rapidly escalating accident that requires evacuation, and includes the following:
   a. Advisory to evacuate is announced coincident with the siren notification.
   b. Mobilization of the general population will commence within 15 minutes after siren notification.
   c. ETE are measured relative to the advisory to evacuate.
2. It is assumed that everyone within the group of areas forming a region that is issued an advisory to evacuate will, in fact, respond and evacuate in general accord with the planned routes.
3. 68 percent of the households in the EPZ have at least 1 commuter; 71 percent of those households with commuters will await the return of a commuter before beginning their evacuation trip, based on the telephone survey results. Therefore 48 percent (68% x 71% = 48%) of EPZ households will await the return of a commuter, prior to beginning their evacuation trip.
4. The ETE will also include consideration of "through" (external-external) trips during the time that such traffic is permitted to enter the evacuated region. "Normal" traffic flow is assumed to be present within the EPZ at the start of the emergency.
5. Access control points (ACP) will be staffed within approximately 120 minutes following the siren notifications, to divert traffic attempting to enter the EPZ. Earlier activation of ACP locations could delay returning commuters. It is assumed that no through traffic will enter the EPZ after this 120 minute time period.
6. Traffic control points within the EPZ will be staffed over time, beginning at the advisory to evacuate. Their number and location will depend on the region to be evacuated and resources available. The objectives of these TCP are:
   a. Facilitate the movements of all (mostly evacuating) vehicles at the location.
   b. Discourage inadvertent vehicle movements towards the plant.
   c. Provide assurance and guidance to any traveler who is unsure of the appropriate actions or routing.
   d. Act as local surveillance and communications center.
   e. Provide information to the emergency operations center (EOC) as needed, based on direct observation or on information provided by travelers.

   In calculating ETE, it is assumed that evacuees will drive safely, travel in directions identified in the plan, and obey all control devices and traffic guides.

7. Buses will be used to transport those without access to private vehicles:
    a. If schools are in session, transport (buses) will evacuate students directly to the designated host schools.
    b. It is assumed parents will pick up children at day care centers prior to evacuation.
    c. Buses, wheelchair vans and ambulances will evacuate patients at medical facilities and at any senior facilities within the EPZ, as needed.
    d. Transit-dependent general population will be evacuated to reception centers.
    e. Schoolchildren, if school is in session, are given priority in assigning transit vehicles.
    f. Bus mobilization time is considered in ETE calculations.
    g. Analysis of the number of required round-trips ("waves") of evacuating transit vehicles is presented.
    h. Transport of transit-dependent evacuees from reception centers to permanent shelters is not considered in this study.
8. Provisions are made for evacuating the transit-dependent portion of the general population to reception centers by bus, based on the assumption that some of these people will ride-share with family, neighbors, and friends, thus reducing the demand for buses. We assume that the percentage of people who rideshare is 50 percent. This assumption is based upon reported experience for other emergencies[3], and on guidance in Section 2.2 of NUREG/CR-7002.
9. One type of adverse weather scenarios is considered. Rain may occur for either winter or summer scenarios. It is assumed that the rain begins earlier or at about the same time the evacuation advisory is issued. No weather-related reduction in the number of transients who may be present in the EPZ is assumed.

    Adverse weather scenarios affect roadway capacity and the free flow highway speeds. The factors applied for the ETE study are based on recent research on the effects of weather on roadway operations[4]; the factors are shown in Table 2-2.

[3] Institute for Environmental Studies, University of Toronto, THE MISSISSAUGA EVACUATION FINAL REPORT, June 1981. The report indicates that 6,600 people of a transit-dependent population of 8,600 people shared rides with other residents; a ride share rate of 76% (Page 5-10).

[4] Agarwal, M. et. Al. Impacts of Weather on Urban Freeway Traffic Flow Characteristics and Facility Capacity, Proceedings of the 2005 Mid-Continent Transportation Research Symposium, August, 2005. The results of this paper are included as Exhibit 10-15 in the HCM 2010.

10. School buses used to transport students are assumed to transport 70 students per bus for elementary schools and 50 students per bus for middle and high schools, based on discussions with county offices of emergency management. Transit buses used to transport the transit-dependent general population are assumed to transport 30 people per bus. Special facility buses are assigned on the basis of 30 patients to allow for staff to accompany the patients.

Table 2-1. Evacuation Scenario Definitions

Scenario	Season[5]	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, Weekend	Evening	Good	None
11	Winter	Weekend	Midday	Good	NASCAR Race at Homestead-Miami Speedway
12	Summer	Midweek	Midday	Good	Roadway Impact – Lane Closure on Florida Turnpike NB

[5] Winter assumes that school is in session (also applies to spring and autumn). Summer assumes that school is not in session.

Table 2-2. Model Adjustment for Adverse Weather

Scenario	Highway Capacity*	Free Flow Speed*	Mobilization Time for General Population
Rain	90%	90%	No Effect
*Adverse weather capacity and speed values are given as a percentage of good weather conditions. Roads are assumed to be passable.			

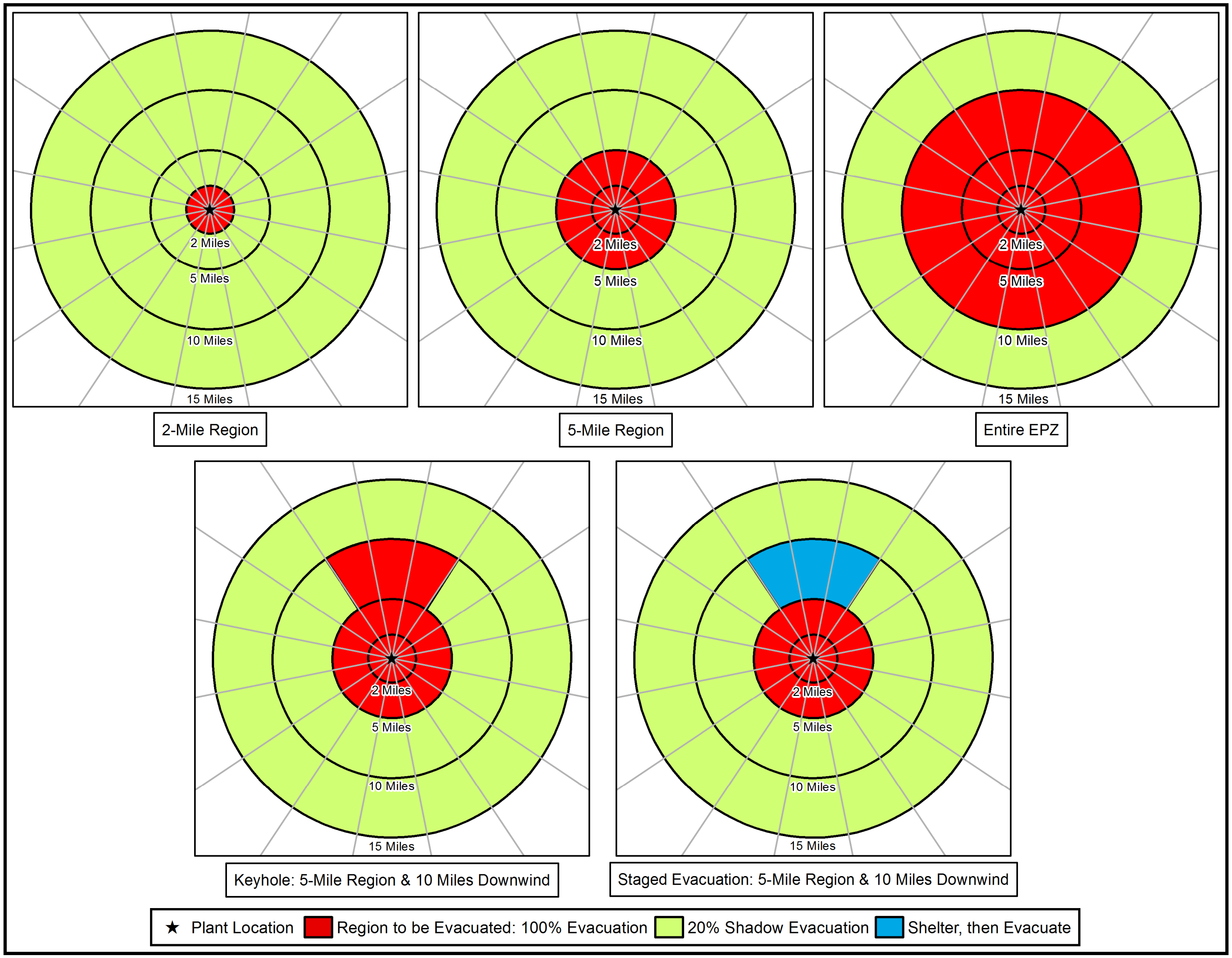


Figure 2-1. Voluntary Evacuation Methodology

3 DEMAND ESTIMATION

The estimates of demand, expressed in terms of people and vehicles, constitute a critical element in developing an evacuation plan. These estimates consist of three components:

1. An estimate of population within the EPZ, stratified into groups (resident, employee, transient).
2. An estimate, for each population group, of mean occupancy per evacuating vehicle. This estimate is used to determine the number of evacuating vehicles.
3. An estimate of potential double-counting of vehicles.

Appendix E presents much of the source material for the population estimates. Our primary source of population data, the 2010 Census, however, is not adequate for directly estimating some transient groups.

Throughout the year, vacationers and tourists enter the EPZ. These non-residents may dwell within the EPZ for a short period (e.g. a few days or one or two weeks), or may enter and leave within one day. Estimates of the size of these population components must be obtained, so that the associated number of evacuating vehicles can be ascertained.

The potential for double-counting people and vehicles must be addressed. For example:

- A resident who works and shops within the EPZ could be counted as a resident, again as an employee and once again as a shopper.
- A visitor who stays at a hotel and spends time at a park, then goes shopping could be counted three times.

Furthermore, the number of vehicles at a location depends on time of day. For example, motel parking lots may be full at dawn and empty at noon. Similarly, parking lots at area parks, which are full at noon, may be almost empty at dawn. Estimating counts of vehicles by simply adding up the capacities of different types of parking facilities will tend to overestimate the number of transients and can lead to ETE that are too conservative.

Analysis of the population characteristics of the Turkey Point Nuclear Power Plant EPZ indicates the need to identify three distinct groups:

- Permanent residents - people who are year round residents of the EPZ.
- Transients - people who reside outside of the EPZ who enter the area for a specific purpose (shopping, recreation) and then leave the area.
- Employees - people who reside outside of the EPZ and commute to businesses within the EPZ on a daily basis.

Estimates of the population and number of evacuating vehicles for each of the population groups are presented for each area and by polar coordinate representation (population rose). The PTN EPZ is subdivided into 10 areas. The EPZ is shown in Figure 3-1.

3.1 Permanent Residents

The primary source for estimating permanent population is the latest U.S. Census data. The average household size (3.13 persons/household – See Figure F-1) and the number of evacuating vehicles per household (1.37 vehicles/household – See Appendix F, sub-section F.3.2 and Figure F-7) were adapted from the telephone survey results.

Population estimates are based upon Census 2010 data. Table 3-1 provides the permanent resident population within the EPZ, by area.

The year 2010 permanent resident population is divided by the average household size and then multiplied by the average number of evacuating vehicles per household in order to estimate number of vehicles. Permanent resident population and vehicle estimates are presented in Table 3-2. Figure 3-2 and Figure 3-3 present the permanent resident population and permanent resident vehicle estimates by sector and distance from Turkey Point. This "rose" was constructed using GIS software.

It can be argued that this estimate of permanent residents overstates, somewhat, the number of evacuating vehicles, especially during the summer. It is certainly reasonable to assert that some portion of the population would be on vacation during the summer and would travel elsewhere. A rough estimate of this reduction can be obtained as follows:

- Assume 50 percent of all households vacation for a two-week period over the summer.
- Assume these vacations, in aggregate, are uniformly dispersed over 10 weeks, i.e. 10 percent of the population is on vacation during each two-week interval.
- Assume half of these vacationers leave the area.

On this basis, the permanent resident population would be reduced by 5 percent in the summer and by a lesser amount in the off-season. Given the uncertainty in this estimate, we elected to apply no reductions in permanent resident population for the summer scenarios to account for residents who may be out of the area.

Homestead Air Reserve Base (HARB)

The base employs nearly 1,000 full-time employees who live in the Homestead and South Dade communities, and another 1,200 Air Force reservists who drill monthly at the base [1]. The 1,000 full-time employees are already counted as permanent residents as the Homestead and South Dade communities are within the EPZ. The aforementioned website also indicates "[t]he base also spends over $500,000 annually on local hotels. Most reservists stay off base in Homestead and Florida City during monthly unit training assemblies." As indicated in Table E-5, approximately 12,000 transients (7,000 of which are in Monroe County at the Ocean Reef Club)

[1] www.homestead.afrc.af.mil/library/factsheets/factsheet.asp?id=12386

have already been accounted for at lodging facilities within the EPZ. Therefore, the transient reservists training at HARB are also accounted for.

3.2 Shadow Population

A portion of the population living outside the evacuation area extending to 15 miles radially from Turkey Point (in the shadow region) may elect to evacuate without having been instructed to do so. Based upon NUREG/CR-7002 guidance, it is assumed that 20 percent of the permanent resident population, based on U.S. Census Bureau data, in this shadow region will elect to evacuate.

Shadow population characteristics (household size, evacuation vehicles per household, mobilization time) are assumed to be the same as that for the EPZ permanent resident population. Table 3-3, Figure 3-4 and Figure 3-5 present estimates of the shadow population and vehicles, by sector.

3.3 Transient Population

Transient population groups are defined as those people (who are not permanent residents, nor commuting employees) who enter the EPZ for a specific purpose (shopping, recreation). Transients may spend less than one day or stay overnight at camping facilities, hotels and motels. The PTN EPZ has a number of areas and facilities that attract transients, including:

- Lodging Facilities
- Marinas
- Campgrounds
- Golf Courses
- Shopping Centers
- Sports Facilities
- Museums and Arts Centers

Surveys of lodging facilities within the EPZ were conducted to determine the number of rooms, percentage of occupied rooms, and the number of people and vehicles per room for each facility. These data were used to estimate the number of transients and evacuating vehicles at each of these facilities. A total of 12,021 transients in 6,327 vehicles are assigned to lodging facilities in the EPZ. This estimate includes visitors at Ocean Reef Community (ORC).

- Ocean Reef Community is a private community which offers rental homes and lodging facilities for transients. The following data were provided by the Director of Public Safety for ORC:
    - 5,000 seasonal residents (3,200 vehicles) during the peak season; 1.56 persons per vehicle

- 2,800 transients (2,000 vehicles) during the peak season; 1.40 persons per vehicle
- Peak season is from November to April
- During the off-peak season, there are 500 seasonal residents and 1,800 transients

As indicated in Table 3-2, the 2010 population in Zone 10 is 1,103 permanent (year-round) residents. Based on an analysis of Census data in GIS, 66 of these people do not live in the ORC. Thus, there are 1,037 permanent residents in the ORC. These residents were subtracted from the seasonal resident data above in order to avoid double counting. This results in 3,963 seasonal residents evacuating in 2,540 vehicles (3,963 divided by the average occupancy of 1.56 persons per vehicle). Seasonal residents are treated as transients. Therefore, there are a total of 6,763 transients (3,963 +2,800) evacuating in 4,540 vehicles (2,540 + 2,000) from the ORC.

The Ocean Reef Club Marina offers 175 slips to residents and visitors. Those people using the marina are included in the total lodging transient estimate provided above.

Surveys of the parks and recreational areas within the EPZ were conducted to determine the number of transients visiting Biscayne National Park, Black Point Park, Black Point Marina, Larry and Penny Thompson Park, and Homestead Bayfront Marina/Herbert Hoover Marina and Park.

Black Point Park, located in Area 6, can have up to 8,000 visitors during special events. An average of 50 percent of these visitors are EPZ residents. Therefore, 4,000 transients are at the park during peak times. An estimate of three people per vehicle results in 1,333 vehicles evacuating from Black Point Park.

Black Point Marina has 425 regular parking spaces, 18 handicap parking spaces, and 2 strollers' only parking for the 178 in-water slips and 10 floating docks at the facility. There are 203 parking spots for cars with trailers and 10 handicap parking spots for cars with trailers. A passenger car equivalent of two vehicles is used for trailers with three people per vehicle, resulting in 871 vehicles and 2,613 people evacuating from the marina. Homestead Bayfront Marina/Herbert Hoover Marina and Park, located in Area 4, has 192 boat slips plus an additional 32 dry slips. During weekend peak times, there are about 2,000 people and 500 vehicles parked at the facility. The dock master confirmed that visitor numbers do not increase during significant events in the EPZ, such as lobster mini-season and the Regatta. It is assumed that all the people at the marina are transients.

On a typical day, there are approximately 400 people and 70 vehicles at Biscayne National Park. Campsites at the park are only accessible by boat[2].

[2] Vehicle occupancy is higher than normal because campsites at the park are only accessible by boat.

The Biscayne National Park Information Guide states, "The mangrove shoreline, crystal clear waters, emerald isles, and living coral reefs attract near 500,000 visitors a year." Winter weekends are peak times for transient activity. Assuming a peak transient season from October to February and that 75% of visitors are present during the peak, 375,000 transients visit the park during peak months (500,000 x 0.75). Assuming 75% of these transients visit on weekends, 14,063 people visit the park during weekends in the peak season ((375,000 x 0.75) ÷ (5 months x 4 weekends/month)). 9,013 of these visitors are at Convoy Point, Black Point Park and Marina, and Homestead Bayfront Park. The remaining 5,050 daily visitors (14,063 – 9,013) enter the park by boat and would, therefore, evacuate by boat as well. There are 2.7 people per boat on average. Therefore, at peak times there could be as many as 1,870 boats entering the park from outside the EPZ (5,050 ÷ 2.7). About 20% of these visitors are in sailboats, the other 80% are in powerboats. These transients include those that enter the park by boat and access Elliot Key, Sands Key, Boca Chita Key, Adams Key, Rubicon Keys, Reid Key, Porgy Key, Old Rhodes Key, and Totten Key for camping, fishing, picnicking, kayaking, canoeing, snorkeling, etc.

Most of the visitors entering Biscayne National Park enter the park by private boat. According to Section XII, Part E, Item Number 2f of Appendix II of The State of Florida Radiological Emergency Preparedness Annex and the Marine Reception Center section under Command and Control of the Procedure section of and of the Miami-Dade County Emergency Management Turkey Point Response Plan, evacuees from Biscayne Bay and offshore areas in waterway off Miami-Dade County will be directed to Matheson Hammock Marina, the Marine Reception Center (MRC), for monitoring and decontamination as necessary. Functions that occur at the MRC include but are not limited to:

1. Vessel anchorage
2. Personnel monitoring and decontamination
3. Transportation to the emergency reception center provided as necessary by Miami-Dade County.

Matheson Hammock Park and Marina is located outside of the EPZ and is shown in Figure 10-1.

Larry and Penny Thompson Memorial Park is located outside of the EPZ, north of Area 6, but will also be evacuated (based on county plans) in the event of an emergency at the plant because of its close proximity to the EPZ. The park is adjacent to the Miami Metrozoo and has 270 acres to offer visitors. The campground has 240 separate campsites for recreational vehicles. The campground is assumed to be fully occupied with non-EPZ residents as the Metrozoo and campground are significant attractions for transient persons. There are also 200 additional parking spaces available for day-trippers with two people per vehicle. Based on information gathered from a telephone conversation with park management, all day-trippers at the park are also transients. Based on the capacity of 240 campsites, 720 evacuating passenger cars were loaded for this site, assuming two passenger car equivalents for each recreational vehicle and one additional passenger car per campsite with four people per site. An additional

200 vehicles with two people per vehicle are used by day-trippers resulting in 920 transient vehicles and 1360 transient people.

Camp Owaissa Bauer is a children's camp located just north of Area 7. It will be evacuated in the event of an emergency at the plant because of its close proximity to the EPZ. Internet searches indicate the camp can accommodate 150 overnight campers in dormitory style cabins and has separate staff quarters. Three buses, which hold 50 campers each, are provided by the facility. A bus is equivalent to two passenger vehicles. Therefore, six vehicles were counted at this facility.

A total of 10,523 transients and 3,700 vehicles have been assigned to parks, marinas and campgrounds within the EPZ.

Keys Gate Golf Club is the only golf course in the EPZ. Direct phone calls were made to the facility to determine the number of golfers and vehicles on site on a typical peak day, and the number of golfers that travel from outside the area. It was reported that 200 people and 80 vehicles are at the facility at peak times. Fifty percent of these visitors are local residents. Thus, a total of 100 transients and 40 vehicles are assigned to this facility.

Southland Mall and the Prime Outlets of Florida City are located within the EPZ. The Southland Mall (formerly Cutler Ridge Mall) is located in Area 6. Phone calls were made to the facility; however, detailed data was not available. Overhead photographs were used to estimate the parking lot capacity of the mall which was found to be roughly 5100 parking spaces. Based on discussions with Miami-Dade County, the mall is not a significant attraction for non-EPZ residents because there are many other large malls located north of the EPZ. It is, therefore, conservatively estimated that 25 percent of the mall's parking lot capacity will be occupied by non-EPZ residents during a peak day resulting in 1,275 transient vehicles and 3,825 transients (three people per vehicle).

The Prime Outlets of Florida City include 40 discount stores and a small food court. It is located in Area 8 on Palm Drive, just east of the junction of U.S. Highway 1 and the Florida Turnpike. Phone calls made to the facility indicate that 3,500 vehicles are at the facility during peak times. There are a maximum of 2 tour buses with an occupancy of 20 people at the facility at peak times. Buses are equivalent to two passenger vehicles; these two buses are represented as 4 vehicles. The office administrator indicated that 35 percent of the parking lot capacity will be used by non-EPZ residents resulting in 1,229 transient vehicles evacuating from this location. An estimate of three people per vehicle plus the 2 tour buses with 20 people per bus results in a total of 3,715 transients.

A total of 7,540 transients and 2,504 vehicles have been assigned to shopping facilities within the EPZ.

Several sports complexes exist throughout the EPZ. Harris Field, located in Area 8, has a parking lot capacity of 788, estimated from aerial imagery. Assuming 25 percent of visitors are non-EPZ visitors and an occupancy rate of three people per vehicle, there are 197 vehicles and 591 people at this facility for a peak day.

Homestead Sports Complex is also located in Area 8. Information about the facility was obtained through a phone call to the facility. The peak times this facility is used are summer weekends. There are an estimated 1,000 people at the facility during peak times. Using three people per vehicle, a total of 333 vehicles originate from this facility. It is assumed all of these visitors are transients.

A total of 1,591 transients and 530 vehicles have been assigned to these sports complexes within the EPZ.

South Miami-Dade Cultural Arts Center is located in Area 6 of the EPZ. Phone calls were made to the facility to collect information. The theater can accommodate 200 vehicles and 1,100 people. There is one festival per year that attracts 2,500 people. According to the operations manager at the facility, half of the visitors are local residents. Therefore a maximum of 1,250 transients and 313 transient vehicles are at the facility at any given time, based on an estimate of 4 people per vehicle provided by the facility.

The Coral Castle Museum is in Area 7 of the EPZ. Data gathered through a phone call to the museum indicates patrons of the museum are evenly split between local residents and transients. There are 100 visitors per day during the peak season, 50 of which are transients. There are 40 vehicles at the facility on a peak day, 20 of which are used by transients.

A total of 1,300 transients and 333 vehicles have been assigned to these facilities. Table 3-4 presents transient population and transient vehicle estimates by Area. Figure 3-6 and Figure 3-7 present these data by sector and distance from the plant.

3.4 Employees

Employees who work within the EPZ fall into two categories:

- Those who live and work in the EPZ
- Those who live outside of the EPZ and commute to jobs within the EPZ.

Those of the first category are already counted as part of the permanent resident population. To avoid double counting, we focus only on those employees commuting from outside the EPZ who will evacuate along with the permanent resident population.

Journey-to-work employment data was obtained from 2000 census data (via the Florida journey-to-work website[3]) with commuter patterns organized by destination. The data was collated for each municipality that is either completely or partially located in the EPZ. The data for all workers in these EPZ municipalities was then analyzed to estimate those workers originating from areas outside of the EPZ. Those who work in the EPZ and have origins outside of the EPZ were summed to get total employment figures for the EPZ. For municipalities that are partially located in the EPZ, the portion of the population living in the EPZ was applied to those workers who have origins in the municipality in order to estimate those who work in the EPZ but reside outside the EPZ. For example, South Miami Heights is partially within the EPZ, while Naranja is completely within the EPZ. There are 35 employees working in Naranja who originate from South Miami Heights. Twenty-five percent of the population within South Miami Heights resides in the EPZ. Thus, of the 35 employees who work in Naranja and live in South Miami Heights, 75 percent (100-25 percent) are non-EPZ residents for a total of 26 employees in Naranja who are non-EPZ residents commuting from South Miami Heights. Differentiating between employees who are EPZ residents and those who are not is necessary to avoid double-counting those people who both live and work in the EPZ. This data was compiled with phone calls made to facilities to determine the total employment within the EPZ. The results of the analysis are presented in Table 3-5 and Table 3-6.

Land use was examined from overhead imagery using Google Earth to determine the percentage of employment located in the EPZ for those municipalities that are only partially within the EPZ. Overhead imagery was also used to distribute the employment for each municipality. Nearly all major employment centers are located on or close to U.S. Highway 1. Employment figures for PTN were added to the journey-to-work data to estimate the total employment for the EPZ. It is conservatively assumed that 100 percent of the employees at the plant live outside the EPZ. Yearly employment statistics for Miami-Dade County were obtained from the U.S. Department of Labor website and used to estimate a yearly employment growth rate, which was in turn used to project employment data to the year 2009.

Based on discussions with representatives from Miami-Dade and Monroe County Offices of Emergency Management (OEM), employment in the area has not significantly changed since the last ETE study done for PTN in 2009 in support of the combined license (COL) application. Contact information for a few new major employers in the EPZ was provided by Miami-Dade County OEM to supplement the employment estimates from 2009. These employers were contacted by telephone and the information gathered was used to supplement the 2009 data.

[3] http://www.j2w.usf.edu/default.asp?l=f

Considering that nearly all employers (excluding the Turkey Point Nuclear Power Plant) are along the US Highway 1 corridor, and therefore in close proximity to other major employers in their respective municipality, it was assumed that employment for each municipality would be evenly divided among the major employers.

A vehicle occupancy of 1.09 employees per vehicle obtained from the telephone survey (See Appendix F, sub-section F.3.1 and Figure F-6) was used to determine the number of evacuating employee vehicles for all major employers.

The ORC is also a major employer within the EPZ. The following data were provided from the Director of Public Safety for ORC:

- 3000 employees during the peak season
- 500 employees during the off-peak
- 80 percent of employees commute to ORC from the north in Miami-Dade County within the EPZ

Based on this data, there are 600 employees (3000 x 20%) commuting into ORC from outside the EPZ. These employees will evacuate in 550 vehicles based on the occupancy of 1.09 employees per vehicle.

Appendix E provides a map of the major employers within the EPZ. Total employment for each municipality was divided up evenly among the major employers within the municipality.

There are 20,472 employees commuting daily into the EPZ. These employees use 18,784 vehicles. Table 3-6 presents non-EPZ Resident employee and vehicle estimates by Area. Figure 3-8 and Figure 3-9 present these data by sector.

3.5 Medical Facilities

There are no inpatient medical facilities within the Monroe County portion of the EPZ. Data were provided by Miami-Dade County for each of the medical facilities within the EPZ. Chapter 8 details the evacuation of medical facilities and their patients. The number and type of evacuating vehicles that need to be provided depend on the patients' state of health. It is estimated that buses can transport up to 30 people; wheelchair buses up to 15 people; and ambulances, up to 2 people.

3.6 Total Demand in Addition to Permanent Population

Vehicles will be traveling through the EPZ (external-external trips) at the time of an accident. After the ATE is announced, these through-travelers will also evacuate. These through vehicles are assumed to travel on the major routes traversing the EPZ – US 1, Florida Turnpike, and Don Shula Expressway. It is assumed that this traffic will continue to enter the EPZ during the first 120 minutes following the ATE.

Average annual daily traffic (AADT) data was obtained from Florida Department of Transportation to estimate the number of vehicles per hour on the aforementioned routes. The AADT was multiplied by the K-Factor, which is the proportion of the AADT on a roadway segment or link during the design hour, resulting in the design hour volume (DHV). The design hour is usually the 30th highest hourly traffic volume of the year, measured in vehicles per hour (vph). The DHV is then multiplied by the D-Factor, which is the proportion of the DHV occurring in the peak direction of travel (also known as the directional split). The resulting values are the directional design hourly volumes (DDHV), and are presented in Table 3-7, for each of the routes considered. The DDHV is then multiplied by 120 minutes (access control points – ACP – are assumed to be activated at 120 minutes after the ATE) to estimate the total number of external vehicles loaded on the analysis network. As indicated, there are 5,882 vehicles entering the EPZ as external-external trips prior to the activation of the ACP and the diversion of this traffic. This number is reduced by sixty percent for evening scenarios (scenarios 5 and 10) as discussed in Section 6.

3.7 Special Event

One special event is considered for the ETE study – a NASCAR race at the Homestead-Miami Speedway. The special event occurs on a Sunday in November (winter, weekend, midday, good weather). Based on discussions with representatives of the speedway, the facility provides parking for approximately 30,000 vehicles and a separate capacity for 1,300 recreational vehicles. The current capacity of the grandstands is 65,000 people; however, as many as 100,000 people typically show up for the race. Overhead imagery was used to determine the boundaries of the parking lots for the speedway and GIS software was used to estimate the square footage of each parking lot. Table 3-8 estimates the capacity of each lot by multiplying the ratio of square footage of the lot to total square footage of all lots and the total capacity of 30,000 vehicles. A recreational vehicle is represented as two passenger car equivalents in the simulation model based on its larger size and more sluggish operating characteristics. A total of 32,600 vehicles would evacuate from the speedway during this event. It is conservatively assumed that none of the people attending the race are EPZ residents.

A detailed traffic control manual was created for the 1999 Winston Cup Race to help facilitate the flow of traffic to and from the speedway. The traffic management procedures outlined in the manual are used for the major events at the speedway. Fifty-four intersections are identified as traffic control points in the plan. The control tactic at each of these intersections was input to the simulation model for this sensitivity study. Special lane treatments are also used on the roads surrounding the speedway, based on discussions with the county and local police:

- Contra-flow is used on Speedway Boulevard (SW 137th Avenue) to provide four lanes northbound after the race.
  - One lane turns west on SW 288th Street to access the Florida Turnpike northbound.
  - One lane accesses the turnpike northbound at the entrance ramp from SW 137th Avenue north of SW 288th Street
  - The remaining two northbound lanes continue through to the intersection with SW 268th Street. One lane turns left toward U.S. Highway 1, while the other lane can go through or turn right to access the turnpike via Allapatah Road.
- The shoulder of the Florida Turnpike northbound is used as an additional lane from the entrance ramps from Campbell Drive to the toll booths north of Exit 9.

These lane treatments are not indicated in the 1999 manual; however they were used in this study. Traffic control should be established at the intersection of SW 137th Avenue and SW 268th Street to prevent southbound movement on SW 137th Avenue, which would conflict with the northbound contra-flow. For details of the traffic control tactics at each intersection, refer to the Homestead Police Department's Operations Plan for the 1999 Winston Cup Race.

3.8 Summary of Demand

A summary of total population and vehicle demand within the EPZ is provided in Table 3-9 and Table 3-10, respectively. This summary includes all population groups described in this section. Additional population groups – transit-dependent, special facility and school population demand – are described in greater detail in Section 8. A total of 342,990 people and 145,885 vehicles are considered in this study.

Table 3-1. EPZ Permanent Resident Population

Area	2000 Population	2010 Population
1	0	0
2	0	0
3	0	0
4	5,217	7,506
5	33,753	44,816
6	29,087	43,313
7	15,288	20,153
8	55,982	89,322
9	409	116
10	932	1,103
TOTAL	**140,668**	**206,329**
EPZ Population Growth:		**46.68%**

Table 3-2. Permanent Resident Population and Vehicles by Area

Area	Residents	Resident Vehicles
1	0	0
2	0	0
3	0	0
4	7,506	3,289
5	44,816	19,625
6	43,313	18,970
7	20,153	8,824
8	89,322	39,109
9	116	51
10	1,103	484
TOTAL	**206,329**	**90,352**

Table 3-3. Shadow Population and Vehicles by Sector

Sector	Population	Evacuating Vehicles
E	0	0
ENE	3	0
ESE	0	0
N	58,639	25,675
NE	15	0
NNE	13	6
NNW	93,119	40,796
NW	6,585	2,881
S	30	13
SE	0	0
SSE	2	1
SSW	3	1
SW	1	0
W	6,599	2,892
WNW	9,151	4,011
WSW	132	58
TOTAL	**174,292**	**76,334**

Note: Residents living on Elliot Key are assumed to evacuate by boat since there are no roads on the island.

Table 3-4. Summary of Transients and Transient Vehicles

Area	Transients	Transient Vehicles
1	0	0
2	0	0
3	0	0
4	2,400	570
5	0	0
6	14,478	5,105
7	518	169
8	8,916	3,050
9	0	0
10	6,763	4,540
Total	**33,075**	**13,434**

Table 3-5. Employment by Municipality

	2000 Census — Journey to Work Statistics Supplemented with Phone Call Data						2009 Data Supplemented with Phone Call Data[a]	
	Total Employment	Employees who are not EPZ residents	Employees who are EPZ residents	Percent Employees who reside outside EPZ	Percent Municipality Employment Centers in EPZ	Adjusted employees who are not EPZ residents[b]	Non-EPZ resident employees[c]	Vehicles
Cutler Bay	5242	3355	1887	64%	100%	3355	3814[d]	3500
South Miami Heights	4250	3325	925	78%	10%	333	376	345
Goulds	802	522	280	65%	100%	522	623[d]	572
Homestead	14,931	8576	6355	57%	100%	8576	9685	8886
Lakes by the Bay	875	466	409	53%	100%	466	526	483
Princeton	1253	650	603	52%	100%	650	734	673
Leisure City	1354	639	715	47%	100%	639	722	662
Naranja	954	456	498	48%	100%	456	515	472
Florida City	2286	1203	1083	53%	100%	1203	1410[d]	1295
Turkey Point Nuclear Power Plant	**CURRENT EMPLOYMENT FIGURES PROVIDED BY FPL**						1467	1,346
Ocean Reef Community	**CURRENT EMPLOYMENT FIGURES PROVIDED BY ORC PUBLIC SAFETY**						600	550
TOTAL EMPLOYMENT	**31,947**	**19,192**	**12,755**	**60%**	**N/A**	**16,200**	**20,472**	**18,784**

(a) Miami-Dade and Monroe County emergency management personnel confirmed that employment characteristics have not changed significantly since 2009. See discussion in Section 3.4
(b) Calculated as the product of "Employees who are not EPZ Residents" and "% Municipality Employment Centers in EPZ".
(c) U.S. Department of Labor statistics indicate that Miami-Dade County had 967,543 employees at the end of 2003 and 1,007,587 at the end of 2006, equivalent to an exponential growth rate of 1.35% per year. This growth rate was used to extrapolate employment data in 2009.
(d) Additional data provided directly from facilities through phone calls was added to this value.

Table 3-6. Summary of Non-EPZ Resident Employees and Employee Vehicles

Area	Employees	Employee Vehicles
1	1,467	1,346
2	0	0
3	0	0
4	0	0
5	2,523	2,317
6	3,353	3,077
7	696	638
8	11,783	10,810
9	50	46
10	600	550
TOTAL	**20,472**	**18,784**

Table 3-7. PTN EPZ External Traffic

Upstream Node	Downstream Node	Road Name	Direction	FLDOT[1] AADT	K-Factor[2]	D-Factor[2]	Hourly Volume	External Traffic
8474	474	Florida Turnpike	Southbound	27,500	0.107	0.167	490	980
8010	476	Don Shula Expressway	Southbound				490	980
8124	453	US 1	Southbound				490	980
8237	237	US 1	Northbound	27,500	0.107	0.500	1,471	2,942
							TOTAL:	**5,882**

1. http://www.dot.state.fl.us/planning/statistics/gis/trafficdata.shtm
2. HCM 2012

Table 3-8. Homestead-Miami Speedway Parking Lot Capacity PTN EPZ External Traffic

LOT	Square Footage of Lot	Percent of Total Square Footage	Vehicle Capacity (PCE's)
A	1,236,457	11.2%	3,372
B	2,178,675	19.8%	5,942
C	1,106,421	10.1%	3,017
D	1,082,053	9.8%	2,951
E	1,230,875	11.2%	3,357
I	227,426	2.1%	620
J	77,128	0.7%	210
K	381,971	3.5%	1,042
L	1,841,352	16.7%	5,022
Blue	495,551	4.5%	1,351
Green/Red	1,142,457	10.4%	3,116
RV	N/A	N/A	2,600
Total	**11,000,366**	**100%**	**32,600**

[1]http://www.dot.state.fl.us/planning/statistics/gis/trafficdata.shtm
[2]HCM 2010

Table 3-9. Summary of Population Demand

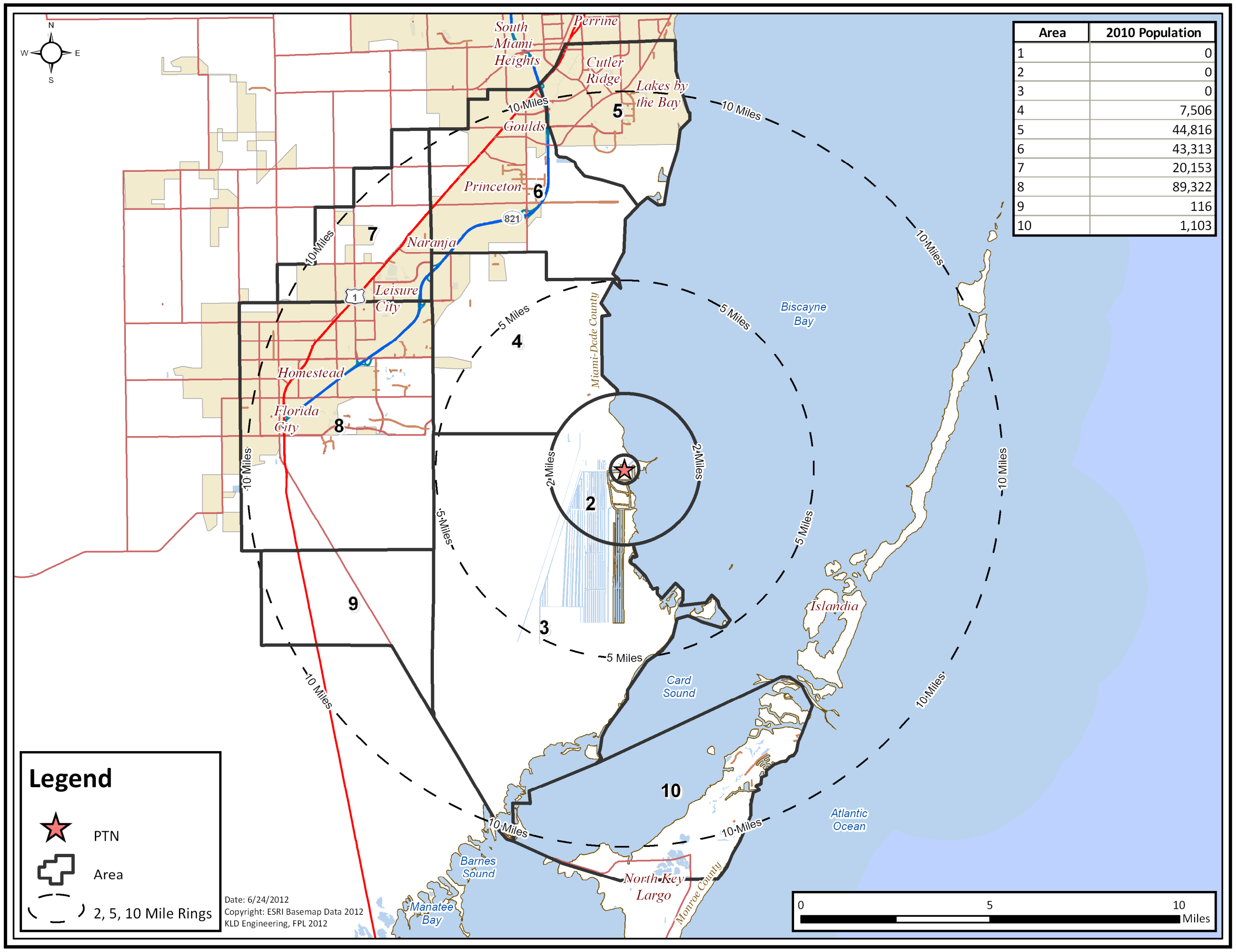
Area	Residents	Transit-Dependent	Transients	Employees	Special Facilities	Schools	Shadow Population	External Traffic	Total
1	0	0	0	1,467	0	0	0	0	1,467
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	7,506	320	2,400	0	27	2,069	0	0	12,322
5	44,816	1,908	0	2,523	314	6,540	0	0	56,101
6	43,313	1,844	14,478	3,353	256	4,392	0	0	67,636
7	20,153	858	518	696	46	6,375	0	0	28,646
8	89,322	3,803	8,916	11,783	717	16,203	0	0	130,744
9	116	0	0	50	55	12	0	0	233
10	1,103	0	6,763	600	0	0	0	0	8,466
Shadow	0	0	0	0	0	2,517	34,858	0	37,375
Total	206,329	8,733	33,075	20,472	1,415	38,108	34,858	0	342,990

NOTE: Shadow Population has been reduced to 20%. Refer to Figure 2-1 for additional information.
NOTE: Special Facilities include medical facilities and correctional facilities.

Table 3-10. Summary of Vehicle Demand

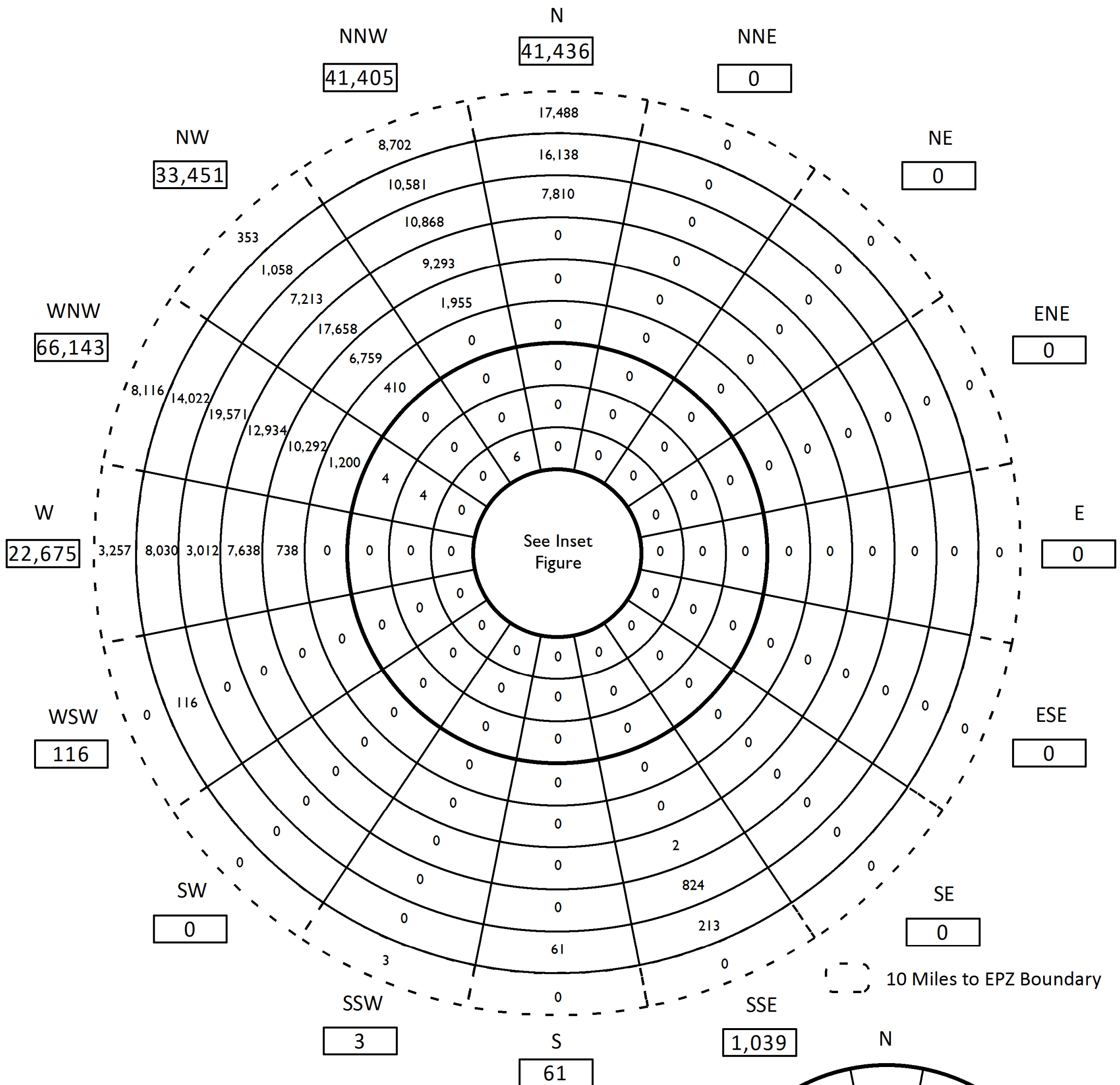
Area	Residents	Transit-Dependent	Transients	Employees	Special Facilities	Schools	Shadow Population	External Traffic	Total
1	0	0	0	1,346	0	0	0	0	1,346
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	3,289	20	570	0	16	62	0	0	3,957
5	19,625	128	0	2,317	90	198	0	0	22,358
6	18,970	124	5,105	3,077	95	136	0	0	27,507
7	8,824	56	169	638	2	248	0	0	9,937
8	39,109	254	3,050	10,810	147	512	0	0	53,882
9	51	0	0	46	4	0	0	0	101
10	484	0	4,540	550	0	0	0	0	5,574
Shadow	0	0	0	0	0	74	15,267	5,882	21,223
Total	90,352	582	13,434	18,784	354	1,230	15,267	5,882	145,885

NOTE: Buses represented as two passenger vehicles. Refer to Section 8 for additional information.



Area	2010 Population
1	0
2	0
3	0
4	7,506
5	44,816
6	43,313
7	20,153
8	89,322
9	116
10	1,103

Figure 3-1. PTN EPZ



Resident Population

Miles	Subtotal by Ring	Cumulative Total
0 - 1	0	0
1 - 2	0	0
2 - 3	6	6
3 - 4	4	10
4 - 5	4	14
5 - 6	1,610	1,624
6 - 7	19,744	21,368
7 - 8	47,525	68,893
8 - 9	49,298	118,191
9 - 10	50,219	168,410
10 - EPZ	37,919	206,329
	Total:	206,329

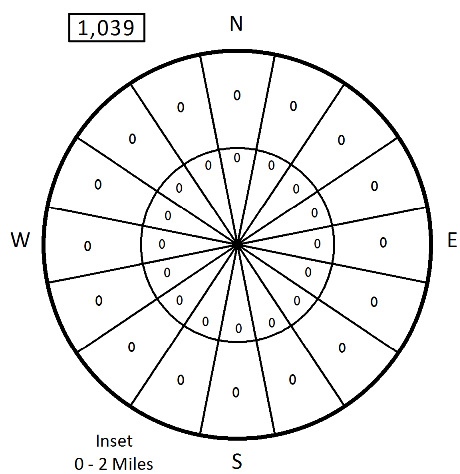
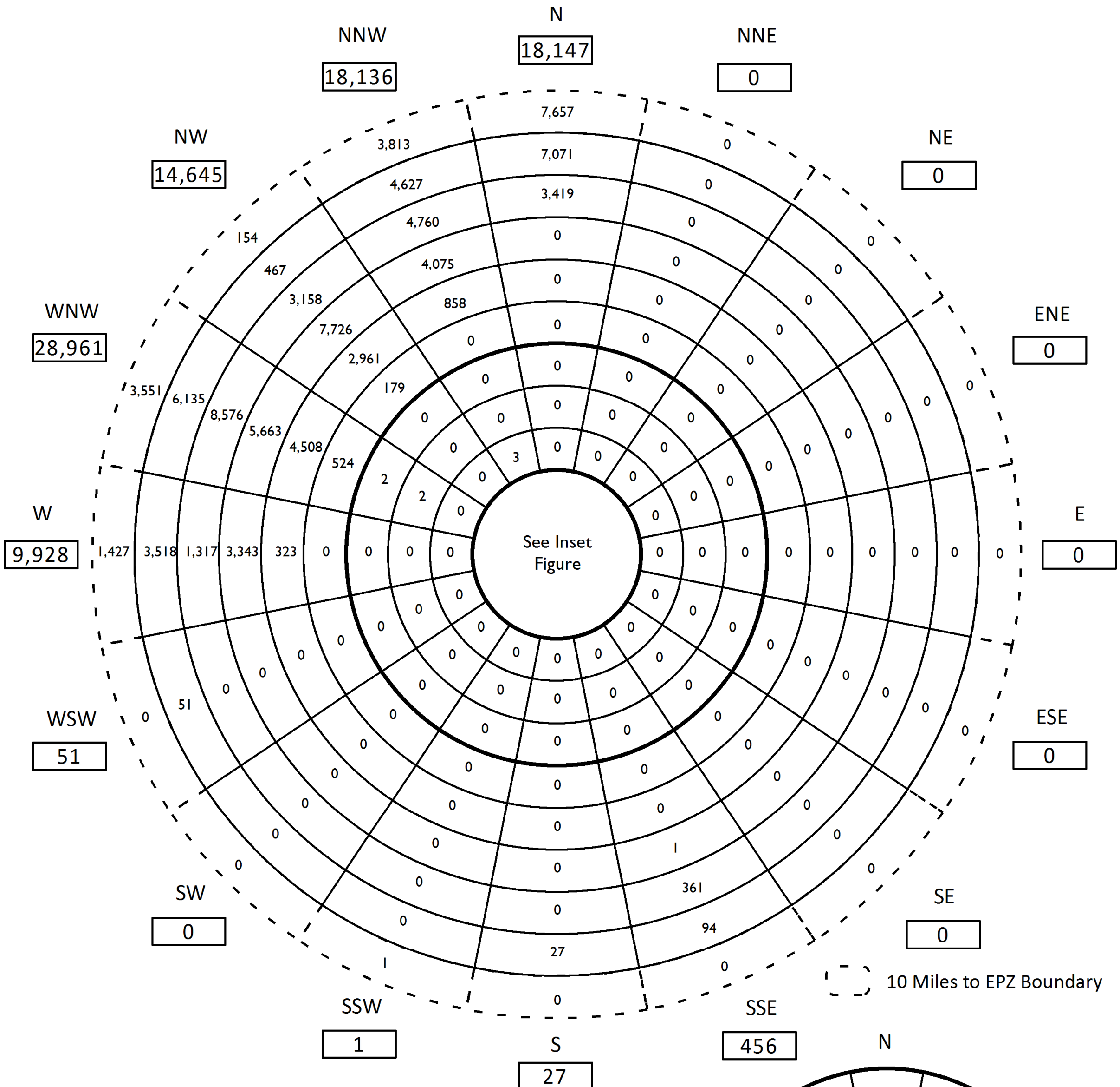


Figure 3-2. Permanent Resident Population by Sector



Resident Vehicles

Miles	Subtotal by Ring	Cumulative Total
0 - 1	0	0
1 - 2	0	0
2 - 3	3	3
3 - 4	2	5
4 - 5	2	7
5 - 6	703	710
6 - 7	8,650	9,360
7 - 8	20,808	30,168
8 - 9	21,591	51,759
9 - 10	21,990	73,749
10 - EPZ	16,603	90,352
	Total:	90,352

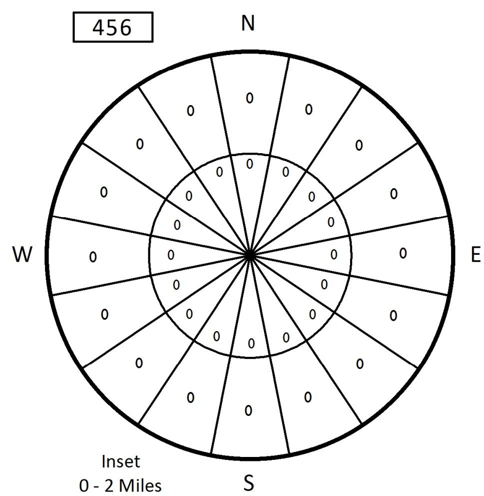
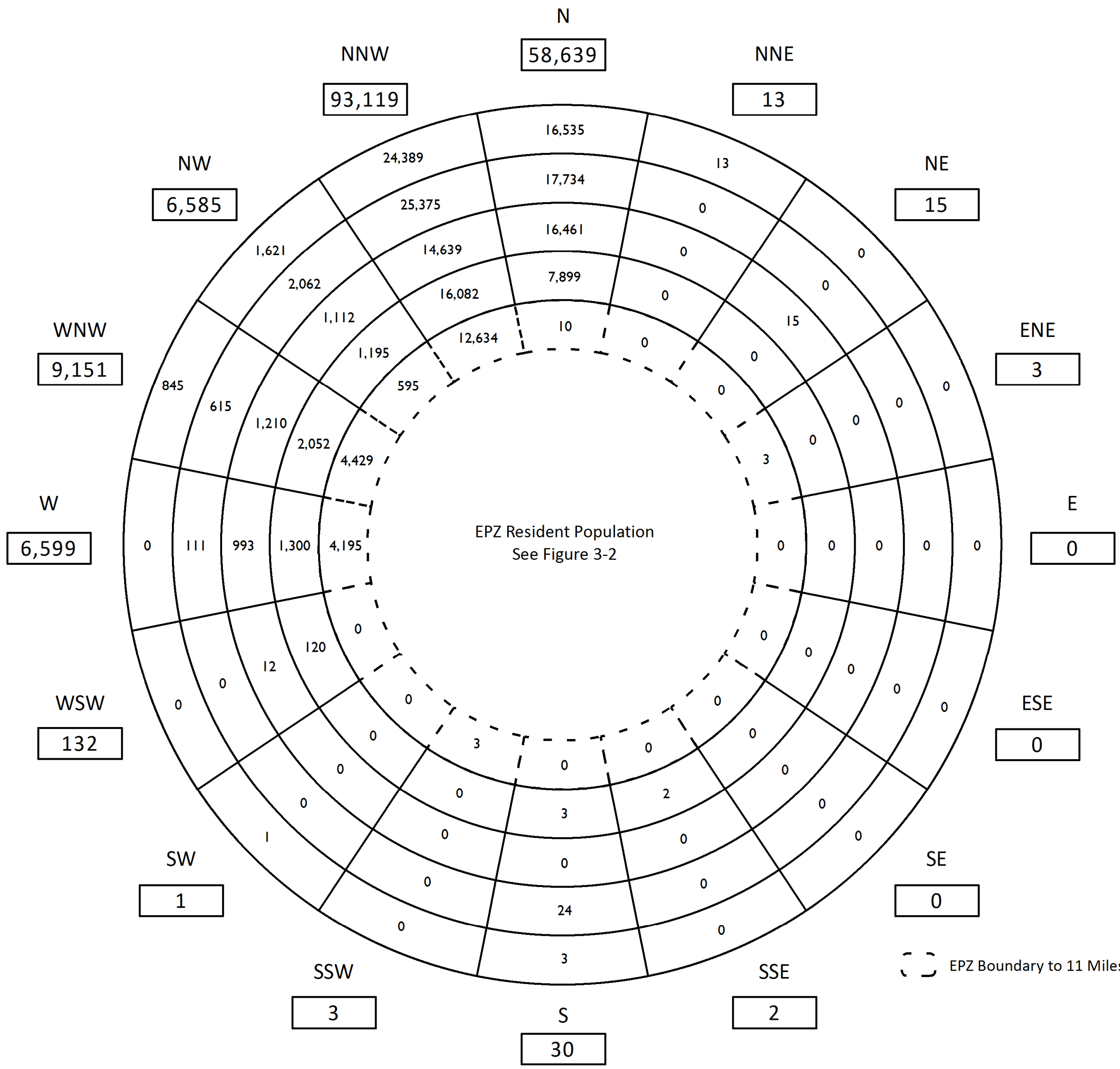


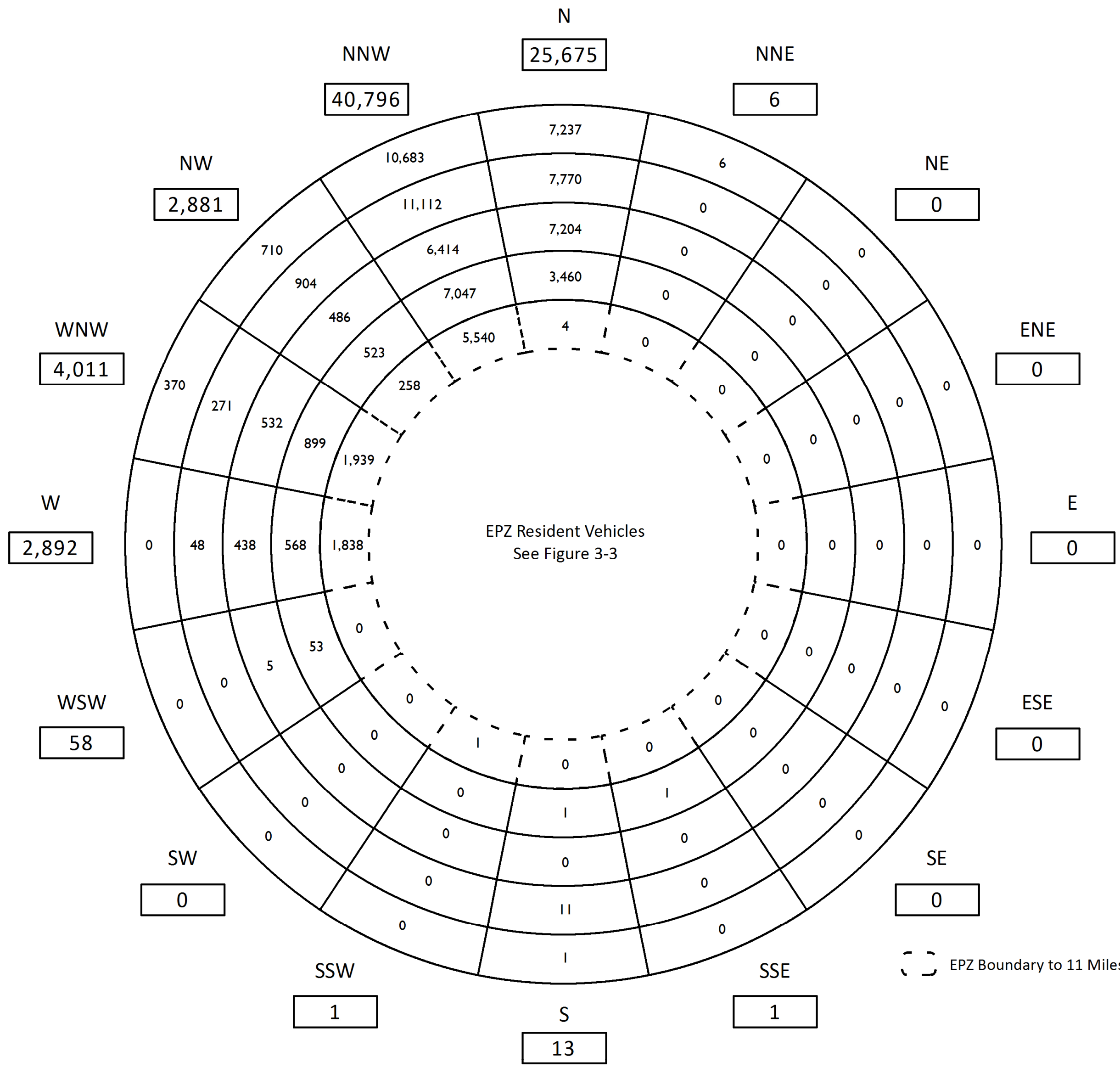
Figure 3-3. Permanent Resident Vehicles by Sector



Shadow Population

Miles	Subtotal by Ring	Cumulative Total
EPZ - 11	21,869	21,869
11 - 12	28,653	50,522
12 - 13	34,442	84,964
13 - 14	45,921	130,885
14 - 15	43,407	174,292
	Total:	174,292

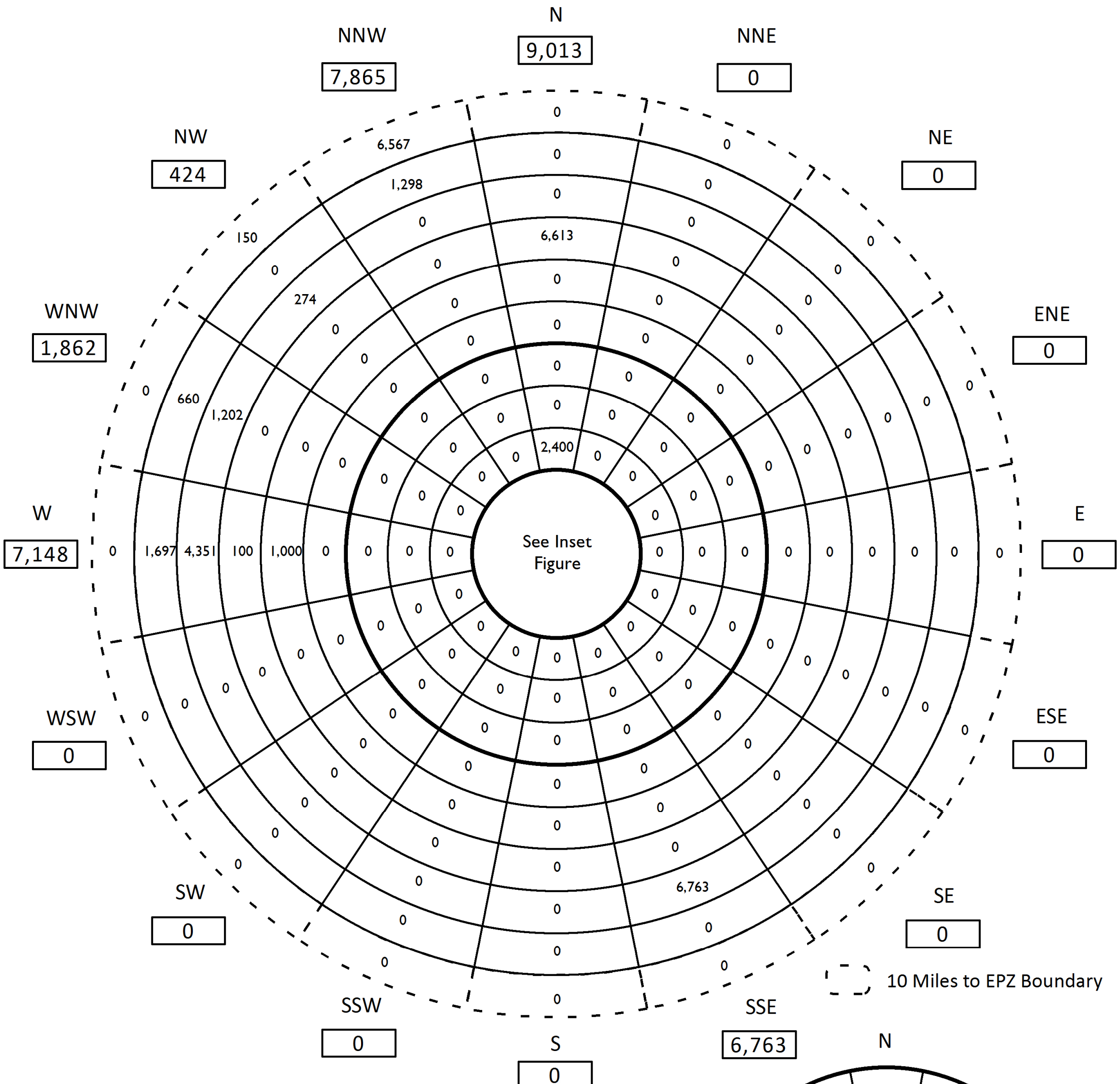
Figure 3-4. Shadow Population by Sector



Shadow Vehicles

Miles	Subtotal by Ring	Cumulative Total
EPZ - 11	9,580	9,580
11 - 12	12,552	22,132
12 - 13	15,079	37,211
13 - 14	20,116	57,327
14 - 15	19,007	76,334
	Total:	76,334

Figure 3-5. Shadow Vehicles by Sector



Transients

Miles	Subtotal by Ring	Cumulative Total
0 - 1	0	0
1 - 2	0	0
2 - 3	2,400	2,400
3 - 4	0	2,400
4 - 5	0	2,400
5 - 6	0	2,400
6 - 7	1,000	3,400
7 - 8	6,713	10,113
8 - 9	12,590	22,703
9 - 10	3,655	26,358
10 - EPZ	6,717	33,075
	Total:	33,075

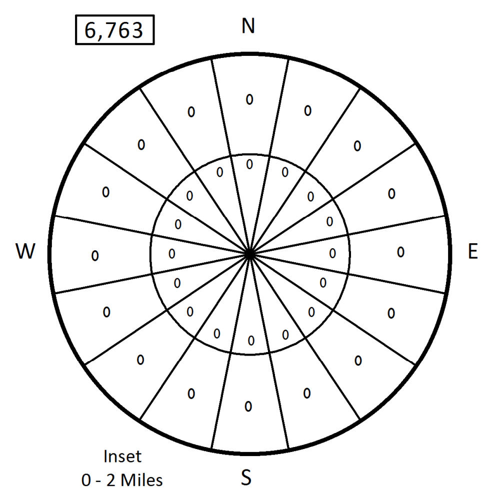
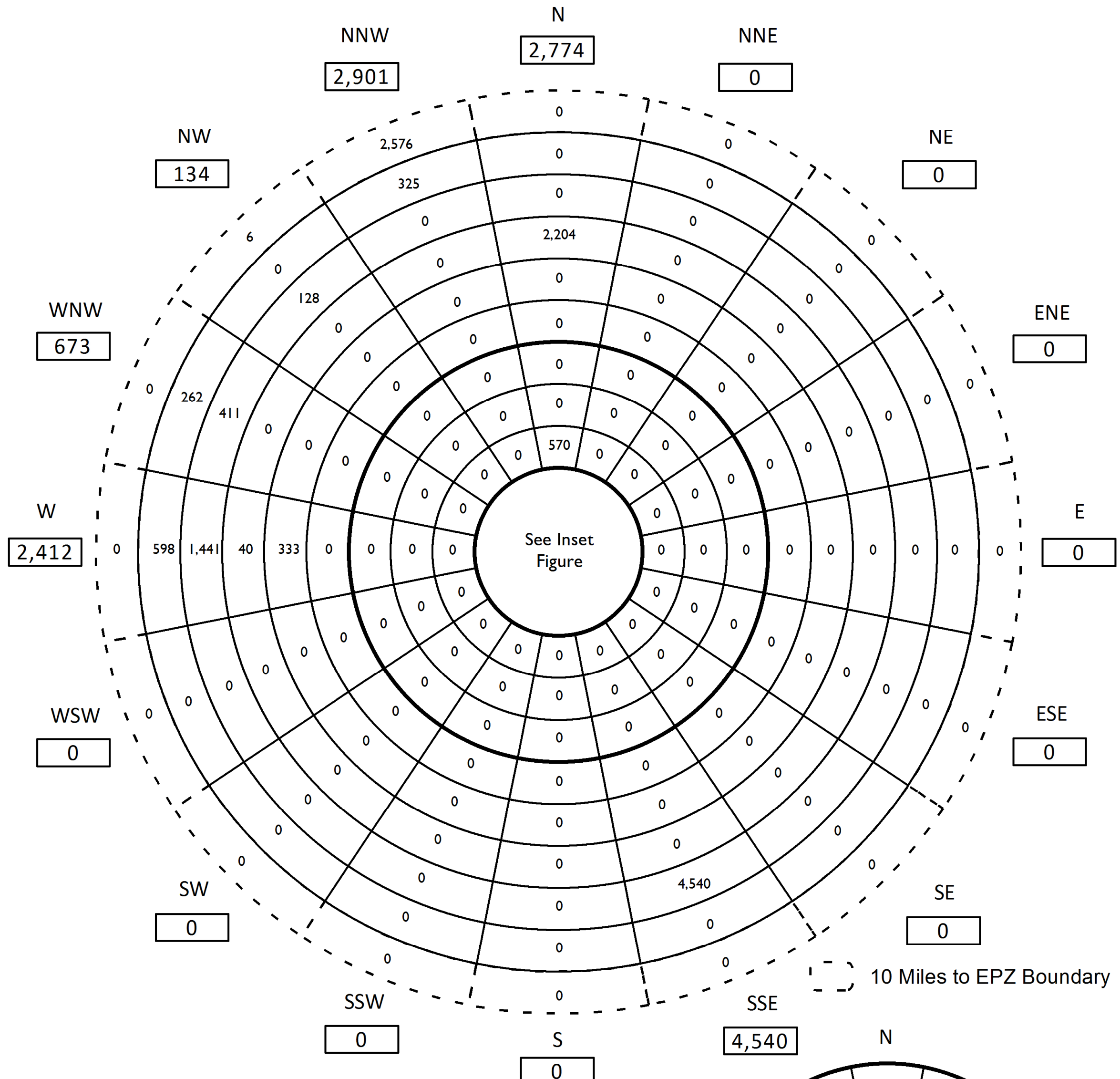
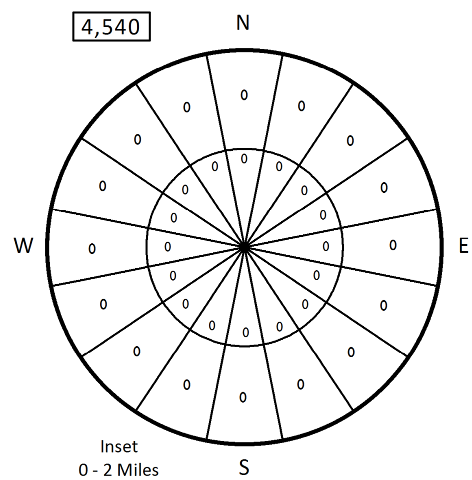


Figure 3-6. Transient Population by Sector

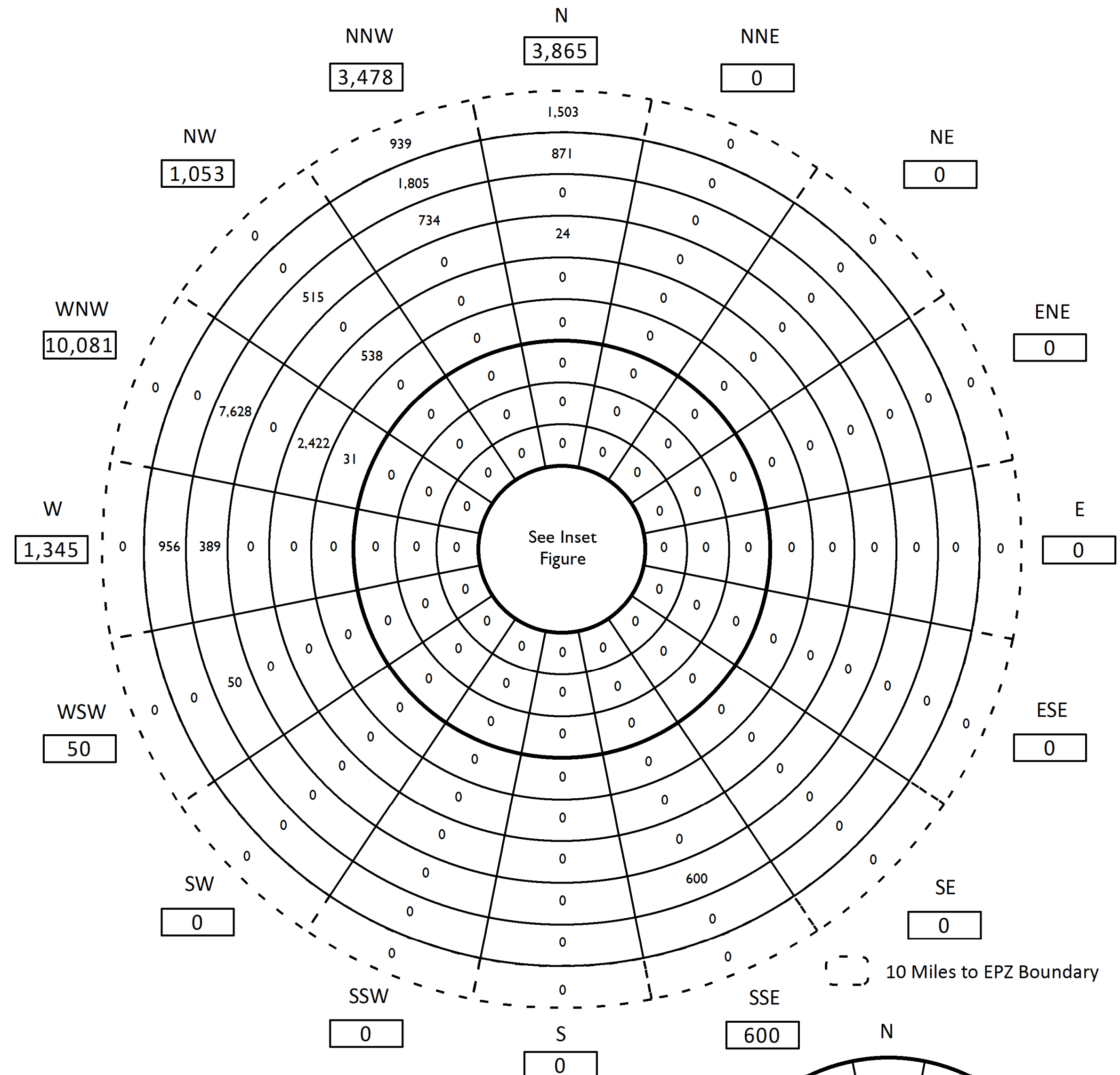




Transient Vehicles

Miles	Subtotal by Ring	Cumulative Total
0 - 1	0	0
1 - 2	0	0
2 - 3	570	570
3 - 4	0	570
4 - 5	0	570
5 - 6	0	570
6 - 7	333	903
7 - 8	2,244	3,147
8 - 9	6,520	9,667
9 - 10	1,185	10,852
10 - EPZ	2,582	13,434
	Total:	13,434

Figure 3-7. Transient Vehicles by Sector



Employees

Miles	Subtotal by Ring	Cumulative Total
0 - 1	1,467	1,467
1 - 2	0	1,467
2 - 3	0	1,467
3 - 4	0	1,467
4 - 5	0	1,467
5 - 6	31	1,498
6 - 7	2,960	4,458
7 - 8	24	4,482
8 - 9	9,916	14,398
9 - 10	3,632	18,030
10 - EPZ	2,442	20,472
	Total:	20,472

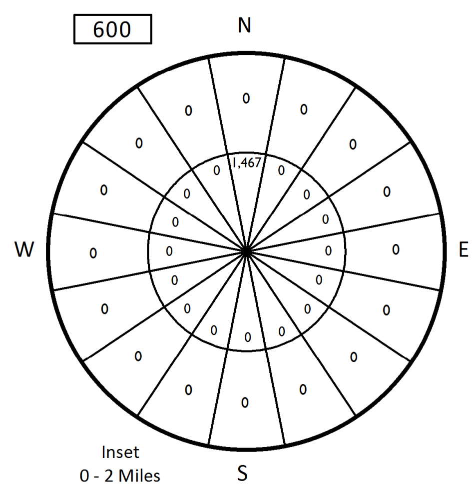
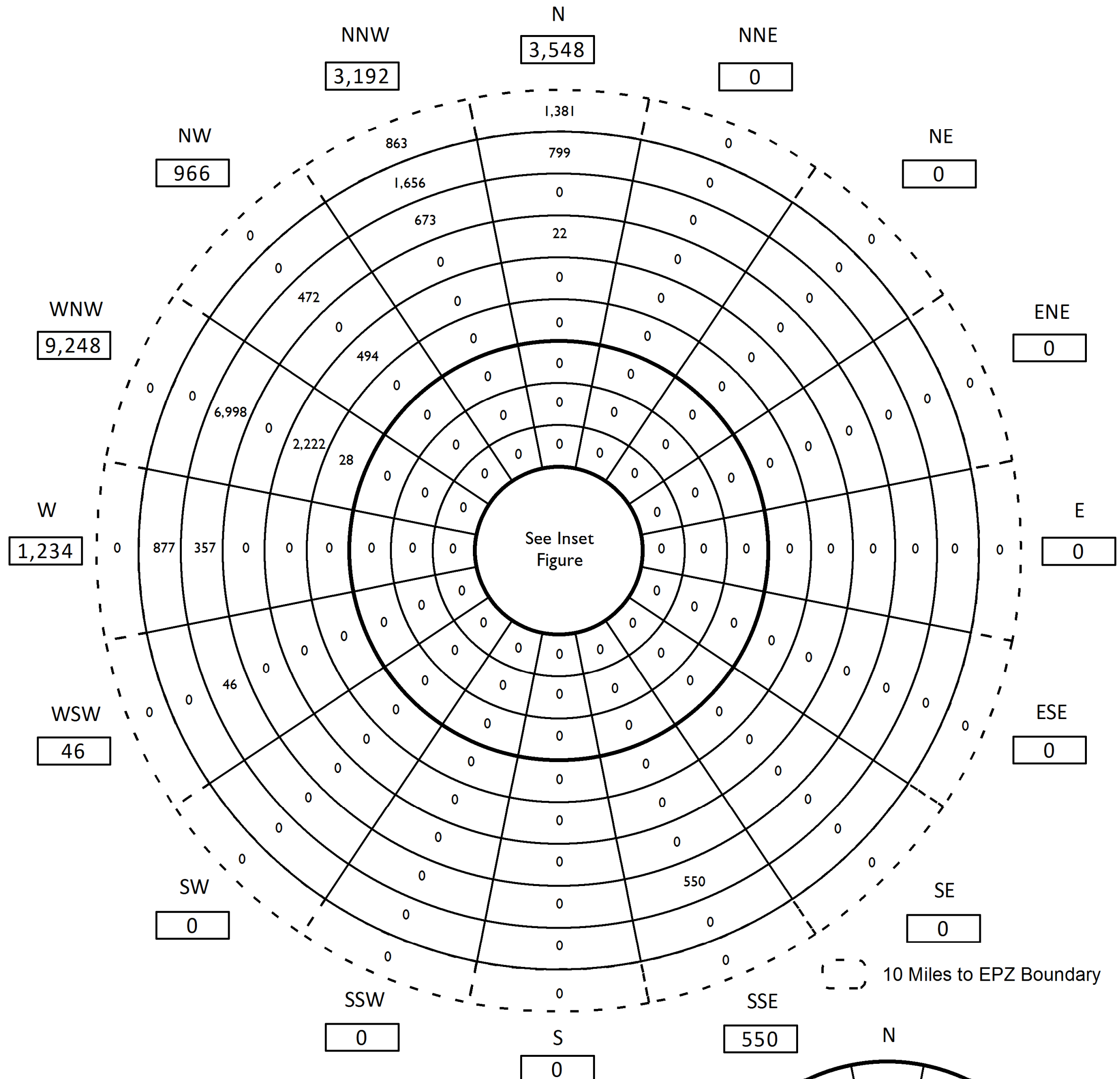


Figure 3-8. Employee Population by Sector



Employee Vehicles

Miles	Subtotal by Ring	Cumulative Total
0 - 1	1,346	1,346
1 - 2	0	1,346
2 - 3	0	1,346
3 - 4	0	1,346
4 - 5	0	1,346
5 - 6	28	1,374
6 - 7	2,716	4,090
7 - 8	22	4,112
8 - 9	9,096	13,208
9 - 10	3,332	16,540
10 - EPZ	2,244	18,784
	Total:	18,784

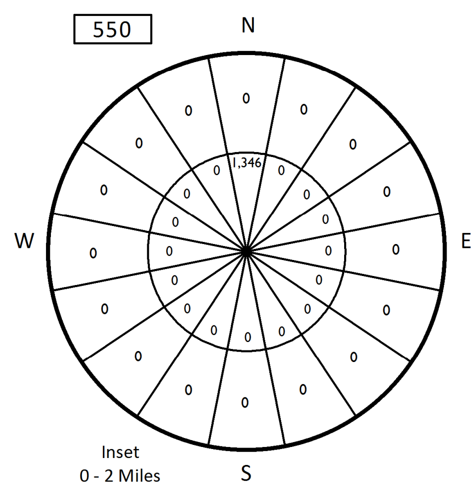


Figure 3-9. Employee Vehicles by Sector

4 ESTIMATION OF HIGHWAY CAPACITY

The ability of the road network to service vehicle demand is a major factor in determining how rapidly an evacuation can be completed. The capacity of a road is defined as the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane of roadway during a given time period under prevailing roadway, traffic and control conditions, as stated in the 2010 Highway Capacity Manual (HCM 2010).

In discussing capacity, different operating conditions have been assigned alphabetical designations, A through F, to reflect the range of traffic operational characteristics. These designations have been termed "levels of service". For example, LOS A connotes free-flow and high-speed operating conditions; LOS F represents a forced flow condition. LOS E describes traffic operating at or near capacity.

Another concept, closely associated with capacity, is “service volume” (SV). Service volume is defined as “The maximum hourly rate at which vehicles, bicycles or persons reasonably can be expected to traverse a point or uniform section of a roadway during an hour under specific assumed conditions while maintaining a designated level of service.” This definition is similar to that for capacity. The major distinction is that values of SV vary from one LOS to another, while capacity is the service volume at the upper bound of LOS E, only.

This distinction is illustrated in Exhibit 11-17 of the HCM 2010. As indicated there, the SV varies with free flow speed (FFS), and LOS. The SV is calculated by the DYNEV II simulation model, based on the specified link attributes, FFS, capacity, control device and traffic demand.

Other factors also influence capacity. These include, but are not limited to:

- Lane width
- Shoulder width
- Pavement condition
- Horizontal and vertical alignment (curvature and grade)
- Percent truck traffic
- Control device (and timing, if it is a signal)
- Weather conditions (rain, snow, fog, wind speed, ice)

These factors are considered during the road survey and in the capacity estimation process; some factors have greater influence on capacity than others. For example, lane and shoulder width have only a limited influence on base free flow speed[1] (BFFS) according to Exhibit 15-7 of the HCM. Consequently, lane and shoulder widths at the narrowest points were observed during the road survey and these observations were recorded, but no detailed measurements of lane or shoulder width were taken. Horizontal and vertical alignment can influence both FFS and capacity. The estimated FFS were measured using the survey vehicle’s speedometer and observing local traffic, under free flow conditions. Capacity is estimated from the procedures of

[1] A very rough estimate of BFFS might be taken as the posted speed limit plus 10 mph (HCM 2010 Page 15-15)

the 2010 HCM. For example, HCM Exhibit 7-1(b) shows the sensitivity of Service Volume at the upper bound of LOS D to grade (capacity is the Service Volume at the upper bound of LOS E).

As discussed in Section 2.3, it is necessary to adjust capacity figures to represent the prevailing conditions during inclement weather. Based on limited empirical data, weather conditions such as rain reduce the values of free speed and of highway capacity by approximately 10 percent. Over the last decade new studies have been made on the effects of rain on traffic capacity. These studies indicate a range of effects between 5 and 20 percent depending on wind speed and precipitation rates. As indicated in Section 2.3, we employ a reduction in free speed and in highway capacity of 10 percent for rain.

Since congestion arising from evacuation may be significant, estimates of roadway capacity must be determined with great care. Because of its importance, a brief discussion of the major factors that influence highway capacity is presented in this section.

Rural highways generally consist of: (1) one or more uniform sections with limited access (driveways, parking areas) characterized by "uninterrupted" flow; and (2) approaches to at-grade intersections where flow can be "interrupted" by a control device or by turning or crossing traffic at the intersection. Due to these differences, separate estimates of capacity must be made for each section. Often, the approach to the intersection is widened by the addition of one or more lanes (turn pockets or turn bays), to compensate for the lower capacity of the approach due to the factors there that can interrupt the flow of traffic. These additional lanes are recorded during the field survey and later entered as input to the DYNEV II system.

4.1 Capacity Estimations on Approaches to Intersections

At-grade intersections are apt to become the first bottleneck locations under local heavy traffic volume conditions. This characteristic reflects the need to allocate access time to the respective competing traffic streams by exerting some form of control. During evacuation, control at critical intersections will often be provided by traffic control personnel assigned for that purpose, whose directions may supersede traffic control devices. The existing traffic management plans documented in the county emergency plans are extensive and were adopted without change.

The per-lane capacity of an approach to a signalized intersection can be expressed (simplistically) in the following form:

$$Q_{cap,m} = \left(\frac{3600}{h_m}\right) \times \left(\frac{G-L}{C}\right)_m = \left(\frac{3600}{h_m}\right) \times P_m$$

where:

$Q_{cap,m}$ = Capacity of a single lane of traffic on an approach, which executes movement, *m*, upon entering the intersection; vehicles per hour (vph)

h_m	=	Mean queue discharge headway of vehicles on this lane that are executing movement, *m*; seconds per vehicle
G	=	Mean duration of GREEN time servicing vehicles that are executing movement, *m*, for each signal cycle; seconds
L	=	Mean "lost time" for each signal phase servicing movement, *m*; seconds
C	=	Duration of each signal cycle; seconds
P_m	=	Proportion of GREEN time allocated for vehicles executing movement, *m*, from this lane. This value is specified as part of the control treatment.
m	=	The movement executed by vehicles after they enter the intersection: through, left-turn, right-turn, and diagonal.

The turn-movement-specific mean discharge headway h_m, depends in a complex way upon many factors: roadway geometrics, turn percentages, the extent of conflicting traffic streams, the control treatment, and others. A primary factor is the value of "saturation queue discharge headway", h_{sat}, which applies to through vehicles that are not impeded by other conflicting traffic streams. This value, itself, depends upon many factors including motorist behavior. Formally, we can write,

$$h_m = f_m(h_{sat}, F, F_2, \dots)$$

where:

h_{sat}	=	Saturation discharge headway for through vehicles; seconds per vehicle
F_1, F_2	=	The various known factors influencing h_m
$f_m(\ )$	=	Complex function relating h_m to the known (or estimated) values of h_{sat}, F_1, F_2, …

The estimation of h_m for specified values of h_{sat}, F_1, F_2, … is undertaken within the DYNEV II simulation model by a mathematical model[2]. The resulting values for h_m always satisfy the condition:

$$h_m \geq h_{sat}$$

That is, the turn-movement-specific discharge headways are always greater than, or equal to the saturation discharge headway for through vehicles. These headways (or its inverse

[2] Lieberman, E., "Determining Lateral Deployment of Traffic on an Approach to an Intersection", McShane, W. & Lieberman, E., "Service Rates of Mixed Traffic on the far Left Lane of an Approach". Both papers appear in Transportation Research Record 772, 1980. Lieberman, E., Xin, W., "Macroscopic Traffic Modeling For Large-Scale Evacuation Planning", presented at the TRB 2012 Annual Meeting, January 22-26, 2012

equivalent, “saturation flow rate”), may be determined by observation or using the procedures of the HCM 2010.

The above discussion is necessarily brief given the scope of this ETE report and the complexity of the subject of intersection capacity. In fact, Chapters 18, 19 and 20 in the HCM 2010 address this topic. The factors, F_1, F_2,…, influencing saturation flow rate are identified in equation (18-5) of the HCM 2010.

The traffic signals within the EPZ and shadow region are modeled using representative phasing plans and phase durations obtained as part of the field data collection. Traffic responsive signal installations allow the proportion of green time allocated (P_m) for each approach to each intersection to be determined by the expected traffic volumes on each approach during evacuation circumstances. The amount of green time (G) allocated is subject to maximum and minimum phase duration constraints; 2 seconds of yellow time are indicated for each signal phase and 1 second of all-red time is assigned between signal phases, typically. If a signal is pre-timed, the yellow and all-red times observed during the road survey are used. A lost time (L) of 2.0 seconds is used for each signal phase in the analysis.

4.2 Capacity Estimation along Sections of Highway

The capacity of highway sections -- as distinct from approaches to intersections -- is a function of roadway geometrics, traffic composition (e.g. percent heavy trucks and buses in the traffic stream) and, of course, motorist behavior. There is a fundamental relationship which relates service volume (i.e. the number of vehicles serviced within a uniform highway section in a given time period) to traffic density. The top curve in Figure 4-1 illustrates this relationship.

As indicated, there are two flow regimes: (1) free flow (left side of curve); and (2) forced flow (right side). In the free flow regime, the traffic demand is fully serviced; the service volume increases as demand volume and density increase, until the service volume attains its maximum value, which is the capacity of the highway section. As traffic demand and the resulting highway density increase beyond this "critical" value, the rate at which traffic can be serviced (i.e. the service volume) can actually decline below capacity (“capacity drop”). Therefore, in order to realistically represent traffic performance during congested conditions (i.e. when demand exceeds capacity), it is necessary to estimate the service volume, V_F, under congested conditions.

The value of V_F can be expressed as:

$$V_F = R \times Capacity$$

where:

R = Reduction factor which is less than unity

We have employed a value of R=0.90. The advisability of such a capacity reduction factor is based upon empirical studies that identified a fall-off in the service flow rate when congestion occurs at "bottlenecks" or "choke points" on a freeway system. Zhang and Levinson[3] describe a research program that collected data from a computer-based surveillance system (loop detectors) installed on the Interstate Highway System, at 27 active bottlenecks in the twin cities metro area in Minnesota over a 7-week period. When flow breakdown occurs, queues are formed which discharge at lower flow rates than the maximum capacity prior to observed breakdown. These queue discharge flow (QDF) rates vary from one location to the next and also vary by day of week and time of day based upon local circumstances. The cited reference presents a mean QDF of 2,016 passenger cars per hour per lane (pcphpl). This figure compares with the nominal capacity estimate of 2,250 pcphpl estimated for the ETE and indicated in Appendix K for freeway links. The ratio of these two numbers is 0.896 which translates into a capacity reduction factor of 0.90.

Since the principal objective of evacuation time estimate analyses is to develop a "realistic" estimate of evacuation times, use of the representative value for this capacity reduction factor (R=0.90) is justified. This factor is applied only when flow breaks down, as determined by the simulation model.

Rural roads, like freeways, are classified as "uninterrupted flow" facilities. (This is in contrast with urban street systems which have closely spaced signalized intersections and are classified as "interrupted flow" facilities.) As such, traffic flow along rural roads is subject to the same effects as freeways in the event traffic demand exceeds the nominal capacity, resulting in queuing and lower QDF rates. As a practical matter, rural roads rarely break down at locations away from intersections. Any breakdowns on rural roads are generally experienced at intersections where other model logic applies, or at lane drops which reduce capacity there. Therefore, the application of a factor of 0.90 is appropriate on rural roads, but rarely, if ever, activated.

The estimated value of capacity is based primarily upon the type of facility and on roadway geometrics. Sections of roadway with adverse geometrics are characterized by lower free-flow speeds and lane capacity. Exhibit 15-30 in the Highway Capacity Manual was referenced to estimate saturation flow rates. The impact of narrow lanes and shoulders on free-flow speed and on capacity is not material, particularly when flow is predominantly in one direction as is the case during an evacuation.

The procedure used here was to estimate "section" capacity, V_E, based on observations made traveling over each section of the evacuation network, based on the posted speed limits and travel behavior of other motorists and by reference to the 2010 HCM. The DYNEV II simulation model determines for each highway section, represented as a network link, whether its capacity would be limited by the "section-specific" service volume, V_E, or by the intersection-specific capacity. For each link, the model selects the lower value of capacity.

[3] Lei Zhang and David Levinson, "Some Properties of Flows at Freeway Bottlenecks," Transportation Research Record 1883, 2004.

4.3 Application to the Turkey Point Nuclear Power Plant Study Area

As part of the development of the link-node analysis network for the study area, an estimate of roadway capacity is required. The source material for the capacity estimates presented herein is contained in:

2010 Highway Capacity Manual
Transportation Research Board
National Research Council
Washington, D.C.

The highway system in the study area consists primarily of three categories of roads and, of course, intersections:

- Two-Lane roads: Local, State
- Multi-Lane Highways (at-grade)
- Freeways

Each of these classifications will be discussed.

4.3.1 Two-Lane Roads

Ref: HCM Chapter 15

Two lane roads comprise the majority of highways within the EPZ. The per-lane capacity of a two-lane highway is estimated at 1700 passenger cars per hour (pc/h). This estimate is essentially independent of the directional distribution of traffic volume except that, for extended distances, the two-way capacity will not exceed 3200 pc/h. The HCM procedures then estimate LOS and Average Travel Speed. The DYNEV II simulation model accepts the specified value of capacity as input and computes average speed based on the time-varying demand: capacity relations.

Based on the field survey and on expected traffic operations associated with evacuation scenarios:

- Most sections of two-lane roads within the EPZ are classified as "Class I", with "level terrain"; some are "rolling terrain".
- "Class II" highways are mostly those within urban and suburban centers.

4.3.2 Multi-Lane Highway

Ref: HCM Chapter 14

Exhibit 14-2 of the HCM 2010 presents a set of curves that indicate a per-lane capacity ranging from approximately 1900 to 2200 pc/h, for free-speeds of 45 to 60 mph, respectively. Based on observation, the multi-lane highways outside of urban areas within the EPZ service traffic with free-speeds in this range. The actual time-varying speeds computed by the simulation model reflect the demand: capacity relationship and the impact of control at intersections. A conservative estimate of per-lane capacity of 1900 pc/h is adopted for this study for multi-lane highways outside of urban areas, as shown in Appendix K.

4.3.3 Freeways

Ref: HCM Chapters 10, 11, 12, 13

Chapter 10 of the HCM 2010 describes a procedure for integrating the results obtained in Chapters 11, 12 and 13, which compute capacity and LOS for freeway components. Chapter 10 also presents a discussion of simulation models. The DYNEV II simulation model automatically performs this integration process.

Chapter 11 of the HCM 2010 presents procedures for estimating capacity and LOS for “Basic Freeway Segments". Exhibit 11-17 of the HCM 2010 presents capacity vs. free speed estimates, which are provided below.

Free Speed (mph):	55	60	65	70+
Per-Lane Capacity (pc/h):	2250	2300	2350	2400

The inputs to the simulation model are highway geometrics, free-speeds and capacity based on field observations. The simulation logic calculates actual time-varying speeds based on demand: capacity relationships. A conservative estimate of per-lane capacity of 2250 pc/h is adopted for this study for freeways, as shown in Appendix K.

Chapter 12 of the HCM 2010 presents procedures for estimating capacity, speed, density and LOS for freeway weaving sections. The simulation model contains logic that relates speed to demand volume: capacity ratio. The value of capacity obtained from the computational procedures detailed in Chapter 12 depends on the "Type" and geometrics of the weaving segment and on the "volume ratio" (ratio of weaving volume to total volume).

Chapter 13 of the HCM 2010 presents procedures for estimating capacities of ramps and of "merge" areas. There are three significant factors to the determination of capacity of a ramp-freeway junction: The capacity of the freeway immediately downstream of an on-ramp or immediately upstream of an off-ramp; the capacity of the ramp roadway; and the maximum flow rate entering the ramp influence area. In most cases, the freeway capacity is the controlling factor. Values of this merge area capacity are presented in Exhibit 13-8 of the HCM 2010, and depend on the number of freeway lanes and on the freeway free speed. Ramp capacity is presented in Exhibit 13-10 and is a function of the ramp free flow speed. The DYNEV II simulation model logic simulates the merging operations of the ramp and freeway traffic in accord with the procedures in Chapter 13 of the HCM 2010. If congestion results from an excess of demand relative to capacity, then the model allocates service appropriately to the two entering traffic streams and produces LOS F conditions (The HCM does not address LOS F explicitly).

4.3.4 Intersections

Ref: HCM Chapters 18, 19, 20, 21

Procedures for estimating capacity and LOS for approaches to intersections are presented in Chapter 18 (signalized intersections), Chapters 19, 20 (un-signalized intersections) and Chapter 21 (roundabouts). The complexity of these computations is indicated by the aggregate length of these chapters. The DYNEV II simulation logic is likewise complex.

The simulation model explicitly models intersections: Stop/yield controlled intersections (both 2-way and all-way) and traffic signal controlled intersections. Where intersections are controlled by fixed time controllers, traffic signal timings are set to reflect average (non-evacuation) traffic conditions. Actuated traffic signal settings respond to the time-varying demands of evacuation traffic to adjust the relative capacities of the competing intersection approaches.

The model is also capable of modeling the presence of manned traffic control. At specific locations where it is advisable or where existing plans call for overriding existing traffic control to implement manned control, the model will use actuated signal timings that reflect the presence of traffic guides. At locations where a special traffic control strategy (continuous left-turns, contra-flow lanes) is used, the strategy is modeled explicitly. Where applicable, the location and type of traffic control for nodes in the evacuation network are noted in Appendix K. The characteristics of the ten highest volume signalized intersections are detailed in Appendix J.

4.4 Simulation and Capacity Estimation

Chapter 6 of the HCM is entitled, "HCM and Alternative Analysis Tools." The chapter discusses the use of alternative tools such as simulation modeling to evaluate the operational performance of highway networks. Among the reasons cited in Chapter 6 to consider using simulation as an alternative analysis tool is:

> *"The system under study involves a group of different facilities or travel modes with mutual interactions invoking several procedural chapters of the HCM. Alternative tools are able to analyze these facilities as a single system."*

This statement succinctly describes the analyses required to determine traffic operations across an area encompassing an EPZ operating under evacuation conditions. The model utilized for this study, DYNEV II, is further described in Appendix C. It is essential to recognize that simulation models do not replicate the methodology and procedures of the HCM – they *replace* these procedures by describing the complex interactions of traffic flow and computing measures of effectiveness (MOE) detailing the operational performance of traffic over time and by location. The DYNEV II simulation model includes some HCM 2010 procedures only for the purpose of estimating capacity.

All simulation models must be calibrated properly with field observations that quantify the performance parameters applicable to the analysis network. Two of the most important of these are: (1) free flow speed (FFS); and (2) saturation headway, h_{sat}. The first of these is estimated by direct observation during the road survey; the second is estimated using the concepts of the HCM 2010, as described earlier. These parameters are listed in Appendix K, for each network link.

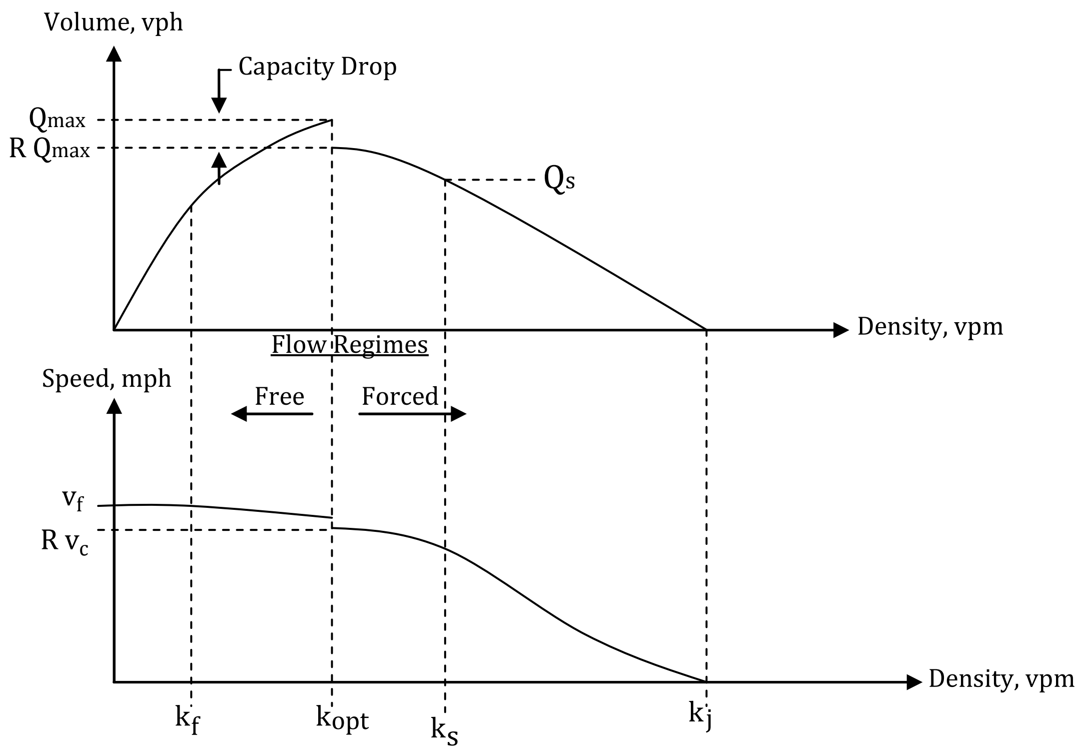


Figure 4-1. Fundamental Diagrams

5 ESTIMATION OF TRIP GENERATION TIME

Federal Government guidelines (see NUREG CR-7002) specify that the planner estimate the distributions of elapsed times associated with mobilization activities undertaken by the public to prepare for the evacuation trip. The elapsed time associated with each activity is represented as a statistical distribution reflecting differences between members of the public. The quantification of these activity-based distributions relies largely on the results of the telephone survey. We define the sum of these distributions of elapsed times as the Trip Generation Time Distribution.

5.1 Background

In general, an accident at a nuclear power plant is characterized by the following Emergency Action Levels (see Appendix 1 of NUREG 0654 for details):

1. Unusual Event
2. Alert
3. Site Area Emergency
4. General Emergency

At each level, the Federal guidelines specify a set of Actions to be undertaken by the Licensee, and by State and Local offsite authorities. As a Planning Basis, we will adopt a conservative posture, in accordance with Section 1.2 of NUREG/CR-7002, that a rapidly escalating accident will be considered in calculating the Trip Generation Time. We will assume:

1. The Advisory to Evacuate will be announced coincident with the siren notification.
2. Mobilization of the general population will commence within 15 minutes after the siren notification.
3. ETE are measured relative to the Advisory to Evacuate.

We emphasize that the adoption of this planning basis is not a representation that these events will occur within the indicated time frame. Rather, these assumptions are necessary in order to:

1. Establish a temporal framework for estimating the Trip Generation distribution in the format recommended in Section 2.13 of NUREG/CR-6863.
2. Identify temporal points of reference that uniquely define "Clear Time" and ETE.

It is likely that a longer time will elapse between the various classes of an emergency.

For example, suppose one hour elapses from the siren alert to the Advisory to Evacuate. In this case, it is reasonable to expect some degree of spontaneous evacuation by the public during this one-hour period. As a result, the population within the EPZ will be lower when the Advisory to Evacuate is announced, than at the time of the siren alert. In addition, many will engage in preparation activities to evacuate, in anticipation that an Advisory will be broadcast. Thus, the time needed to complete the mobilization activities and the number of people remaining to evacuate the EPZ after the Advisory to Evacuate, will both be somewhat less than the estimates presented in this report. Consequently, the ETE presented in this report are higher than the actual evacuation time, if this hypothetical situation were to take place.

The notification process consists of two events:

1. Transmitting information using the alert notification systems available within the EPZ (e.g. sirens, tone alerts, EAS broadcasts, loud speakers).
2. Receiving and correctly interpreting the information that is transmitted.

The population within the EPZ is dispersed over an area of approximately 190 square miles and is engaged in a wide variety of activities. It must be anticipated that some time will elapse between the transmission and receipt of the information advising the public of an accident.

The amount of elapsed time will vary from one individual to the next depending on where that person is, what that person is doing, and related factors. Furthermore, some persons who will be directly involved with the evacuation process may be outside the EPZ at the time the emergency is declared. These people may be commuters, shoppers and other travelers who reside within the EPZ and who will return to join the other household members upon receiving notification of an emergency.

As indicated in Section 2.13 of NUREG/CR-6863, the estimated elapsed times for the receipt of notification can be expressed as a distribution reflecting the different notification times for different people within, and outside, the EPZ. By using time distributions, it is also possible to distinguish between different population groups and different day-of-week and time-of-day scenarios, so that accurate ETE may be computed.

For example, people at home or at work within the EPZ will be notified by siren, and/or tone alert and/or radio (if available). Those well outside the EPZ will be notified by telephone, radio, TV and word-of-mouth, with potentially longer time lags. Furthermore, the spatial distribution of the EPZ population will differ with time of day - families will be united in the evenings, but dispersed during the day. In this respect, weekends will differ from weekdays.

As indicated in Section 4.1 of NUREG/CR-7002, the information required to compute trip generation times is typically obtained from a telephone survey of EPZ residents. Such a survey was conducted in support of this ETE study. Appendix F presents the survey sampling plan, survey instrument, and raw survey results. The remaining discussion will focus on the application of the trip generation data obtained from the telephone survey to the development of the ETE documented in this report.

5.2 Fundamental Considerations

The environment leading up to the time that people begin their evacuation trips consists of a sequence of events and activities. Each event (other than the first) occurs at an instant in time and is the outcome of an activity.

Activities are undertaken over a period of time. Activities may be in "series" (i.e. to undertake an activity implies the completion of all preceding events) or may be in parallel (two or more activities may take place over the same period of time). Activities conducted in series are functionally dependent on the completion of prior activities; activities conducted in parallel are functionally independent of one another. The relevant events associated with the public's preparation for evacuation are:

Event Number	Event Description
1	Notification
2	Awareness of Situation
3	Depart Work
4	Arrive Home
5	Depart on Evacuation Trip

Associated with each sequence of events are one or more activities, as outlined in Table 5-1.

These relationships are shown graphically in Figure 5-1.

- An Event is a 'state' that exists at a point in time (e.g., depart work, arrive home)
- An Activity is a 'process' that takes place over some elapsed time (e.g., prepare to leave work, travel home)

As such, a completed Activity changes the 'state' of an individual (e.g. the activity, 'travel home' changes the state from 'depart work' to 'arrive home'). Therefore, an Activity can be described as an 'Event Sequence'; the elapsed times to perform an event sequence vary from one person to the next and are described as statistical distributions on the following pages.

An employee who lives outside the EPZ will follow sequence (c) of Figure 5-1. A household within the EPZ that has one or more commuters at work, and will await their return before beginning the evacuation trip will follow the first sequence of Figure 5-1(a). A household within the EPZ that has no commuters at work, or that will not await the return of any commuters, will follow the second sequence of Figure 5-1(a), regardless of day of week or time of day.

Households with no commuters on weekends or in the evening/night-time, will follow the applicable sequence in Figure 5-1(b). Transients will always follow one of the sequences of Figure 5-1(b). Some transients away from their residence could elect to evacuate immediately without returning to the residence, as indicated in the second sequence.

It is seen from Figure 5-1, that the Trip Generation time (i.e. the total elapsed time from Event 1 to Event 5) depends on the scenario and will vary from one household to the next. Furthermore, Event 5 depends, in a complicated way, on the time distributions of all activities preceding that event. That is, to estimate the time distribution of Event 5, we must obtain estimates of the time distributions of all preceding events. For this study, we adopt the conservative posture that all activities will occur in sequence.

In some cases, assuming certain events occur strictly sequential (for instance, commuter returning home before beginning preparation to leave) can result in rather *conservative* (that is, longer) estimates of mobilization times. It is reasonable to expect that at least some parts of these events will overlap for many households, but that assumption is not made in this study.

5.3 Estimated Time Distributions of Activities Preceding Event 5

The time distribution of an event is obtained by "summing" the time distributions of all prior contributing activities. (This "summing" process is quite different than an algebraic sum since it is performed on distributions – not scalar numbers).

Time Distribution No. 1, Notification Process: Activity 1 → 2

Federal regulations, 10CFR 50 Appendix E, Item IV.D.3 stipulate, "[t]he design objective of the prompt public alert and notification system shall be to have the capability to essentially complete the initial alerting and initiate notification of the public within the plume exposure pathway EPZ within about 15 minutes." Furthermore, Item 2 of Section B in Appendix 3 of NUREG/CR-0654/FEMA-REP-1 states that "special arrangements will be made to assure 100% coverage within 45 minutes of the population who may not have received the initial notification within the entire plume exposure EPZ." Given the federal regulations and guidance, and the presence of sirens within the EPZ, it is assumed that 100% of the population in the EPZ can be notified within 45 minutes. The assumed distribution for notifying the EPZ population is provided in Table 5-2.

Distribution No. 2, Prepare to Leave Work: Activity 2 → 3

It is reasonable to expect that the vast majority of business enterprises within the EPZ will elect to shut down following notification and most employees would leave work quickly. Commuters, who work outside the EPZ could, in all probability, also leave quickly since facilities outside the EPZ would remain open and other personnel would remain. Personnel or farmers responsible for equipment/livestock would require additional time to secure their facility. The distribution of Activity 2 → 3 shown in Table 5-3 reflects data obtained by the telephone survey. This distribution is plotted in Figure 5-2.

Distribution No. 3, Travel Home: Activity 3 → 4

These data are provided directly by those households which responded to the telephone survey. This distribution is plotted in Figure 5-2 and listed in Table 5-4.

Distribution No. 4, Prepare to Leave Home: Activity 2, 4 → 5

These data are provided directly by those households which responded to the telephone survey. This distribution is plotted in Figure 5-2 and listed in Table 5-5.

5.4 Calculation of Trip Generation Time Distribution

The time distributions for each of the mobilization activities presented herein must be combined to form the appropriate Trip Generation Distributions. As discussed above, this study assumes that the stated events take place in sequence such that all preceding events must be completed before the current event can occur. For example, if a household awaits the return of a commuter, the work-to-home trip (Activity 3 $\rightarrow$ 4) must precede Activity 4 $\rightarrow$ 5.

To calculate the time distribution of an event that is dependent on two sequential activities, it is necessary to "sum" the distributions associated with these prior activities. The distribution summing algorithm is applied repeatedly as shown to form the required distribution. As an outcome of this procedure, new time distributions are formed; we assign "letter" designations to these intermediate distributions to describe the procedure. Table 5-7 presents the summing procedure to arrive at each designated distribution.

Table 5-8 presents a description of each of the final trip generation distributions achieved after the summing process is completed.

5.4.1 Statistical Outliers

As already mentioned, some portion of the survey respondents answer "don't know" to some questions or choose to not respond to a question. The mobilization activity distributions are based upon actual responses. But, it is the nature of surveys that a few numeric responses are inconsistent with the overall pattern of results. An example would be a case in which for 540 responses, almost all of them estimate less than two hours for a given answer, but 3 say "four hours" and 4 say "six or more hours".

These "outliers" must be considered: are they valid responses, or so atypical that they should be dropped from the sample?

In assessing outliers, there are three alternates to consider:

1) Some responses with very long times may be valid, but reflect the reality that the respondent really needs to be classified in a different population subgroup, based upon special needs;

2) Other responses may be unrealistic (6 hours to return home from commuting distance, or 2 days to prepare the home for departure);

3) Some high values are representative and plausible, and one must not cut them as part of the consideration of outliers.

The issue of course is how to make the decision that a given response or set of responses are to be considered "outliers" for the component mobilization activities, using a method that objectively quantifies the process.

There is considerable statistical literature on the identification and treatment of outliers singly or in groups, much of which assumes the data is normally distributed and some of which uses non-parametric methods to avoid that assumption. The literature cites that limited work has been done directly on outliers in sample survey responses.

In establishing the overall mobilization time/trip generation distributions, the following principles are used:

1) It is recognized that the overall trip generation distributions are conservative estimates, because they assume a household will do the mobilization activities sequentially, with no overlap of activities;

2) The individual mobilization activities (prepare to leave work, travel home, prepare home are reviewed for outliers, and then the overall trip generation distributions are created (see Figure 5-1, Table 5-6, Table 5-7);

3) Outliers can be eliminated either because the response reflects a special population (e.g. special needs, transit dependent) or lack of realism, because the purpose is to estimate trip generation patterns for personal vehicles;

4) To eliminate outliers,
    a) the mean and standard deviation of the specific activity are estimated from the responses,
    b) the median of the same data is estimated, with its position relative to the mean noted,
    c) the histogram of the data is inspected, and
    d) all values greater than 3.5 standard deviations are flagged for attention, taking special note of whether there are gaps (categories with zero entries) in the histogram display.

   In general, only flagged values more than 4 standard deviations from the mean are allowed to be considered outliers, with gaps in the histogram expected.

   When flagged values are classified as outliers and dropped, steps "a" to "d" are repeated.

5) As a practical matter, even with outliers eliminated by the above, the resultant histogram, viewed as a cumulative distribution, is not a normal distribution. A typical situation that results is shown in Figure 5-3.

6) In particular, the cumulative distribution differs from the normal distribution in two key aspects, both very important in loading a network to estimate evacuation times:

   - Most of the real data is to the left of the "normal" curve, indicating that the network loads faster for the first 80-85% of the vehicles, potentially causing more (and earlier) congestion than otherwise modeled;
   - The last 10-15% of the real data "tails off" slower than the comparable "normal" curve, indicating that there is significant traffic still loading at later times.

   Because these two features are important to preserve, it is the histogram of the data that is used to describe the mobilization activities, not a "normal" curve fit to the data. One could consider other distributions, but using the shape of the *actual* data curve is unambiguous and preserves these important features;

7) With the mobilization activities each modeled according to Steps 1-6, including preserving the features cited in Step 6, the overall (or total) mobilization times are constructed.

This is done by using the data sets and distributions under different scenarios (e.g. commuter returning, no commuter returning). In general, these are additive, using weighting based upon the probability distributions of each element; Figure 5-4 presents the combined trip generation distributions designated A, C, and D. These distributions are presented on the same time scale. (As discussed earlier, the use of strictly additive activities is a conservative approach, because it makes all activities sequential – preparation for departure follows the return of the commuter. In practice, it is reasonable that some of these activities are done in parallel, at least to some extent – for instance, preparation to depart begins by a household member at home while the commuter is still on the road.)

The mobilization distributions that result are used in their tabular/graphical form as direct inputs to later computations that lead to the ETE.

The DYNEV II simulation model is designed to accept varying rates of vehicle trip generation for each origin centroid, expressed in the form of histograms. These histograms, which represent Distributions A, C, and D, properly displaced with respect to one another, are tabulated in Table 5-8 (Distribution B, Arrive Home, omitted for clarity).

The final time period (14) is 600 minutes long. This time period is added to allow the analysis network to clear, in the event congestion persists beyond the trip generation period. Note that there are no trips generated during this final time period.

5.4.2 Staged Evacuation Trip Generation

As defined in NUREG/CR-7002, staged evacuation consists of the prompt evacuation of the 2 mile region, while those beyond 2 miles shelter-in-place. As discussed in Section 6, Miami-Dade County does not consider the evacuation of the 2 mile radius and 5 miles downwind. Rather, Miami-Dade considers evacuation of the 5 mile radius and downwind to the EPZ boundary. Thus, this study considers staged evacuation based on a 5 mile prompt evacuation as discussed below:

1. Areas comprising the 5 mile region are advised to evacuate immediately
2. Areas comprising regions extending from 5 miles and downwind to the EPZ boundary are advised to shelter in-place while the 5 mile region is cleared
3. As vehicles evacuate the 5 mile region, sheltered people from 5 to 10 miles downwind continue preparation for evacuation
4. The population sheltering in the 5 to 10 mile region are advised to begin evacuating when approximately 90% of those originally within the 5 mile region evacuate across the 5 mile region boundary
5. Non-compliance with the shelter recommendation is the same as the shadow evacuation percentage of 20%

Assumptions

1. The population in the Shadow Region beyond the EPZ boundary, extending to approximately 15 miles radially from the plant, will react as they do for all non-staged evacuation scenarios. That is 20% of these households will elect to evacuate with no shelter delay.
2. The transient population will not be expected to stage their evacuation because of the limited sheltering options available to people who may be at parks, at a beach, or at other venues. Also, notifying the transient population of a staged evacuation would prove difficult.
3. Employees will also be assumed to evacuate without first sheltering.

Procedure

1. Trip generation for population groups in the 5 mile region will be as computed based upon the results of the telephone survey and analysis.
2. Trip generation for the population subject to staged evacuation will be formulated as follows:
    a. Identify the 90th percentile evacuation time for the areas comprising the five mile region. This value, T_{Scen}^*, obtained from simulation results is scenario-specific. It will become the time at which the region being sheltered will be told to evacuate for each scenario.
    b. The resultant trip generation curves for staging are then formed as follows:
        i. The non-shelter trip generation curve is followed until a maximum of 20% of the total trips are generated (to account for shelter non-compliance).
        ii. No additional trips are generated until time T_{Scen}^*
        iii. Following time T_{Scen}^*, the balance of trips are generated:
            1. by stepping up and then following the non-shelter trip generation curve (if T_{Scen}^* is $\leq$ max trip generation time) or
            2. by stepping up to 100% (if T_{Scen}^* is > max trip generation time)
    c. Note: This procedure implies that there may be different staged trip generation distributions for different scenarios. NUREG/CR-7002 uses the statement "approximately 90th percentile" as the time to end staging and begin evacuating. The value of T_{Scen}^* is 3:20.
3. Staged trip generation distributions are created for the following population groups:
    a. Residents with returning commuters
    b. Residents without returning commuters

Figure 5-5 presents the staged trip generation distributions for both residents with and without returning commuters; the 90th percentile five-mile evacuation time is 200 minutes. At the 90th percentile evacuation time, approximately 20% of the population (who normally would have completed their mobilization activities for an un-staged evacuation) advised to shelter has nevertheless departed the area. These people do not comply with the shelter advisory. Also included on the plot are the trip generation distributions for these groups as applied to the regions advised to evacuate immediately.

Since the 90th percentile evacuation time occurs before the end of the trip generation period, after the sheltered region is advised to evacuate, the shelter trip generation distribution rises to meet the balance of the non-staged trip generation distribution. Following time T_{Scen}^*, the balance of staged evacuation trips that are ready to depart are released within 15 minutes. After T_{Scen}^*+15, the remainder of evacuation trips are generated in accordance with the un-staged trip generation distribution.

Table 5-9 provides the trip generation for staged evacuation.

5.4.3 Trip Generation for Waterways and Recreational Areas

Appendix II of Annex A of the State of Florida Radiological Emergency Management Plan indicates that boaters in the waters within the 10-mile EPZ will be notified of the emergency by VHF Radio and loudspeakers from boats and aircraft operated by Biscayne National Park Service, State Emergency Support Function 16, Miami-Dade Police Marine Patrol, and the United States Coast Guard. The Miami-Dade County and Monroe County Turkey Point Response Plans reiterate this point.

As indicated in Table 5-2, this study assumes 100% notification in 45 minutes. Table 5-8 indicates that all transients will have mobilized within 2 hours. It is assumed that this 2 hour timeframe is sufficient time for boaters, campers and other transients to return to their vehicles and begin their evacuation trip.

Table 5-1. Event Sequence for Evacuation Activities

Event Sequence	Activity	Distribution
1 → 2	Receive Notification	1
2 → 3	Prepare to Leave Work	2
2,3 → 4	Travel Home	3
2,4 → 5	Prepare to Leave to Evacuate	4

Table 5-2. Time Distribution for Notifying the Public

Elapsed Time (Minutes)	Percent of Population Notified
0	0%
5	7%
10	13%
15	27%
20	47%
25	66%
30	87%
35	92%
40	97%
45	100%

Table 5-3. Time Distribution for Employees to Prepare to Leave Work

Elapsed Time (Minutes)	Cumulative Percent Employees Leaving Work	Elapsed Time (Minutes)	Cumulative Percent Employees Leaving Work
0	0%	40	82.2%
5	24.5%	45	87.3%
10	34.1%	50	88.2%
15	47.8%	55	88.4%
20	55.8%	60	97.2%
25	57.3%	75	99.1%
30	78.5%	90	99.8%
35	80.5%	105	100.0%

NOTE: The survey data was normalized to distribute the "Don't know" response. That is, the sample was reduced in size to include only those households who responded to this question. The underlying assumption is that the distribution of this activity for the "Don't know" responders, if the event takes place, would be the same as those responders who provided estimates.

Table 5-4. Time Distribution for Commuters to Travel Home

Elapsed Time (Minutes)	Cumulative Percent Returning Home	Elapsed Time (Minutes)	Cumulative Percent Returning Home
0	0	45	81.4%
5	10.4%	50	82.3%
10	23.5%	55	82.6%
15	36.3%	60	91.1%
20	49.1%	75	95.2%
25	53.8%	90	98.6%
30	67.8%	105	99.1%
35	70.2%	120	100.0%
40	73.8%		

NOTE: The survey data was normalized to distribute the "Don't know" response

Table 5-5. Time Distribution for Population to Prepare to Evacuate

Elapsed Time (Minutes)	Cumulative Percent Ready to Evacuate	Elapsed Time (Minutes)[1]	Cumulative Percent Ready to Evacuate
0	0%	195	92.2%
15	20.2%	210	92.2%
30	45.3%	225	92.2%
45	53.3%	240	92.6%
60	63.9%	255	93.6%
75	74.3%	270	93.6%
90	75.6%	285	93.6%
105	75.8%	300	94.0%
120	81.2%	315	94.8%
135	87.8%	330	94.8%
150	88.4%	345	94.8%
165	88.8%	360	100.0%
180	90.6%		

[1] PTN is located in a hurricane-prone area. As a result, many residents of the area are accustomed to emergency evacuations for hurricanes and other weather related events. Although the telephone survey was posed as response to a non-weather related event (see Appendix F), it appears many respondents gave unusually long response times to this question. As discussed in Section 7 and in Appendix M, the ETE for PTN is dictated by traffic congestion, not trip generation time. As a result, this unusually long preparation time does not impact the results of this study.

Table 5-6. Mapping Distribution to Events

Apply "Summing" Algorithm To:	Distribution Obtained	Event Defined
Distributions 1 and 2	Distribution A	Event 3
Distributions A and 3	Distribution B	Event 4
Distributions B and 4	Distribution C	Event 5
Distributions 1 and 4	Distribution D	Event 5

Table 5-7. Description of the Distributions

Distribution	Description
A	Time distribution of commuters departing place of work (Event 3). Also applies to employees who work within the EPZ who live outside, and to Transients within the EPZ.
B	Time distribution of commuters arriving home (Event 4).
C	Time distribution of residents with commuters who return home, leaving home to begin the evacuation trip (Event 5).
D	Time distribution of residents without commuters returning home, leaving home to begin the evacuation trip (Event 5).

Table 5-8. Trip Generation Histograms for the EPZ Population for Un-staged Evacuation

Time Period	Duration (Min)	Percent of Total Trips Generated Within Indicated Time Period			
		Employees (Distribution A)	Transients (Distribution A)	Residents with Commuters (Distribution C)	Residents Without Commuters (Distribution D)
1	15	4%	4%	0%	1%
2	15	22%	22%	0%	10%
3	15	30%	30%	2%	20%
4	15	23%	23%	4%	17%
5	15	11%	11%	9%	10%
6	15	7%	7%	11%	10%
7	30	3%	3%	22%	8%
8	30	0%	0%	17%	8%
9	60	0%	0%	19%	7%
10	60	0%	0%	7%	2%
11	60	0%	0%	2%	1%
12	60	0%	0%	3%	6%
13	90	0%	0%	4%	0%
14	600	0%	0%	0%	0%

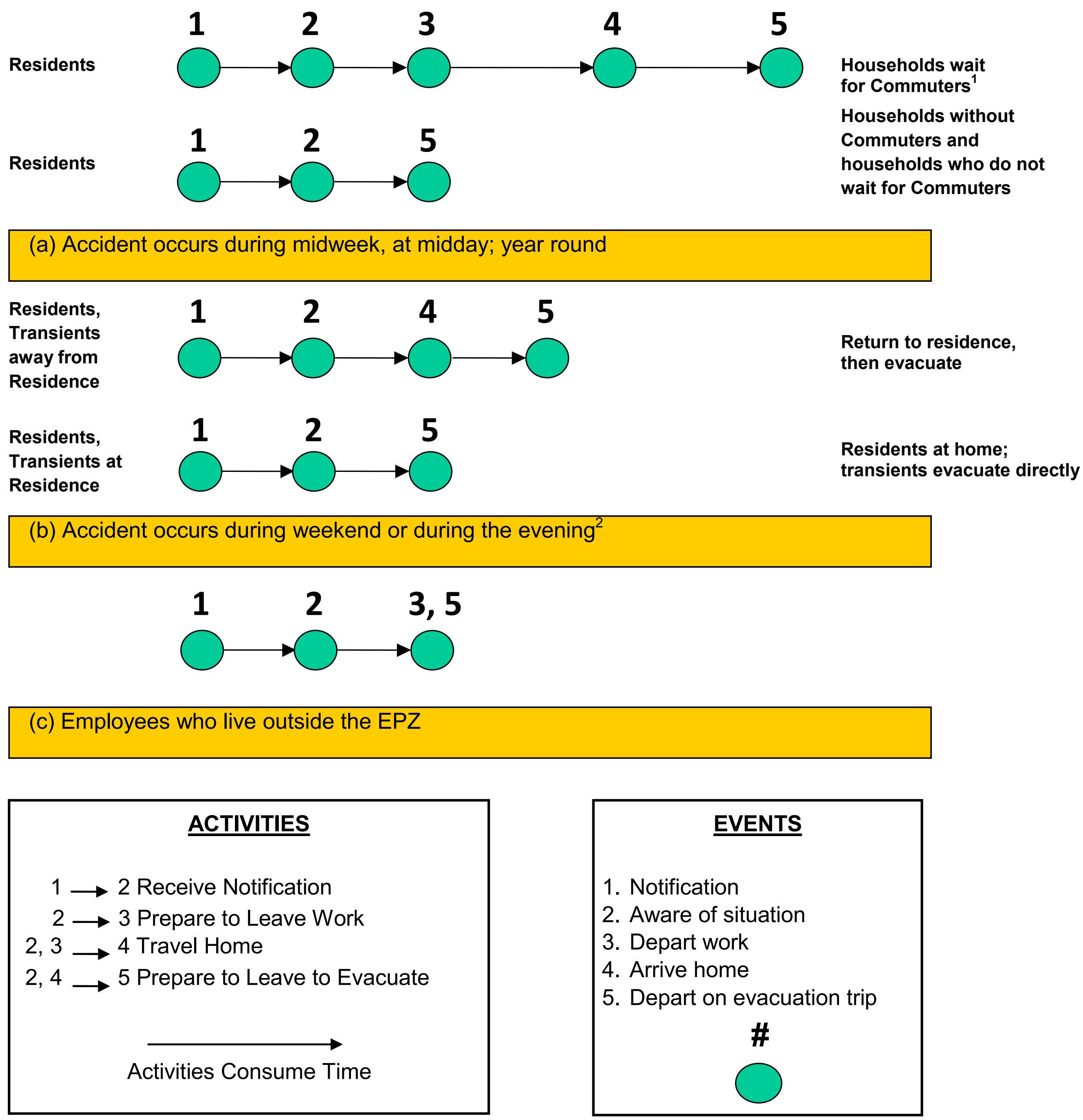
NOTE:

- Shadow vehicles are loaded onto the analysis network (Figure 1-2) using Distribution C.
- Special event vehicles are loaded using Distribution A.

Table 5-9. Trip Generation Histograms for the EPZ Population for Staged Evacuation

Time Period	Duration (Min)	Percent of Total Trips Generated Within Indicated Time Period*	
		Residents with Commuters (Distribution C)	Residents Without Commuters (Distribution D)
1	15	0%	0%
2	15	0%	2%
3	15	0%	4%
4	15	1%	4%
5	15	2%	2%
6	15	2%	2%
7	30	5%	1%
8	30	3%	2%
9	60	4%	1%
10	60	74%	75%
11	60	2%	1%
12	60	3%	6%
13	90	4%	0%
14	600	0%	0%

*Trip Generation for Employees and Transients (see Table 5-8) is the same for Un-staged and Staged Evacuation.



[1] Applies for evening and weekends also if commuters are at work.
[2] Applies throughout the year for transients.

Figure 5-1. Events and Activities Preceding the Evacuation Trip

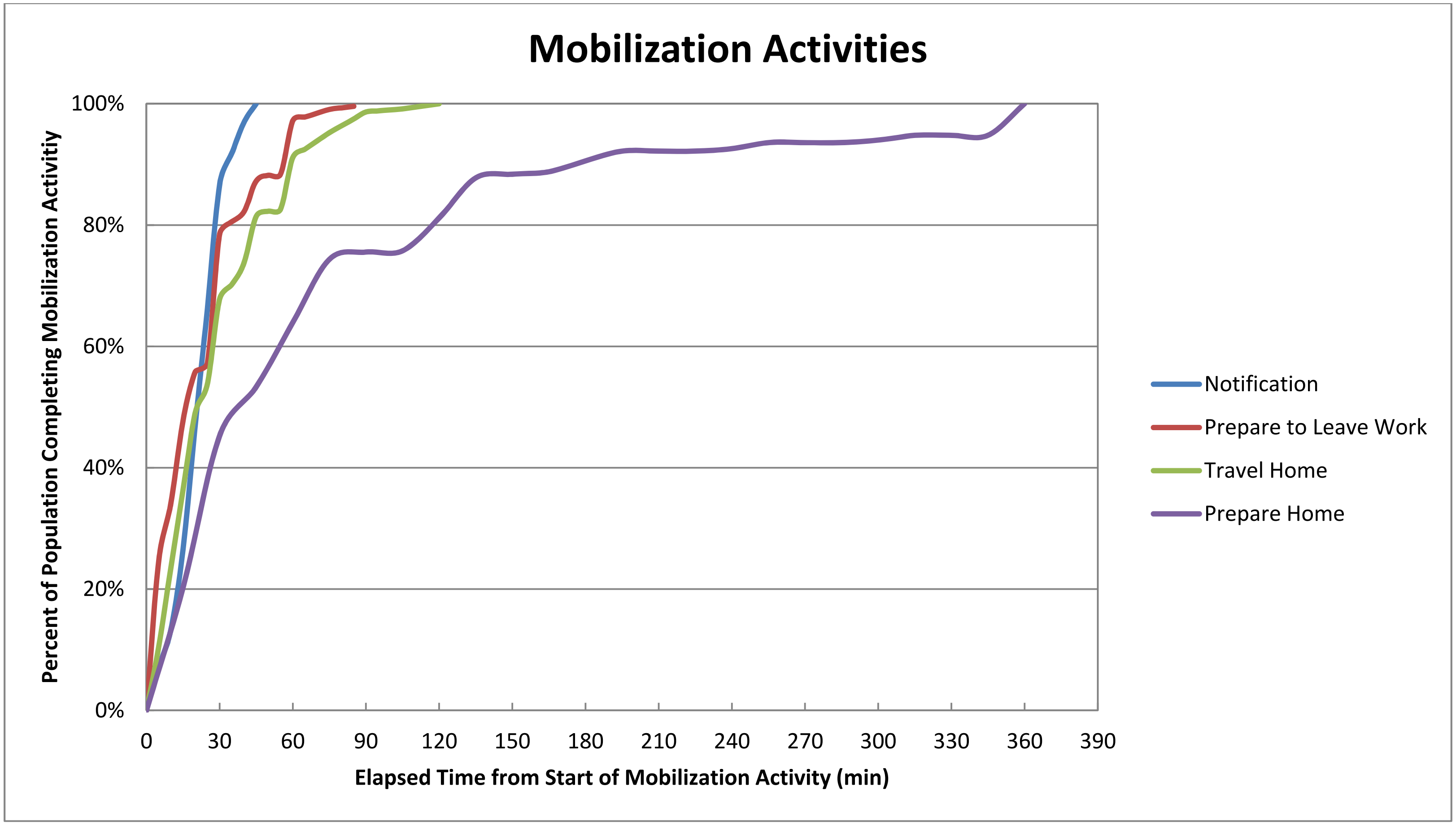


Figure 5-2. Evacuation Mobilization Activities

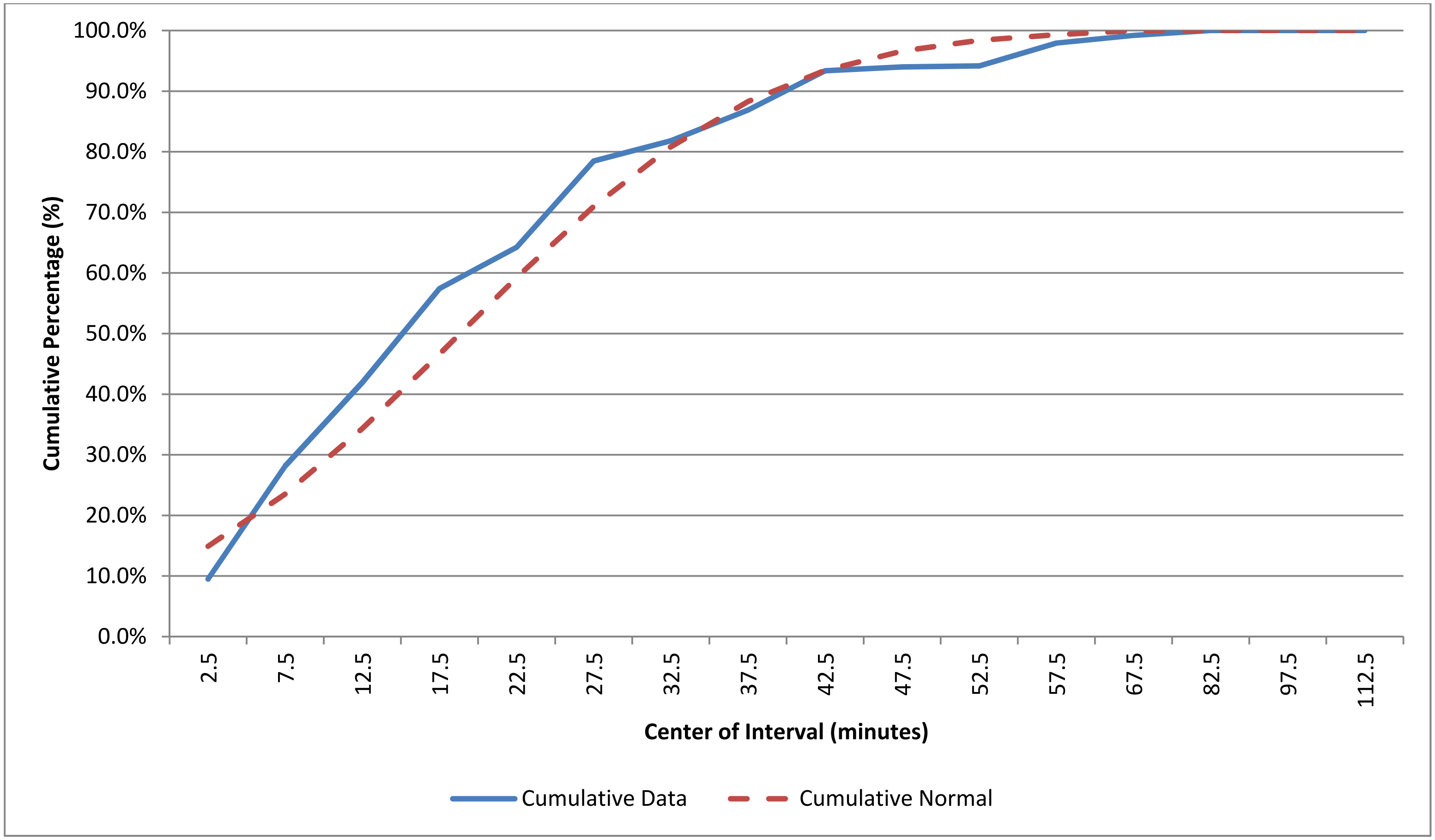


Figure 5-3. Comparison of Data Distribution and Normal Distribution

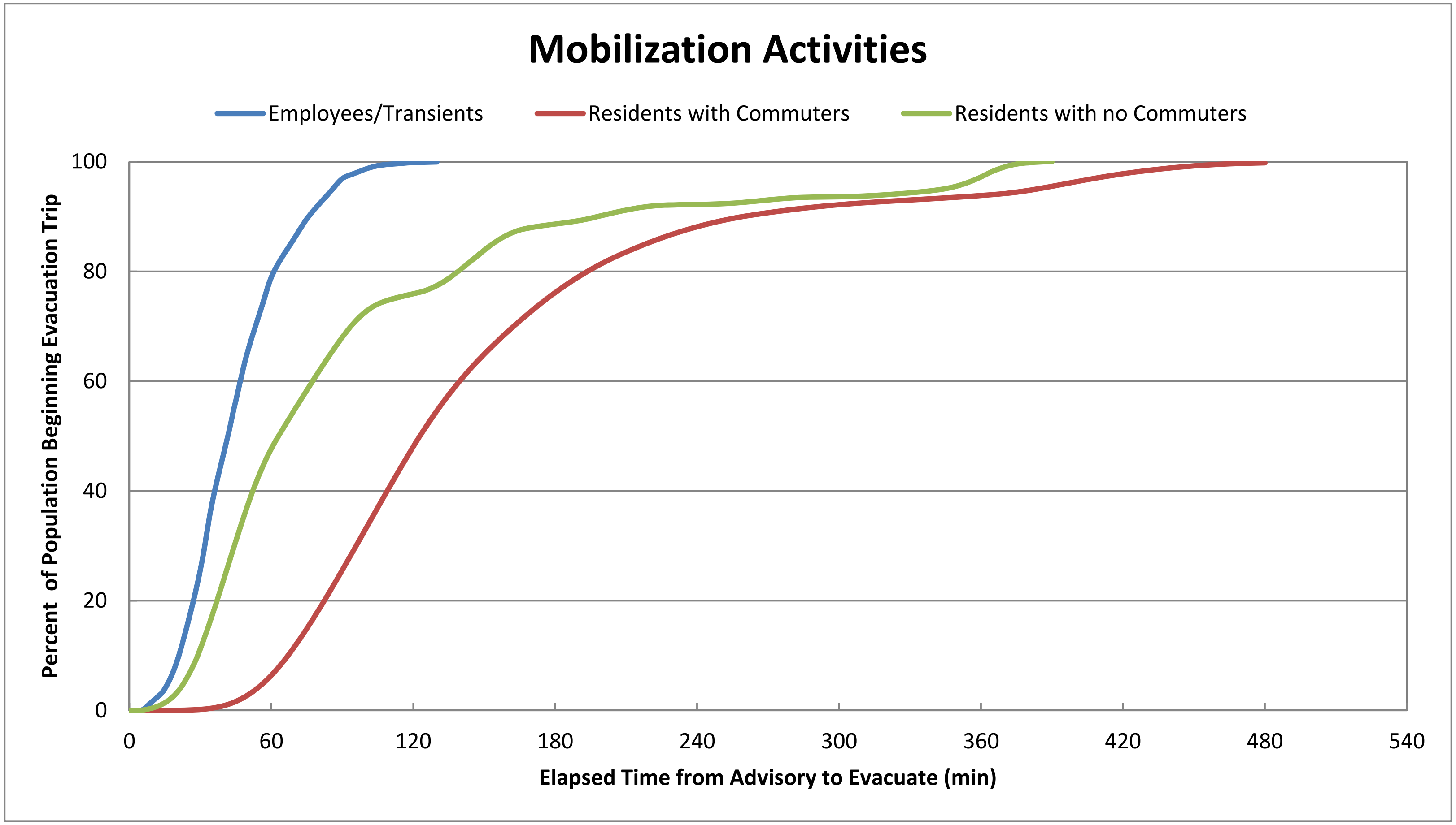


Figure 5-4. Comparison of Trip Generation Distributions

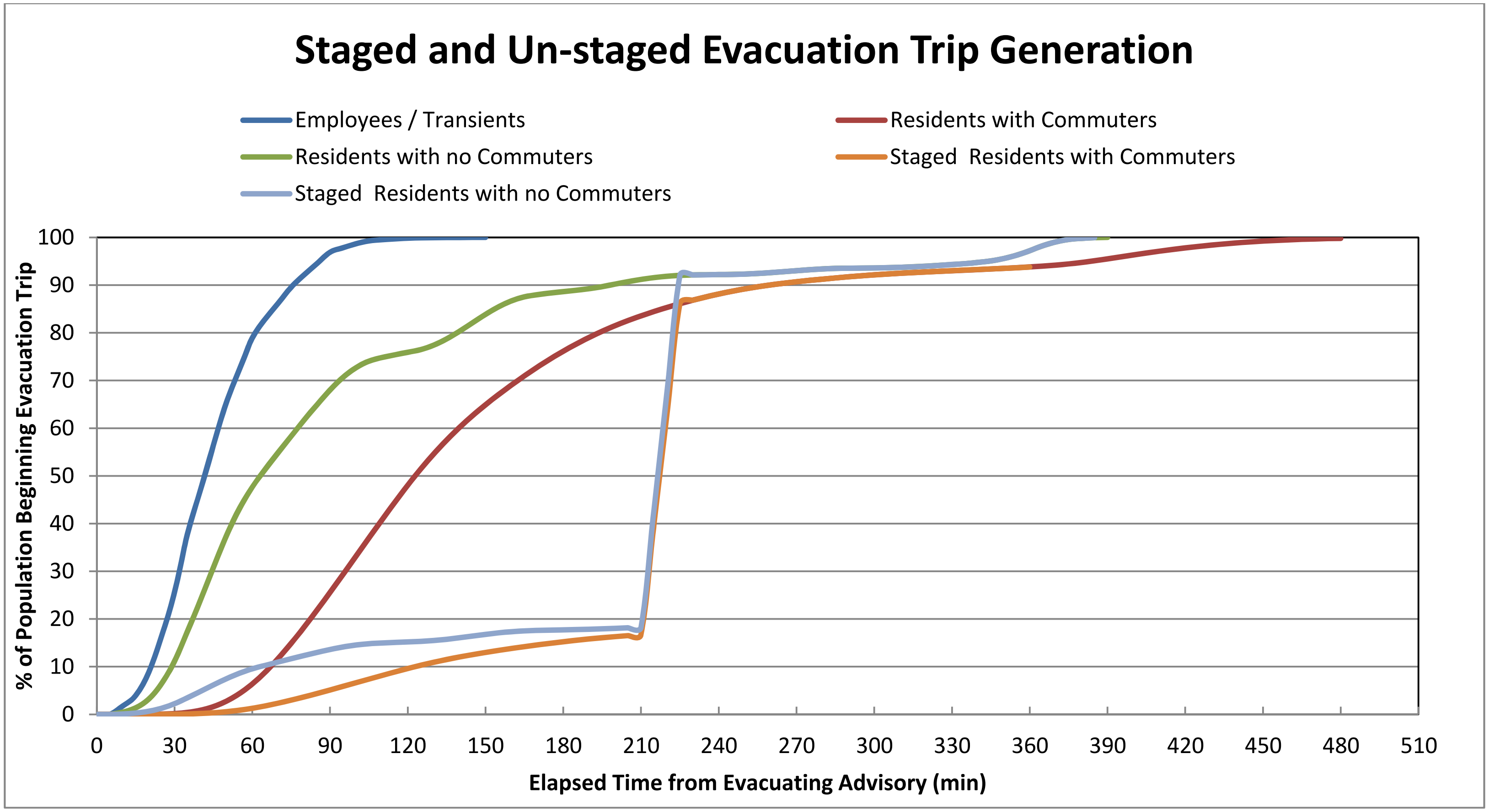


Figure 5-5. Comparison of Staged and Un-staged Trip Generation Distributions in the 5 to 10 Mile Region

6 DEMAND ESTIMATION FOR EVACUATION SCENARIOS

An evacuation "case" defines a combination of evacuation region and evacuation scenario. The definitions of "region" and "scenario" are as follows:

Region A grouping of contiguous evacuating areas that forms either a "keyhole" sector-based area, or a circular area within the EPZ, that must be evacuated in response to a radiological emergency.

Scenario A combination of circumstances, including time of day, day of week, season, and weather conditions. Scenarios define the number of people in each of the affected population groups and their respective mobilization time distributions.

A total of 23 regions were defined which encompass all the groupings of areas considered. These regions are defined in Table 6-1. The area configurations are identified in Figure 6-1. These regions were identified based on the EPZ County protective action decision (PAD) standard operating procedures (pages 120-122 in the Monroe County plan and Volume III, Chapter B, Subject 4 of the Miami-Dade plan). Each keyhole sector-based area generally consists of a central circle centered at the power plant, and three adjoining sectors (some regions use 4 sectors based on County PAD procedures), each with a central angle of 22.5 degrees, as per NUREG/CR-7002 guidance. The central sector coincides with the wind direction. These sectors extend to the EPZ boundary (regions R04 through R11). Regions R01, R02 and R03 represent evacuations of circular areas with radii of 2, 5 and 10 miles, respectively. Regions R12 through R20 are identical to regions R03 through R11, respectively; however, those areas between 5 miles and the EPZ boundary are staged until 90% of the 5-mile region (region R02) has evacuated. Regions R21 through R23 were considered at the request of Miami-Dade County; these regions do not generally conform to the keyhole approach discussed above. Note that the EPZ Counties do not consider evacuation of the 2-mile region and downwind to 5 miles. Also, Monroe County only evacuates their portion of the EPZ when an evacuation of the entire EPZ is considered (regions R03 and R12). The corresponding Emergency Alert System (EAS) message numbers identified in the county plans for each wind direction/regional configuration are provided in the last column of Table 6-1.

A total of 12 scenarios were evaluated for all regions. Thus, there are a total of 23x12=276 evacuation cases. Table 6-2 is a description of all scenarios.

Each combination of region and scenario implies a specific population to be evacuated. Table 6-3 presents the percentage of each population group estimated to evacuate for each scenario. Table 6-4 presents the vehicle counts for each scenario for an evacuation of region R03 – the entire EPZ.

The vehicle estimates presented in Section 3 are peak values. These peak values are adjusted depending on the scenario and region being considered, using scenario and region specific percentages; the scenario percentages are presented in Table 6-3, while the regional percentages are provided in Table H-1. The percentages documented in Table 6-3 were determined as follows:

The number of residents with commuters during the week (when workforce is at its peak) is equal to the product of 68% (the number of households with at least one commuter) and 71% (the number of households with a commuter that would await the return of the commuter prior to evacuating). See assumption 3 in Section 2.3. It is estimated for weekend and evening scenarios that 10% of households with commuters will have a commuter at work during those times.

Employment is assumed to be at its peak during the winter, midweek, midday scenarios. Employment is reduced slightly (96%) for summer, midweek, midday scenarios. This is based on the estimation that 50% of the employees commuting into the EPZ will be on vacation for a week during the approximate 12 weeks of summer. It is further estimated that those taking vacation will be uniformly dispersed throughout the summer with approximately 4% of employees vacationing each week. It is further estimated that only 10% of the employees are working in the evenings and during the weekends.

Transient activity is estimated to be at its peak during winter weekends and less (50%) during the week. As shown in Appendix E, there is a significant amount of lodging and campgrounds offering overnight accommodations in the EPZ; thus, transient activity is estimated to be relatively high during evening hours – 25% for summer and 35% for winter. Transient activity on summer weekends is estimated to be 75%.

As noted in the shadow footnote to Table 6-3, the shadow percentages are computed using a base of 20% (see assumption 5 in Section 2.2); to include the employees within the shadow region who may choose to evacuate, the voluntary evacuation is multiplied by a scenario-specific proportion of employees to permanent residents in the shadow region. For example, using the values provided in Table 6-4 for scenario 1, the shadow percentage is computed as follows:

$$20\% \times \left(1 + \frac{18{,}033}{43{,}784 + 46{,}568}\right) = 24\%$$

One special event – a NASCAR race at Homestead-Miami Speedway – was considered as scenario 11. Thus, the special event traffic is 100% evacuated for scenario 11, and 0% for all other scenarios.

It is estimated that summer school enrollment is approximately 10% of enrollment during the regular school year for summer, midweek, midday scenarios. School is not in session during weekends and evenings, thus no buses for school children are needed under those circumstances. As discussed in Section 7, schools are in session during the winter season, midweek, midday and 100% of buses will be needed under those circumstances. Transit buses for the transit-dependent population are set to 100% for all scenarios as it is assumed that the transit-dependent population is present in the EPZ for all scenarios.

External traffic is estimated to be reduced by 60% during evening scenarios and is 100% for all other scenarios.

Table 6-1. Description of Evacuation Regions

Region	Description	Area 1	2	3	4	5	6	7	8	9	10	EAS Message
R01	2-Mile Ring	x	x									E14/E15
R02	5-Mile Ring	x	x	x	x							E16/E17
R03	Full EPZ	x	x	x	x	x	x	x	x	x	x	E29
Evacuate 5-Mile Radius and Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R04	N	x	x	x	x	x	x	x				E23/E27
R05	NNE	x	x	x	x	x	x					E24/E28
N/A	NE, ENE, E, ESE, SE, SSE, S	**Refer to Region R02**										5 & 9
R06	SSW	x	x	x	x					x		E25
R07	SW, WSW	x	x	x	x				x	x		E20
R08	W	x	x	x	x			x	x	x		N/A
R09	WNW, NW	x	x	x	x		x	x	x			E22/E26
R10	NNW	x	x	x	x	x	x	x	x			N/A
Site Specific Region												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R11	-	x	x	x	x		x	x	x	x		N/A
Staged Evacuation - 5-Mile Radius Evacuates, then Evacuate Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R12	Full EPZ	x	x	x	x	x	x	x	x	x	x	N/A
R13	N	x	x	x	x	x	x	x				N/A
R14	NNE	x	x	x	x	x	x					N/A
N/A	NE, ENE, E, ESE, SE, SSE, S	**Refer to Region R02**										N/A
R15	SSW	x	x	x	x					x		N/A
R16	SW, WSW	x	x	x	x				x	x		N/A
R17	W	x	x	x	x			x	x	x		N/A
R18	WNW, NW	x	x	x	x		x	x	x			N/A
R19	NNW	x	x	x	x	x	x	x	x			N/A
R20	-	x	x	x	x		x	x	x	x		N/A
Additional Miami-Dade County Requested Regions												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R21	-	x	x	x						x		E18
R22	-	x	x	x					x	x		E19
R23	-	x	x	x	x			x	x			E21
Shelter-in-Place until 90% ETE for R02, then Evacuate					Area(s) Shelter-in-Place				Area(s) Evacuate			

Table 6-2. Evacuation Scenario Definitions

Scenario	Season[1]	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, Weekend	Evening	Good	None
11	Winter	Weekend	Midday	Good	NASCAR Race at Homestead-Miami Speedway
12	Summer	Midweek	Midday	Good	Roadway Impact – Lane Closure on Florida Turnpike NB

[1] Winter assumes that school is in session (also applies to spring and autumn). Summer assumes that school is not in session.

Table 6-3. Percent of Population Groups Evacuating for Various Scenarios

Scenario	Households With Returning Commuters	Households Without Returning Commuters	Employees	Transients	Shadow	Special Events	School Buses	Transit Buses	External Through Traffic
1	48%	52%	96%	50%	24%	0%	10%	100%	100%
2	48%	52%	96%	50%	24%	0%	10%	100%	100%
3	10%	90%	10%	75%	20%	0%	0%	100%	100%
4	10%	90%	10%	75%	20%	0%	0%	100%	100%
5	10%	90%	10%	25%	20%	0%	0%	100%	40%
6	48%	52%	100%	50%	24%	0%	100%	100%	100%
7	48%	52%	100%	50%	24%	0%	100%	100%	100%
8	10%	90%	10%	100%	20%	0%	0%	100%	100%
9	10%	90%	10%	100%	20%	0%	0%	100%	100%
10	10%	90%	10%	35%	20%	0%	0%	100%	40%
11	10%	90%	10%	100%	20%	100%	0%	100%	100%
12	48%	52%	96%	50%	24%	0%	10%	100%	100%

Resident Households with Commuters ....Households of EPZ residents who await the return of commuters prior to beginning the evacuation trip.
Resident Households with No Commuters ......Households of EPZ residents who do not have commuters or will not await the return of commuters prior to beginning the evacuation trip.
Employees..EPZ employees who live outside the EPZ
Transients ....People who are in the EPZ at the time of an accident for recreational or other (non-employment) purposes.
Shadow..Residents and employees in the shadow region (outside of the EPZ) who will spontaneously decide to relocate during the evacuation. The basis for the values shown is a 20% relocation of shadow residents along with a proportional percentage of shadow employees.
Special Events ....Additional vehicles in the EPZ due to the identified special event.
School and Transit Buses ....Vehicle-equivalents present on the road during evacuation servicing schools and transit-dependent people (1 bus is equivalent to 2 passenger vehicles).
External Through Traffic ....Traffic on interstates/freeways and major arterial roads at the start of the evacuation. This traffic is stopped by access control 2 hours after the evacuation begins.

Table 6-4. Vehicle Estimates by Scenario

Scenario	Households With Returning Commuters	Households Without Returning Commuters	Employees	Transients	Shadow	Special Events	School Buses	Transit Buses	External Through Traffic	Total Scenario Vehicles
1	43,784	46,568	18,033	6,717	18,314	-	123	586	5,882	140,007
2	43,784	46,568	18,033	6,717	18,314	-	123	586	5,882	140,007
3	4,378	85,974	1,878	10,076	15,584	-	-	586	5,882	124,358
4	4,378	85,974	1,878	10,076	15,584	-	-	586	5,882	124,358
5	4,378	85,974	1,878	3,359	15,584	-	-	586	2,353	114,112
6	43,784	46,568	18,784	6,717	18,441	-	1,230	586	5,882	141,992
7	43,784	46,568	18,784	6,717	18,441	-	1,230	586	5,882	141,992
8	4,378	85,974	1,878	13,434	15,584	-	-	586	5,882	127,716
9	4,378	85,974	1,878	13,434	15,584	-	-	586	5,882	127,716
10	4,378	85,974	1,878	4,702	15,584	-	-	586	2,353	115,455
11	4,378	85,974	1,878	13,434	15,584	32,600	-	586	5,882	160,316
12	43,784	46,568	18,033	6,717	18,314	-	123	586	5,882	140,007

Note: Vehicle estimates are for an evacuation of the entire EPZ (region R03)

Note: Transit Buses also include four vehicles for correctional facilities.

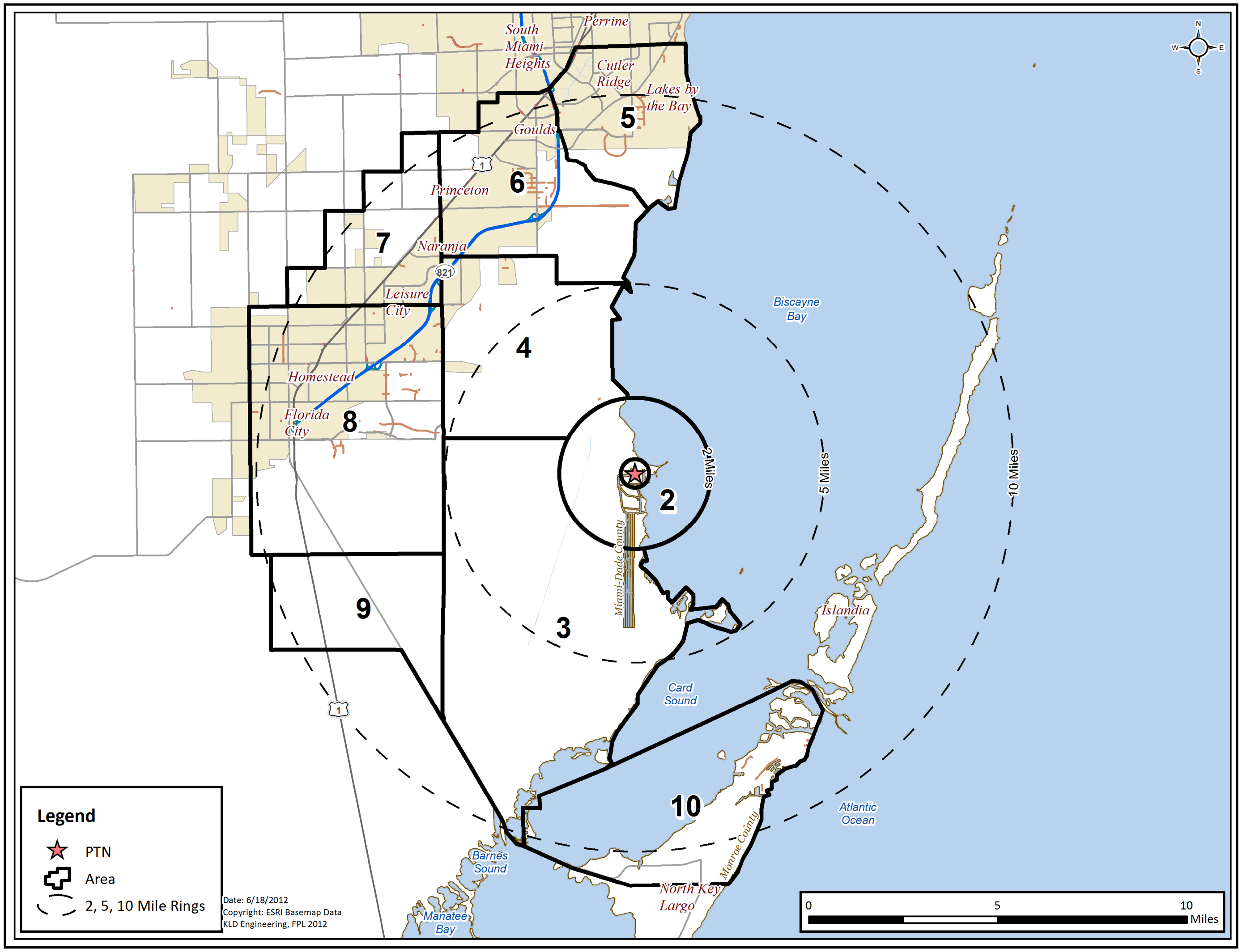


Figure 6-1. PTN EPZ Areas

7 GENERAL POPULATION EVACUATION TIME ESTIMATES (ETE)

This section presents the ETE results of the computer analyses using the DYNEV II System described in Appendices B, C and D. These results cover 23 regions within the Turkey Point Nuclear Power Plant EPZ and the 12 evacuation scenarios discussed in Section 6.

The ETE for all evacuation cases are presented in Table 7-1 and Table 7-2. These tables present the estimated times to clear the indicated population percentages from the evacuation regions for all evacuation scenarios. The ETE of the 5-mile region for both staged and un-staged regions are presented in Table 7-3 and Table 7-4. Table 7-5 defines the evacuation regions considered. The tabulated values of ETE are obtained from the DYNEV II System outputs which are generated at 5-minute intervals.

7.1 Voluntary Evacuation and Shadow Evacuation

"Voluntary evacuees" are people within the EPZ in areas for which an ATE has not been issued, yet who elect to evacuate. "Shadow evacuation" is the voluntary outward movement of some people from the shadow region (outside the EPZ) for whom no protective action recommendation has been issued. Both voluntary and shadow evacuations are assumed to take place over the same time frame as the evacuation from within the impacted evacuation region.

The ETE for the PTN EPZ addresses the issue of voluntary evacuees in the manner shown in Figure 7-1. Within the EPZ, 20 percent of people located in areas outside of the evacuation region who are not advised to evacuate, are assumed to elect to evacuate. Similarly, it is assumed that 20 percent of those people in the shadow region will choose to leave the area.

Figure 7-2 presents the area identified as the shadow region. This region extends radially from the plant to cover a region between the EPZ boundary and approximately 15 miles. The population and number of evacuating vehicles in the shadow region were estimated using the same methodology that was used for permanent residents within the EPZ (see Section 3.1). As discussed in Section 3.2, it is estimated that a total of 174,292 people reside in the Shadow region; 20 percent of them would evacuate. See Table 6-4 for the number of evacuating vehicles from the shadow region.

Traffic generated within this shadow region, traveling away from the PTN location has the potential for impeding evacuating vehicles from within the evacuation region. All ETE calculations include this shadow traffic movement.

7.2 Staged Evacuation

As defined in NUREG/CR-7002, staged evacuation consists of the prompt evacuation of the 2 mile region, while those beyond 2 miles shelter-in-place. As discussed in Sections 5.4.2 and 6, Miami-Dade County does not consider the evacuation of the 2 mile radius and 5 miles downwind. Rather, Miami-Dade considers evacuation of the 5 mile radius and downwind to the EPZ boundary. Thus, this study considers staged evacuation based on a 5 mile prompt evacuation as discussed below:

1. Areas comprising the 5 mile region are advised to evacuate immediately.
2. Areas comprising regions extending from 5 miles downwind to the EPZ boundary are advised to shelter in-place while the 5 mile region is cleared.
3. As vehicles evacuate the 5 mile region, people from 5 miles downwind to the EPZ boundary continue preparation for evacuation while they shelter.
4. The population sheltering in the 5 miles downwind to the EPZ boundary region is advised to evacuate when approximately 90% of the 5 mile region evacuating traffic crosses the 5 mile region boundary.
5. Non-compliance with the shelter recommendation is the same as the shadow evacuation percentage of 20%.

See Section 5.4.2 for additional information on staged evacuation.

7.3 Patterns of Traffic Congestion during Evacuation

Figure 7-3 through Figure 7-7 illustrate the patterns of traffic congestion that arise for the case when the entire EPZ (region R03) is advised to evacuate during the winter, midweek, midday period under good weather conditions (scenario 6).

Traffic congestion, as the term is used here, is defined as LOS F. LOS F is defined as follows (HCM 2010, page 5-5):

> The HCM uses LOS F to define operations that have either broken down (i.e., demand exceeds capacity) or have exceeded a specified service measure value, or combination of service measure values, that most users would consider unsatisfactory. However, particularly for planning applications where different alternatives may be compared, analysts may be interested in knowing just how bad the LOS F condition is. Several measures are available to describe individually, or in combination, the severity of a LOS F condition:
>
> > • *Demand-to-capacity ratios* describe the extent to which capacity is exceeded during the analysis period (e.g., by 1%, 15%, etc.);
> >
> > • *Duration of LOS F* describes how long the condition persists (e.g., 15 min, 1 h, 3 h); and
> >
> > • *Spatial extent measures* describe the areas affected by LOS F conditions. These include measures such as the back of queue, and the identification of the specific intersection approaches or system elements experiencing LOS F conditions.

All highway "links" which experience LOS F are delineated in these figures by a thick red line; all others are lightly indicated. Congestion develops rapidly around concentrations of population and traffic bottlenecks. Figure 7-3 presents the traffic congestion patterns at one hour after the advisory to evacuate. There is significant congestion within the EPZ at this time. The Florida Turnpike is congested northbound between the access ramps from SW 137th Ave and U.S. Highway 1. Krome Avenue northbound is congested from the intersection with U.S. Highway 1 to the end of the study area. 344th Street is congested westbound as those workers evacuating from Turkey Point encounter an all-way stop at the intersection with 117th Avenue. U.S. Highway 1 and Old Cutler Rd are also congested northbound. Finally, County Route 905 (CR-905) westbound is congested due to evacuation of the Ocean Reef Community and the TCPs at the intersections with CR-905A (Card Sound Rd) and with U.S. Highway 1.

Figure 7-4 presents the traffic congestion patterns at the peak of congestion, three hours after the ATE. All northbound routes leaving the EPZ exhibit pronounced traffic congestion. Congestion exists northbound on the turnpike from the interchange with U.S. Highway 1 in Florida City to the split with Don Shula Expressway. Krome Avenue is congested northbound from Florida City through the shadow region. U.S. Highway 1 is congested northbound from Florida City to 136th Street. Old Cutler Rd is congested northbound from the intersection with U.S. Highway 1 to 184th Street. The congestion on 344th Street westbound cleared at one hour and 45 minutes after the advisory to evacuate. Congestion on CR-905 westbound leaving the ORC cleared at 2:15. However, congestion persists on CR-905 westbound in the shadow region at the intersection with U.S. Highway 1. Note that the 5-mile region is essentially clear of congestion at this time.

The congestion patterns at five hours after the advisory to evacuate are displayed in Figure 7-5. The congestion patterns are similar to those at three hours. Congestion is beginning to dissipate on Old Cutler Rd northbound and on U.S. Highway 1 within the shadow region. Pronounced congestion persists on U.S. Highway 1 northbound within the EPZ. The Turnpike is now clear from Florida City to SW 288th St. Congestion on CR-905 within the shadow region cleared at 4 hours, 15 minutes after the ATE.

Figure 7-6 presents the congestion patterns at seven hours after the ATE. Congestion on Old Cutler Rd has cleared, while congestion continues to dissipate northbound on U.S. Highway 1 within the shadow region. Pronounced congestion persists on U.S. Highway 1 northbound in the EPZ in Goulds, Princeton, and Naranja. Congestion northbound on the Florida Turnpike has cleared within the study area since the access ramps are the bottleneck metering vehicles as they enter the highway. Nearly all of the congestion has eased in area 8. Congestion persists on the northbound routes through area 7.

At 9 hours and 30 minutes after the ATE (Figure 7-7), the last of the congestion within the EPZ is exhibited along Krome Avenue northbound. The EPZ is completely clear of traffic congestion 10 minutes later. Congestion along U.S. Highway 1 and the Florida Turnpike clear by eight hours after the ATE.

These congestion patterns indicate that there is unused capacity available for those people evacuating the EPZ, namely U.S. Highway 1 southbound toward the Florida Keys.

7.4 Evacuation Rates

Evacuation is a continuous process, as implied by Figure 7-8 through Figure 7-19. These figures indicate the rate at which traffic flows out of the indicated areas for the case of an evacuation of the full EPZ (region R03) under the indicated conditions. One figure is presented for each scenario considered.

As indicated in Figure 7-8, there is typically a long "tail" to these distributions. Vehicles begin to evacuate an area slowly at first, as people respond to the ATE at different rates. Then traffic demand builds rapidly (slopes of curves increase). When the system becomes congested, traffic exits the EPZ at rates somewhat below capacity until some evacuation routes have cleared. As more routes clear, the aggregate rate of egress slows since many vehicles have already left the EPZ. Towards the end of the process, relatively few evacuation routes service the remaining demand.

This decline in aggregate flow rate, towards the end of the process, is characterized by these curves flattening and gradually becoming horizontal. Ideally, it would be desirable to fully saturate all evacuation routes equally so that all will service traffic near capacity levels and all will clear at the same time. For this ideal situation, all curves would retain the same slope until the end – thus minimizing evacuation time. In reality, this ideal is generally unattainable reflecting the spatial variation in population density, mobilization rates and in highway capacity over the EPZ.

7.5 Evacuation Time Estimate (ETE) Results

Table 7-1 through Table 7-2 present the ETE values for all 23 evacuation regions and all 12 evacuation scenarios. Table 7-3 through Table 7-4 present the ETE values for the 5-Mile region for both staged and un-staged keyhole regions downwind to the EPZ boundary. The ETE tables are organized as follows:

Table	Contents
7-1	ETE represents the elapsed time required for 90 percent of the population within a region, to evacuate from that region. All scenarios are considered, as well as staged evacuation scenarios.
7-2	ETE represents the elapsed time required for 100 percent of the population within a region, to evacuate from that region. All scenarios are considered, as well as staged evacuation scenarios.
7-3	ETE represents the elapsed time required for 90 percent of the population within the 5-mile region, to evacuate from that region with both concurrent and staged evacuations.
7-4	ETE represents the elapsed time required for 100 percent of the population within the 5-mile region, to evacuate from that region with both concurrent and staged evacuations.

The animation snapshots described above reflect the ETE statistics for the concurrent (un-staged) evacuation scenarios and regions, which are displayed in Figure 7-3 through Figure 7-7. Most of the congestion is located beyond the 5-mile region, which is reflected in the ETE statistics:

- The 90th percentile ETE for region R01 (2-mile region), which is comprised solely of employees at PTN, range between 1:20 (hr:min) and 1:35 (slightly higher for weekday than weekend scenarios).
- The 90th percentile ETE for region R02 (5-mile region) range between 2:20 and 3:15 (slightly higher for weekday than weekend scenarios).
- The 90th percentile ETE for regions R03 (full EPZ) and R04 through R10 (regions extending to the EPZ boundary) are 3½ hours longer on average (for non-special event scenarios) than the region R02 ETE due to the pronounced traffic congestion beyond the 5-mile radius.

The 100th percentile ETE for all regions and scenarios within 5 miles are comparable to mobilization time. This fact implies that the congestion within the 5-mile region dissipates prior to the end of mobilization, as is displayed in Figure 7-4. However, for those evacuation regions that extend beyond 5 miles, ETE is significantly longer than mobilization time, implying that traffic congestion does not clear prior to the completion of mobilization time, as seen in Figure 7-7. The congestion is pronounced in regions with wind directions toward the north and west (R07 through R11) where ETE are approximately 1½ hours (slightly higher in rain scenarios) longer for non-special event scenarios.

Comparison of scenarios 8 and 11 in Table 7-1 indicates that the special event – a NASCAR race at the Homestead-Miami Speedway – has a significant impact on the ETE for the 90th percentile. The 2- and 5-mile regions are not adversely affected by the special event (note the ETE for the 5-mile region actually decreases by 40 minutes because of the traffic control measures implemented during the NASCAR race), but for regions that extend beyond 5 miles, the 90th percentile ETE increases by as much as 2 hours and 50 minutes. The special event has a significant impact on the 100th percentile ETE as well, adding an additional 2½ hours for a full EPZ (region R03) evacuation.

Comparison of scenarios 1 and 12 in Table 7-1 indicates that the roadway closure – one lane northbound on the Florida Turnpike from the interchange with U.S. Highway 1 in Florida City to the end of the analysis-network at the interchange with the Don Shula Expressway – does have a material impact on 90th percentile ETE for keyhole regions with wind toward the north and west (regions R07 through R11) and for the full EPZ (region R03), with up to 1 hour and 20 minute increases in ETE. Wind from the north and west carries the plume over the major population centers in the EPZ, which utilize the Florida Turnpike northbound as an evacuation route. Closing a single lane on the Florida Turnpike northbound reduces capacity in half for most of the roadway through the EPZ, increasing congestion and prolonging ETE.

The results of the roadway impact scenario indicate that events such as adverse weather or traffic accidents which could close a lane on the Florida Turnpike, could impact ETE. State and local police could consider traffic management tactics such as using the shoulder of the roadway as a travel lane or re-routing of traffic along other evacuation routes to avoid overwhelming the Florida Turnpike. All efforts should be made to remove the blockage on the Florida Turnpike, particularly within the first 7 hours of the evacuation.

As discussed in Section 3.3, approximately 5,050 people enter the EPZ at Biscayne National Park by boat. Using an occupancy rate of 2.7 people per boat, provided by the park ranger, there are as many as 1,870 boats entering the Biscayne National Park from outside the EPZ at peak times. These visitors can be located on any of the keys within the EPZ when the Advisory to Evacuate is issued. It is assumed the 2 hour transient mobilization time, shown in Table 5-8, is sufficient time for these visitors to be notified, prepare to evacuate, and board their boats for evacuation.

A conservative evacuation speed of 5 mph (4.3 knots) is estimated to account for the presence of sailboats, and for the potential congestion caused by a large number of boats evacuating towards the same destination. Using a straight line distance from the same longitude as PTN within each region to the Intracoastal Waterway and following the Intracoastal Waterway northbound towards Matheson Hammock Marina, the evacuation time estimate for these transients is computed as:

ETE = Mobilization Time + (Distance to Intracoastal Waterway ÷ 5 mph) + (Distance to region boundary along the Intracoastal Waterway ÷ 5 mph)

2-mile region (taken from park boundary which is approximately 1 mile from the 2-mile radius):

2 hours + (0 miles ÷ 5 mph) + (1 mile ÷ 5 mph) = 2.2 hours = 2 hours 12 minutes

5-mile region (taken from park boundary):

2 hours + (0 miles ÷ 5 mph) + (4 miles ÷ 5 mph) = 2.8 hours = 2 hours 48 minutes

Full EPZ (taken from Elliot Key):

2 hours + (3 miles ÷ 5 mph) + (8 miles ÷ 5 mph) = 4.2 hours = 4 hours 12 minutes

Assuming the last boat is mobilized at 2 hours, these values represent the 100th percentile ETE for this population. The 100th percentile ETE for the 5-mile region and full EPZ (Scenario 8 – winter, weekend, midday, good weather) are less than the 90th percentile ETE for their respective regions in Table 7-2. The 100th percentile ETE for the boats evacuating the 2-mile region (R01) for Scenario 8 is 12 minutes longer (10%) than the ETE values represented in Table 7-2. Section IV, Item 6 in Appendix E to 10 CFR Part 50 indicates a significant change in ETE is a 25% or 30 minute increase, whichever is less. Thus, the difference of 10% or 12 minutes is in good agreement with the vehicular ETE of 2 hours.

As shown in Table 5-8, 90 percent of transients mobilize in 1 hour and 15 minutes. Assuming the 90th percentile boat is mobilized at 1 hour and 15 minutes, the 90th percentile ETE for this population is computed as follows:

2-mile region (taken from the park boundary):

1.25 hours + (0 miles ÷ 5 mph) + (1 mile ÷ 5 mph) = 1.45 hours = 1 hours 27 minutes

5-mile region (taken from site boundary):

1.25 hours + (0 miles ÷ 5 mph) + (4 miles ÷ 5 mph) = 2.05 hours = 2 hours 3 minutes

Full EPZ (taken from Elliot Key):

1.25 hours + (3 miles ÷ 5 mph) + (8 miles ÷ 5 mph) = 3.45 hours = 3 hours and 27 minutes

The 90th percentile ETE for the 5-mile region and full EPZ are less than the 90th percentile ETE for their respective regions in Table 7-1 for Scenario 8. The 90th percentile ETE for the boats evacuating the 2-mile region (R01) for Scenario 8 is 7 minutes longer (9%), which is in good agreement with the vehicular ETE of 1 hour and 20 minutes.

7.6 Staged Evacuation Results

Table 7-3 and Table 7-4 present a comparison of the ETE compiled for the concurrent (un-staged) evacuation studies with the staged evacuation studies. Note that regions R12 through R20 (staged) are the same geographic areas as regions R03 through R11 (concurrent), respectively.

To determine whether the staged evacuation strategy is worthy of consideration, one must show that the ETE for the 5-mile region (region R02) can be reduced without significantly affecting the region between 5 miles and the EPZ boundary.

Comparing regions R03 through R11 with regions R12 through R20 in Table 7-1 indicates that the 90th percentile ETE increases by as little as 5 minutes and as much as 2 hours and 30 minutes when staging evacuation. As shown in Figure 5-5, staging the evacuation causes a significant “spike” (sharp increase) in mobilization (trip-generation rate) of evacuating vehicles: nearly 70 percent of the evacuating vehicles between 5 miles and the EPZ boundary who have sheltered in place while residents within 5 miles evacuated, begin their evacuation trip over a 15 minute timeframe. This spike oversaturates evacuation routes, causing significant traffic congestion, rerouting and prolonged ETE.

Comparing regions R03 through R11 with regions R12 through R20 in Table 7-2 indicates that the 100th percentile ETE increase by as much as 1 hour and 50 minutes when staging evacuation.

As shown in Table 7-3, the ETE for region R02 (5-mile region only) is about 3:00, on average. When evacuating a keyhole region beyond 5 miles, the ETE for the 5-mile region increases significantly as shown for R03 through R11 in Table 7-3 (by as much as 5:45 for scenario 11). The reason for this increase is that many of the vehicles evacuating from Leisure City and Naranja would travel eastbound on SW 268th St, SW 280th St and SW 288th St to access the ramps to the Florida Turnpike. In doing so, these vehicles enter the 5-mile region and significantly increase the ETE for the 5-mile region. When staging these keyhole regions (regions R12 through R20) in Table 7-3, the ETE increase by as much as 4 hours and 30 minutes. Again, the spike in traffic demand increases traffic congestion, prompts the routing described above and prolongs ETE.

Table 7-4 indicates that the 100th percentile ETE for both un-staged and staged evacuation of the 5-mile region for nearly all keyholes is 8:05, which reflects the trip generation time, rather than traffic congestion, except for the special event (scenario 11). The special event involves a large number of vehicles evacuating from the Homestead-Miami Speedway. Many of these vehicles will evacuate northbound on Speedway Blvd (SW 137th Ave), which is the boundary of the 5-mile region. These additional special event vehicles cause traffic congestion which extends the 100th percentile ETE beyond the trip generation time. See the ETE for regions R03 and R07 through R11 for scenario 11 in Table 7-4.

Note that staged evacuation was not considered for scenario 11. The Homestead-Miami Speedway would be evacuated immediately if there were an incident at PTN. As such, it is not realistic to stage the large population at the Speedway during an evacuation.

In summary, staged evacuation would be beneficial for evacuating the resident population within the 5-mile region of PTN. As discussed above, the ETE for the 5-mile region are however significantly longer when evacuating additional areas beyond 5 miles due to the routing of vehicles from beyond 5 miles into the 5-mile region to access the Florida Turnpike. Although staged evacuation is disadvantageous to those beyond 5 miles, it does expedite the evacuation of those evacuees from within the 5-mile region.

7.7 Guidance on Using ETE Tables

The user first determines the percentile of population for which the ETE is sought (the NRC guidance calls for the 90th percentile). The applicable value of ETE within the chosen table may then be identified using the following procedure:

1. Identify the applicable scenario:
    - Season
        - Summer
        - Winter (also Autumn and Spring)
    - Day of Week
        - Midweek
        - Weekend
    - Time of Day
        - Midday
        - Evening
    - Weather Condition
        - Good Weather
        - Rain
    - Special Event
        - NASCAR Championship Race at Homestead-Miami Speedway
        - Road Closure (A single lane on the Florida Turnpike northbound is closed)
    - Evacuation Staging
        - No, Staged Evacuation is not considered
        - Yes, Staged Evacuation is considered

While these scenarios are designed, in aggregate, to represent conditions throughout the year, some further clarification is warranted:

- The conditions of a summer evening (either midweek or weekend) and rain are not explicitly identified in the tables. For these conditions, scenarios (2) and (4) apply.

- The conditions of a winter evening (either midweek or weekend) and rain are not explicitly identified in the tables. For these conditions, scenarios (7) and (10) for rain apply.
- The seasons are defined as follows:
  - Summer assumes that public schools are not in session.
  - Winter (includes Spring and Autumn) considers that public schools are in session.
- Time of Day: Midday implies the time over which most commuters are at work or are travelling to/from work.

2. With the desired percentile ETE and scenario identified, now identify the evacuation region:
   - Determine the projected azimuth direction of the plume (coincident with the wind direction). This direction is expressed in terms of compass orientation: towards N, NNE, NE, …
   - Determine the distance that the evacuation region will extend from the nuclear power plant. The applicable distances and their associated candidate regions are given below:
     - 2 Miles (region R01)
     - To 5 Miles (region R02)
     - To EPZ boundary (regions R03 through R11, and regions R21 through R23)
   - Enter Table 7-5 and identify the applicable group of candidate regions based on the distance that the selected region extends from the PTN. Select the evacuation region identifier in that row, based on the azimuth direction of the plume, from the first column of the Table.
3. Determine the ETE Table based on the percentile selected. Then, for the scenario identified in Step 1 and the region identified in Step 2, proceed as follows:
   - The columns of Table 7-1 are labeled with the scenario numbers. Identify the proper column in the selected Table using the scenario number defined in Step 1.
   - Identify the row in this table that provides ETE values for the region identified in Step 2.
   - The unique data cell defined by the column and row so determined contains the desired value of ETE expressed in hours:minutes.

Example

It is desired to identify the ETE for the following conditions:

- Sunday, August 10th at 4:00 AM.
- It is raining.
- Wind direction is toward the north-northeast (NNE).
- Wind speed is such that the distance to be evacuated is judged to be a 5-mile radius and downwind to the EPZ boundary.
- The desired ETE is that value needed to evacuate 90 percent of the population from within the impacted region.
- A staged evacuation is not desired.

Table 7-1 is applicable because the 90th percentile ETE is desired. Proceed as follows:

1. Identify the scenario as summer, weekend, evening and raining. Entering Table 7-1, it is seen that there is no match for these descriptors. However, the clarification given above assigns this combination of circumstances to scenario 4.
2. Enter Table 7-5 and locate the region described as "Evacuate 5-Mile Radius and Downwind to EPZ Boundary" for wind direction toward the NNE and read region R05 in the first column of that row.
3. Enter Table 7-1 to locate the data cell containing the value of ETE for scenario 4 and region R05. This data cell is in column (4) and in the row for region R05; it contains the ETE value of 4:00.

Table 7-1. Time to Clear the Indicated Area of *90* Percent of the Affected Population

	Summer		Summer		Summer	Winter		Winter		Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Region	Midday		Midday		Evening	Midday		Midday		Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather	Rain	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	1:35	1:35	1:20	1:20	1:20	1:35	1:35	1:20	1:20	1:20	1:20	1:35
R02	3:10	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:20	3:05
R03	6:40	7:20	6:00	6:20	5:45	6:45	7:25	6:00	6:30	5:45	8:20	8:00
5-Mile Region and Keyhole to EPZ Boundary												
R04	4:25	4:55	4:05	4:25	3:50	4:25	4:45	4:10	4:30	4:00	4:25	4:45
R05	4:05	4:25	3:45	4:00	3:45	4:10	4:25	3:55	4:05	3:40	4:10	4:30
R06	2:30	2:30	2:20	2:25	2:40	2:30	2:35	2:20	2:25	2:35	2:20	2:25
R07	5:05	5:20	4:25	4:35	4:20	5:10	5:35	4:30	4:40	4:25	6:45	6:00
R08	6:00	6:20	5:15	5:25	4:40	6:05	6:35	5:15	5:45	5:00	7:45	7:10
R09	6:35	7:00	5:40	6:10	5:25	6:35	7:05	5:50	6:15	5:25	8:05	7:50
R10	6:40	7:30	6:10	6:25	5:40	6:40	7:30	6:10	7:00	5:50	8:35	7:55
Site Specific Regions												
R11	6:35	7:05	5:40	6:05	5:20	6:40	7:00	5:50	6:15	5:35	8:10	7:40
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	7:30	7:50	7:20	7:50	7:20	7:25	8:00	7:20	7:45	7:20		8:05
R13	6:05	6:20	6:00	6:15	6:00	6:00	6:15	6:00	6:15	6:10		6:10
R14	5:55	6:10	6:00	6:10	6:00	5:55	6:05	6:00	6:10	5:55		6:05
R15	4:25	4:25	4:20	4:25	4:30	4:20	4:20	4:20	4:20	4:25		4:20
R16	6:10	6:20	6:15	6:25	6:05	6:10	6:30	6:05	6:20	6:05	N/A	6:35
R17	7:05	7:15	6:50	7:15	7:10	6:55	7:15	6:50	7:10	6:55		7:30
R18	7:20	7:40	7:15	7:40	7:15	7:10	7:50	7:15	7:40	7:15		8:05
R19	7:30	7:55	7:20	7:45	7:20	7:30	8:05	7:25	7:50	7:25		8:10
R20	7:20	7:40	7:20	7:45	7:20	7:10	7:50	7:15	7:40	7:15		8:10
Site Specific Regions												
R21	2:20	2:20	2:20	2:25	2:20	2:20	2:25	2:15	2:20	2:20	2:20	2:25
R22	5:00	5:10	4:15	4:30	4:05	4:55	5:25	4:20	4:35	4:05	6:45	5:55
R23	6:10	6:20	5:15	5:30	4:55	6:10	6:35	5:15	5:40	4:55	8:05	6:55

Table 7-2. Time to Clear the Indicated Area of *100* Percent of the Affected Population

	Summer		Summer		Summer	Winter		Winter		Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Region	Midday		Midday		Evening	Midday		Midday		Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather	Rain	Good Weather	Special Event	Roadway Impact
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	2:10	2:10	2:00	2:05	2:00	2:10	2:10	2:00	2:05	2:00	2:00	2:10
R02	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R03	9:40	10:30	8:55	9:55	8:15	9:40	11:00	9:15	10:00	8:35	11:45	11:10
5-Mile Region and Keyhole to EPZ Boundary												
R04	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10
R05	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10
R06	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10
R07	8:10	8:55	8:10	8:10	8:10	8:10	9:10	8:10	8:15	8:10	10:15	8:50
R08	8:50	9:40	8:15	8:45	8:10	8:35	9:40	8:15	9:05	8:10	10:55	9:35
R09	9:35	10:15	8:15	9:15	8:10	9:35	10:25	8:50	9:20	8:20	11:00	10:35
R10	9:35	10:30	8:50	9:55	8:15	9:35	11:00	9:05	10:00	8:35	11:45	10:40
Site Specific Regions												
R11	9:35	10:15	8:15	9:30	8:10	9:35	10:30	8:50	9:30	8:25	11:15	10:45
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	10:35	11:25	10:10	10:45	9:55	10:20	12:05	9:50	10:55	9:50	N/A	11:25
R13	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10		8:10
R14	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10		8:10
R15	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10	8:10		8:10
R16	9:15	9:55	9:05	9:45	8:45	9:05	10:10	9:05	9:35	8:55		9:55
R17	9:50	10:00	9:40	9:50	9:25	10:00	10:40	9:25	10:25	9:25		10:00
R18	9:55	11:10	9:55	10:25	9:40	10:10	10:55	10:00	10:40	9:35		10:35
R19	10:35	11:25	10:10	10:55	10:05	10:15	12:00	10:15	10:40	9:55		11:00
R20	9:55	11:10	9:55	10:25	10:00	10:10	10:55	10:10	10:55	9:35		10:55
Site Specific Regions												
R21	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R22	8:25	9:10	8:05	8:05	8:05	8:15	9:35	8:05	8:10	8:05	9:50	9:25
R23	8:50	9:25	8:35	8:55	8:05	8:40	9:45	8:05	9:25	8:05	11:20	9:30

Table 7-3. Time to Clear *90* Percent of the 5-Mile Area within the Indicated Region

	Summer		Summer		Summer	Winter		Winter		Winter	Winter	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Region	Midday		Midday		Evening	Midday		Midday		Evening	Midday	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather	Rain	Good Weather	Special Event	Roadway Impact
Un-staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R02	3:10	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:20	3:05
R03	5:50	6:30	5:10	5:30	4:45	5:55	6:30	5:20	5:40	4:45	7:45	7:20
R04	3:20	3:20	3:00	3:05	3:20	3:25	3:25	3:05	3:10	3:15	2:55	3:20
R05	3:20	3:20	3:10	3:10	3:20	3:20	3:20	3:00	3:05	3:20	2:30	3:20
R06	3:15	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:25	3:10
R07	4:35	4:45	4:00	4:10	3:45	4:40	5:15	4:05	4:15	3:40	6:30	5:40
R08	5:00	5:30	4:30	4:30	3:45	5:10	5:45	4:20	4:45	3:55	7:10	6:20
R09	5:40	5:55	4:45	5:15	4:30	5:40	6:00	5:00	5:25	4:25	7:30	7:00
R10	5:55	6:25	5:20	5:40	4:45	6:00	6:30	5:25	6:00	4:50	8:05	7:15
R11	3:10	3:15	3:00	3:05	3:15	3:05	3:05	3:00	3:05	3:10	2:20	3:05
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	6:35	7:00	6:35	6:50	6:35	6:40	7:05	6:35	6:50	6:30		7:30
R13	4:40	4:50	4:40	4:55	4:40	4:45	4:50	4:40	4:55	4:45		4:55
R14	4:30	4:35	4:35	4:35	4:35	4:30	4:30	4:35	4:35	4:35		4:35
R15	4:30	4:35	4:30	4:30	4:35	4:30	4:30	4:30	4:35	4:30		4:30
R16	5:50	6:00	6:05	6:05	5:50	5:50	6:10	5:55	6:00	5:50	N/A	6:25
R17	6:10	6:25	6:05	6:20	6:20	6:05	6:20	6:05	6:15	6:15		6:50
R18	6:25	6:50	6:30	6:40	6:30	6:15	7:00	6:30	6:40	6:20		7:30
R19	6:40	7:05	6:35	7:00	6:40	6:40	7:10	6:30	6:55	6:45		7:35
R20	6:25	6:40	6:30	6:40	6:35	6:30	6:50	6:30	6:40	6:30		7:30

Table 7-4. Time to Clear *100* Percent of the 5-Mile Area within the Indicated Region

	Summer		Summer		Summer	Winter		Winter		Winter	Summer	Summer
	Midweek		Weekend		Midweek Weekend	Midweek		Weekend		Midweek Weekend	Weekend	Midweek
Scenario:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**Scenario:**	**(1)**	**(2)**	**(3)**
Region	Midday		Midday		Evening	Midday		Midday		Evening	Evening	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather
Un-staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R02	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R03	8:05	8:05	8:05	8:05	8:05	8:05	8:20	8:05	8:05	8:05	9:35	8:50
R04	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R06	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05
R07	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:10	8:05
R08	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	9:10	8:05
R09	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	9:25	8:20
R10	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	10:00	8:40
Staged Evacuation - 5-Mile Region and Keyhole to EPZ Boundary												
R12	8:05	8:30	8:05	8:15	8:05	8:05	8:30	8:05	8:10	8:05		8:35
R13	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R14	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R15	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R16	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	N/A	8:05
R17	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05		8:05
R18	8:05	8:10	8:05	8:05	8:05	8:05	8:20	8:05	8:05	8:05		8:40
R19	8:05	8:30	8:05	8:05	8:05	8:05	8:45	8:05	8:05	8:05		9:00
R20	8:05	8:10	8:05	8:10	8:05	8:10	8:20	8:05	8:05	8:05		8:40

Table 7-5. Description of Evacuation Regions

Region	Description	Area 1	2	3	4	5	6	7	8	9	10	EAS Message
R01	2-Mile Ring	x	x									E14/E15
R02	5-Mile Ring	x	x	x	x							E16/E17
R03	Full EPZ	x	x	x	x	x	x	x	x	x	x	E29
Evacuate 5-Mile Radius and Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R04	N	x	x	x	x	x	x	x				E23/E27
R05	NNE	x	x	x	x	x	x					E24/E28
N/A	NE, ENE, E, ESE, SE, SSE, S	Refer to Region R02										5 & 9
R06	SSW	x	x	x	x					x		E25
R07	SW, WSW	x	x	x	x				x	x		E20
R08	W	x	x	x	x			x	x	x		N/A
R09	WNW, NW	x	x	x	x		x	x	x			E22/E26
R10	NNW	x	x	x	x	x	x	x	x			N/A
Site Specific Region												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R11	-	x	x	x	x		x	x	x	x		N/A
Staged Evacuation - 5-Mile Radius Evacuates, then Evacuate Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R12	Full EPZ	x	x	x	x	x	x	x	x	x	x	N/A
R13	N	x	x	x	x	x	x	x				N/A
R14	NNE	x	x	x	x	x	x					N/A
N/A	NE, ENE, E, ESE, SE, SSE, S	Refer to Region R02										N/A
R15	SSW	x	x	x	x					x		N/A
R16	SW, WSW	x	x	x	x				x	x		N/A
R17	W	x	x	x	x			x	x	x		N/A
R18	WNW, NW	x	x	x	x		x	x	x			N/A
R19	NNW	x	x	x	x	x	x	x	x			N/A
R20	-	x	x	x	x		x	x	x	x		N/A
Additional Miami-Dade County Requested Regions												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R21	-	x	x	x						x		E18
R22	-	x	x	x					x	x		E19
R23	-	x	x	x	x			x	x			E21
Shelter-in-Place until 90% ETE for R02, then Evacuate				Area(s) Shelter-in-Place					Area(s) Evacuate			

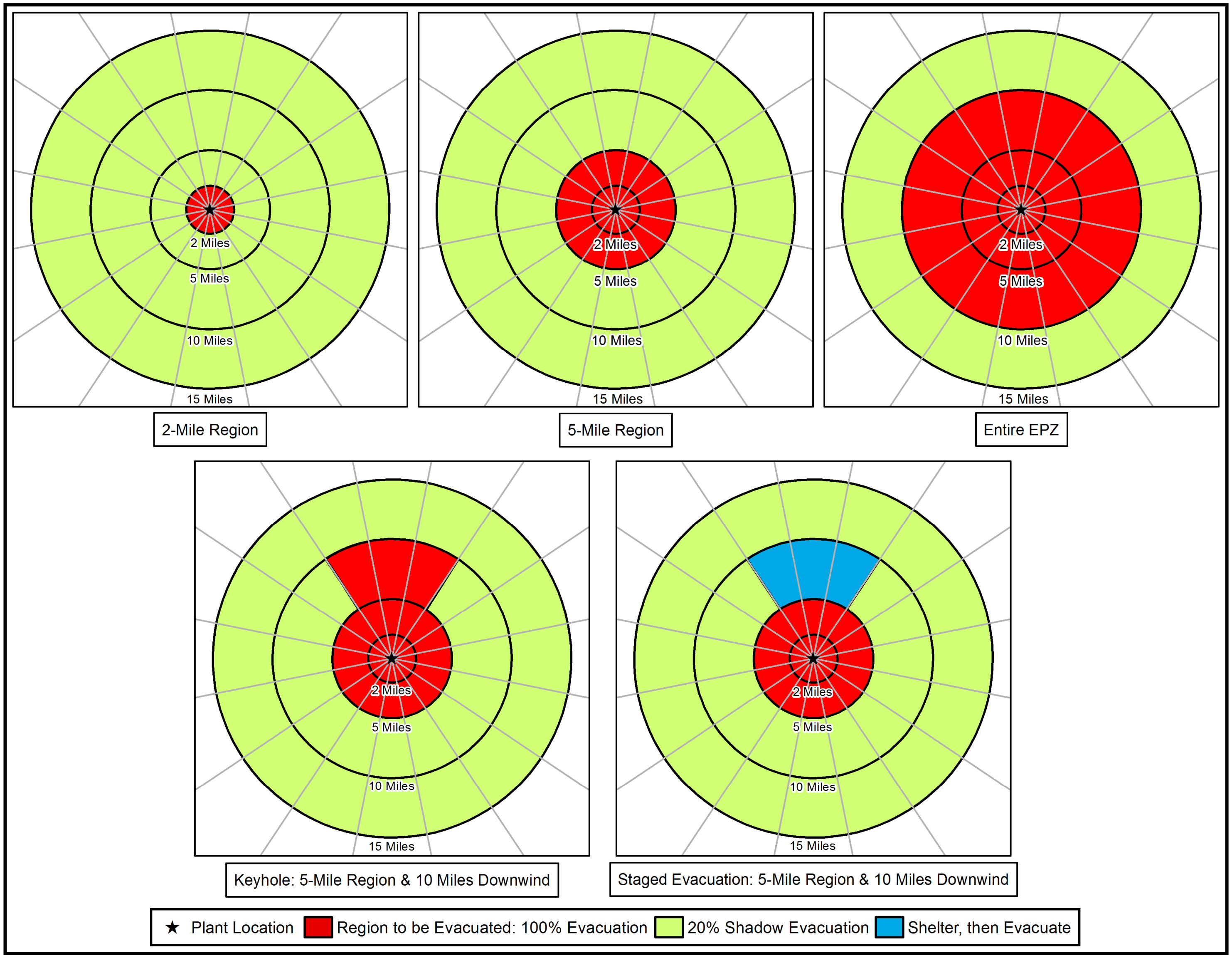


Figure 7-1. Voluntary Evacuation Methodology

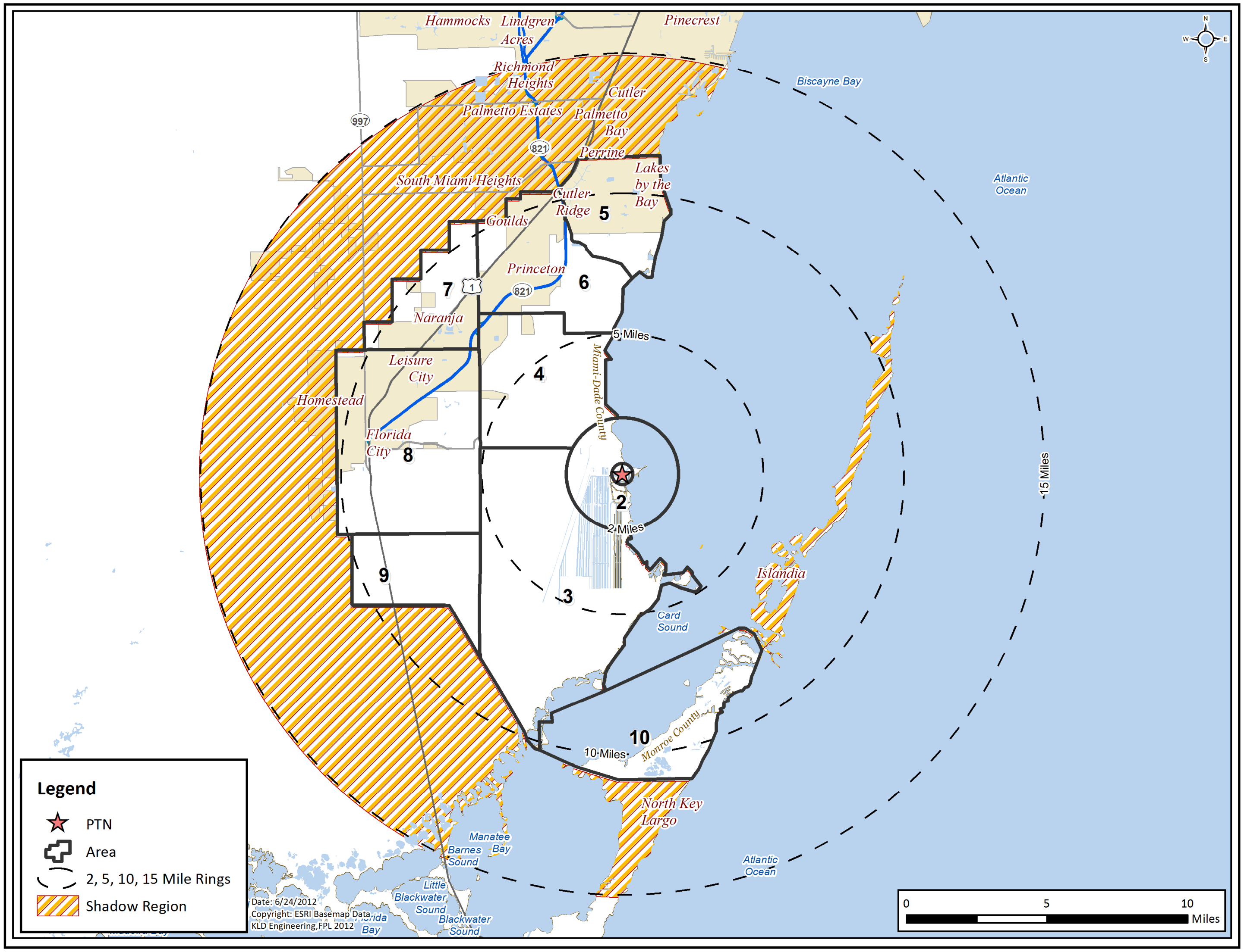


Figure 7-2. PTN Shadow Region

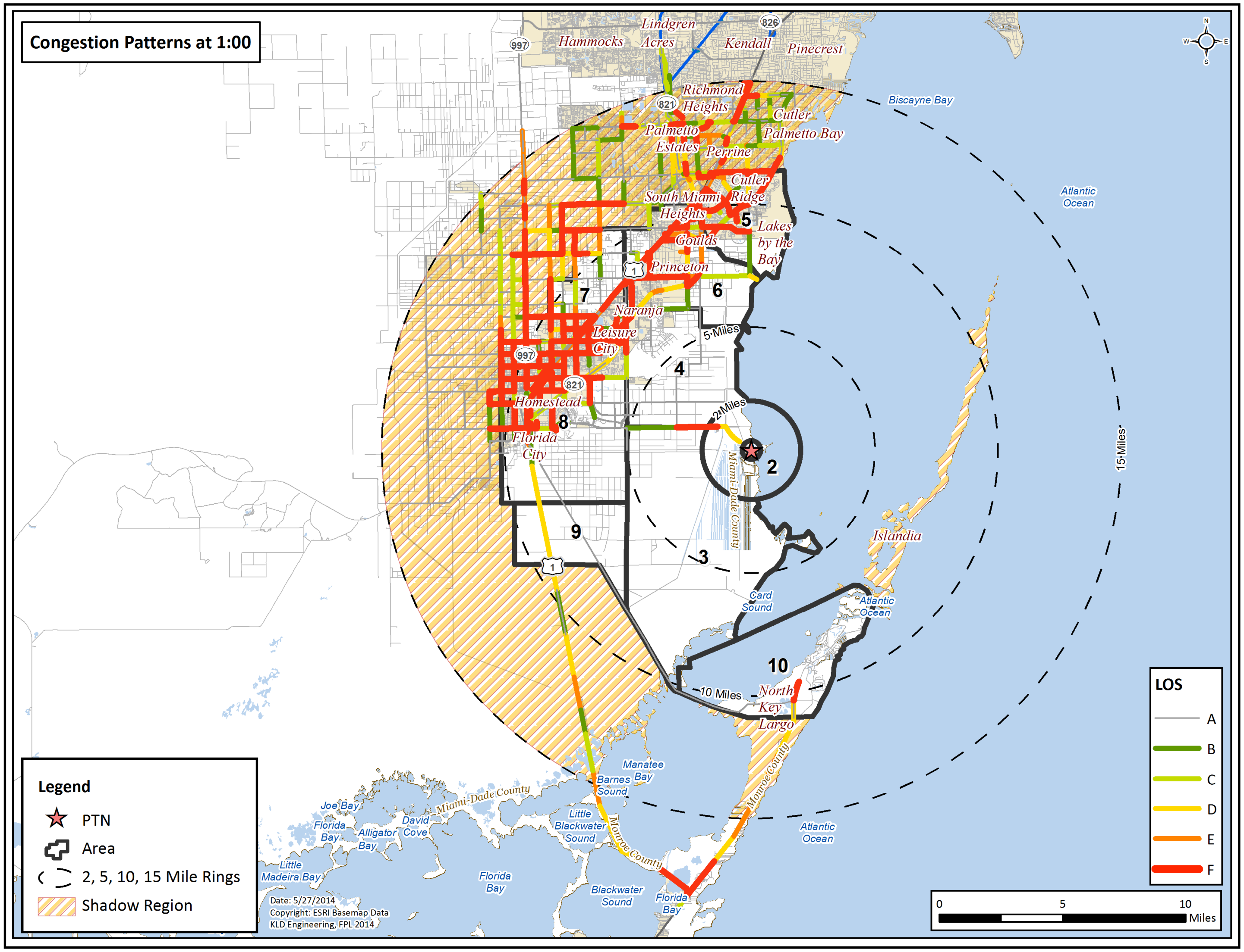


Figure 7-3. Congestion Patterns at 1 Hour after the Advisory to Evacuate

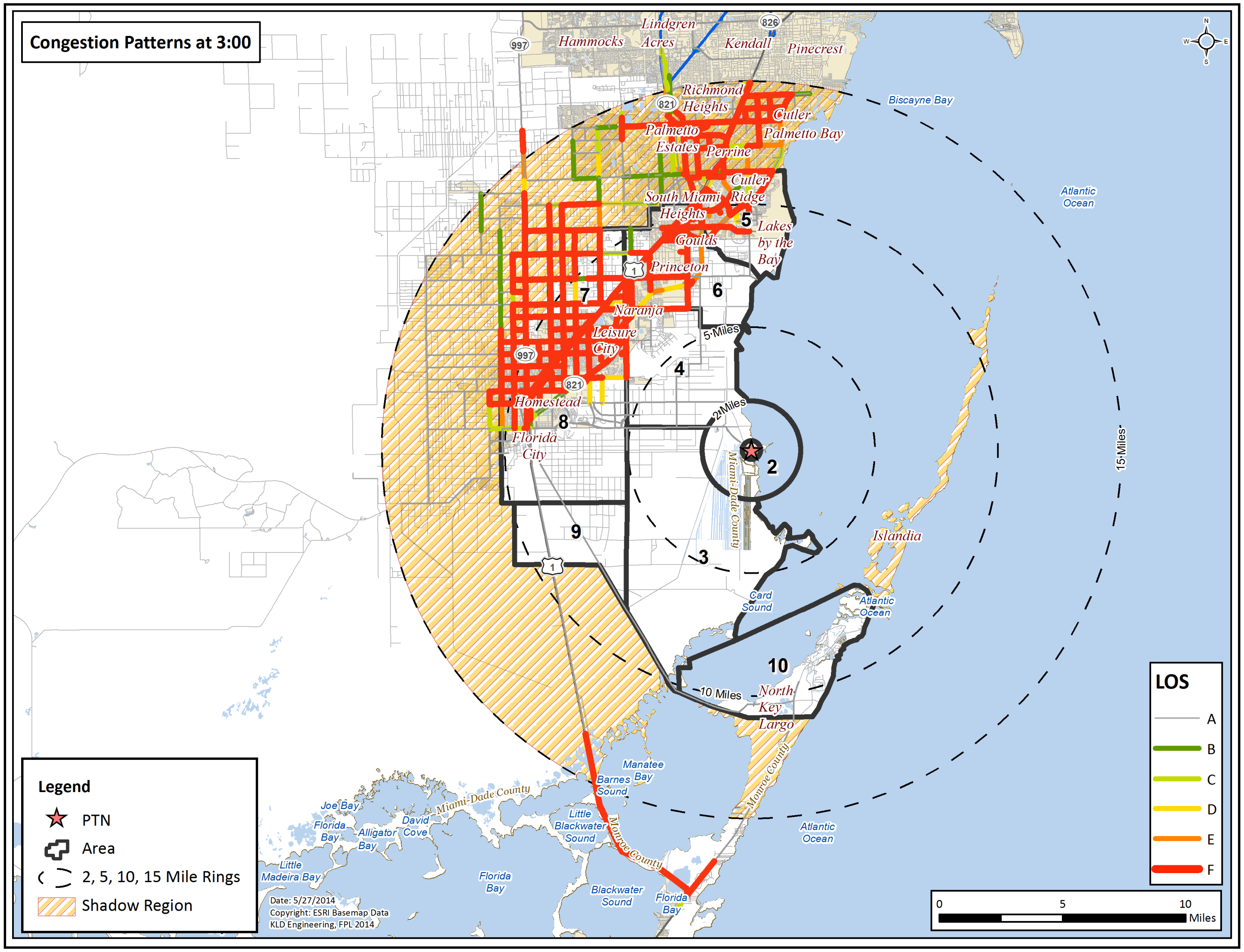


Figure 7-4. Congestion Patterns at 3 Hours after the Advisory to Evacuate

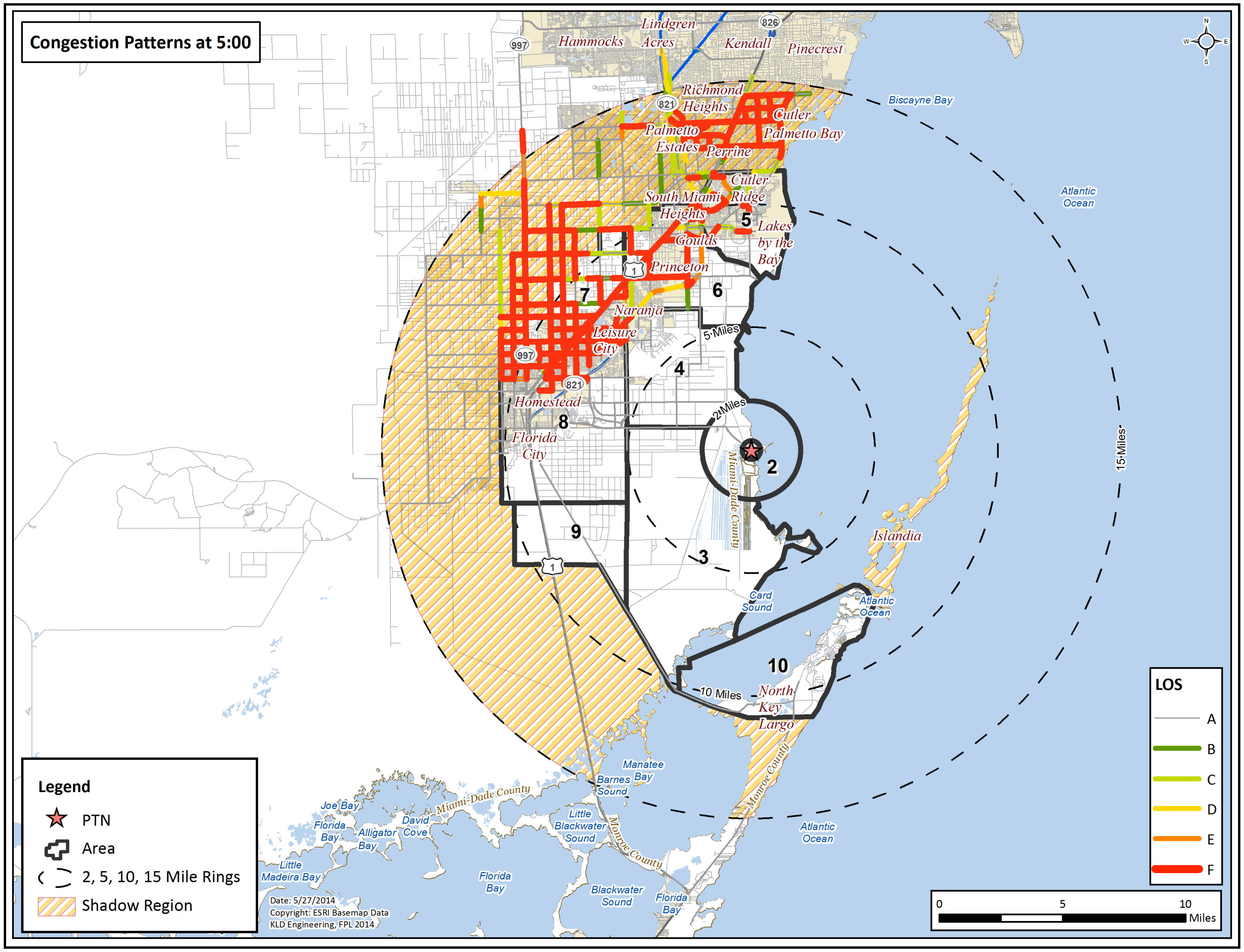


Figure 7-5. Congestion Patterns at 5 Hours after the Advisory to Evacuate

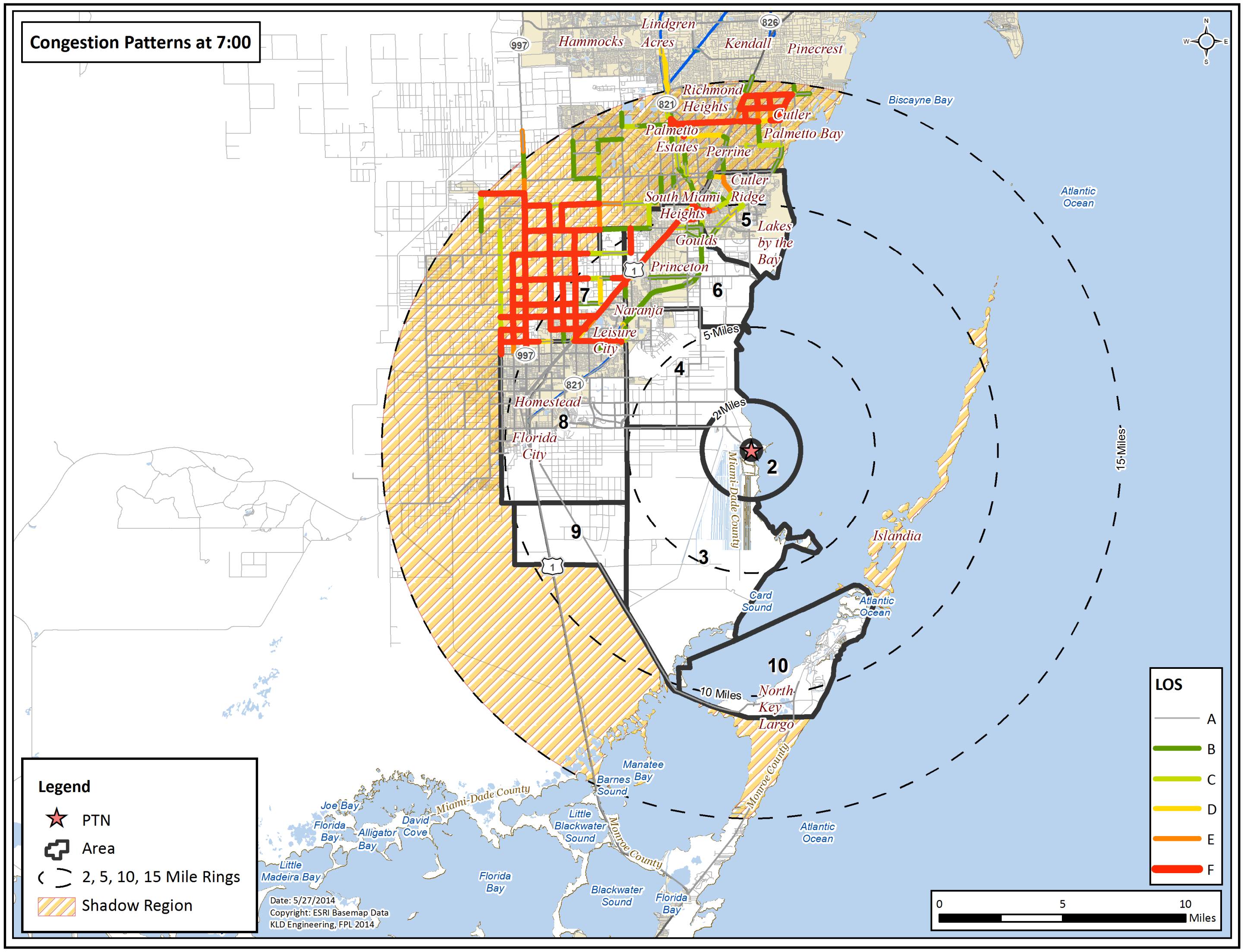


Figure 7-6. Congestion Patterns at 7 Hours after the Advisory to Evacuate

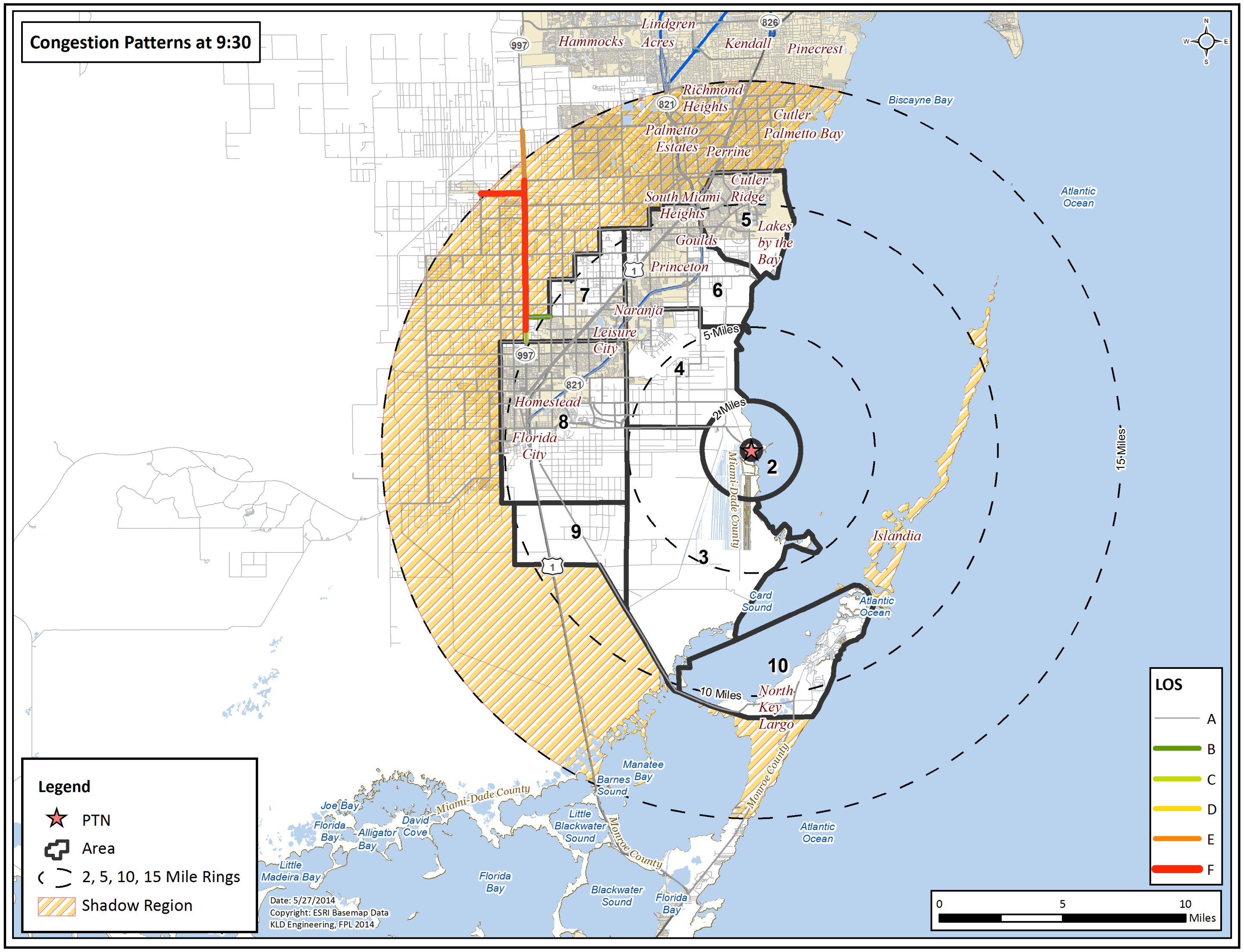


Figure 7-7. Congestion Patterns at 9 Hours and 30 Minutes after the Advisory to Evacuate

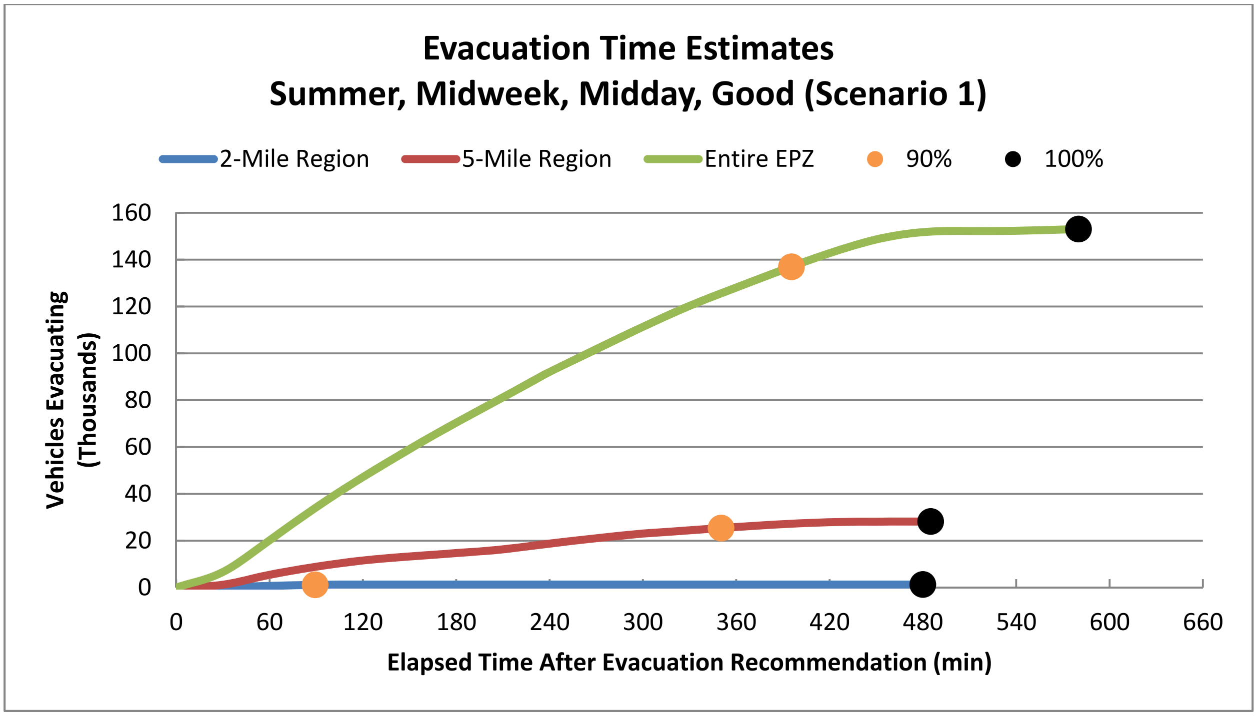


Figure 7-8. Evacuation Time Estimates - Scenario 1 for Region R03

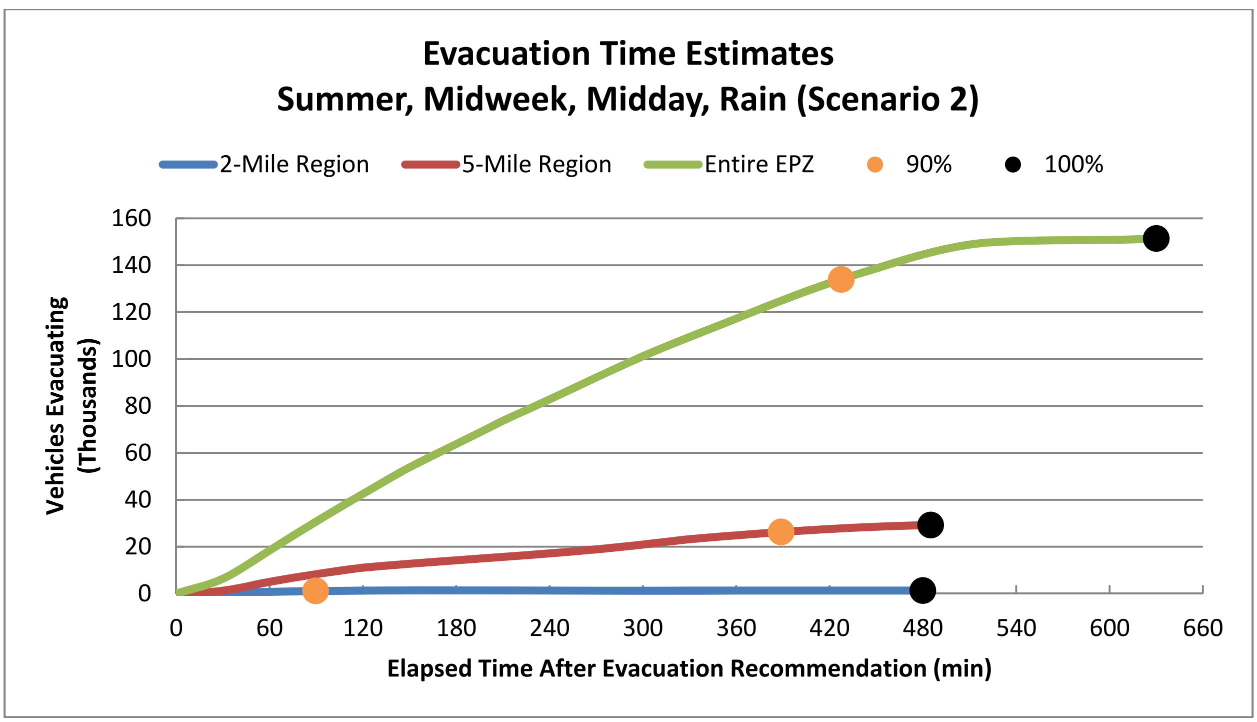


Figure 7-9. Evacuation Time Estimates - Scenario 2 for Region R03

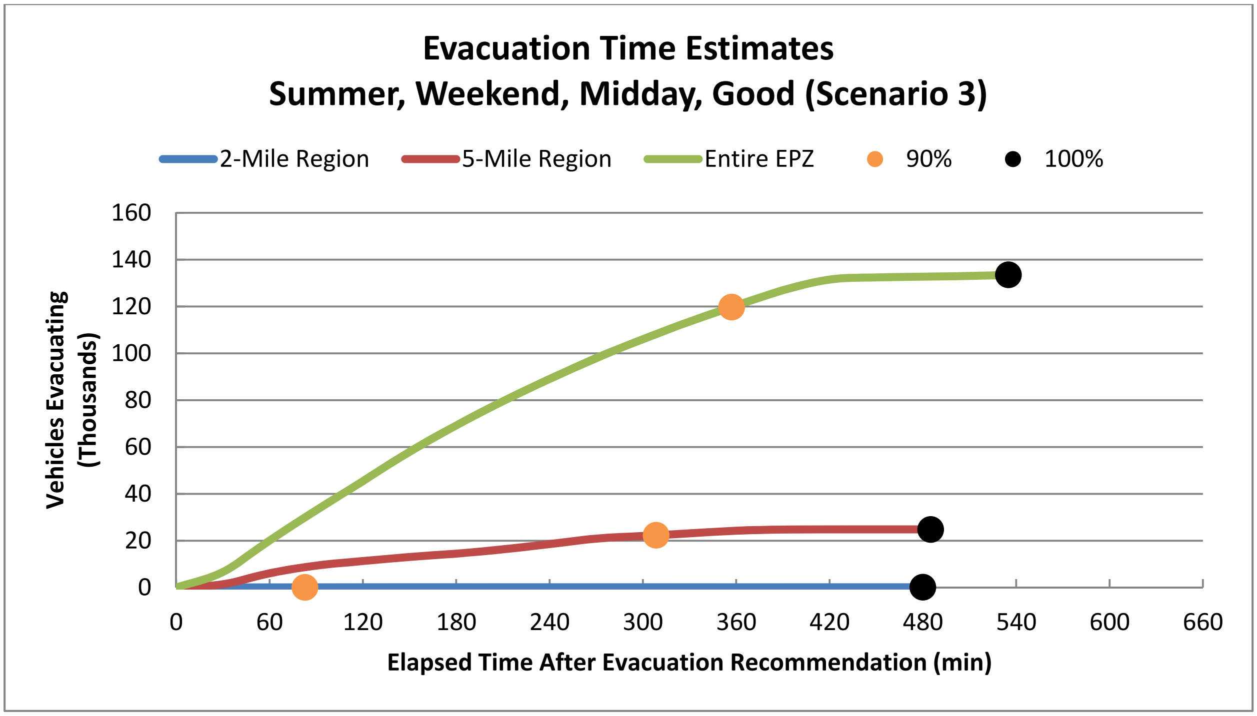


Figure 7-10. Evacuation Time Estimates - Scenario 3 for Region R03

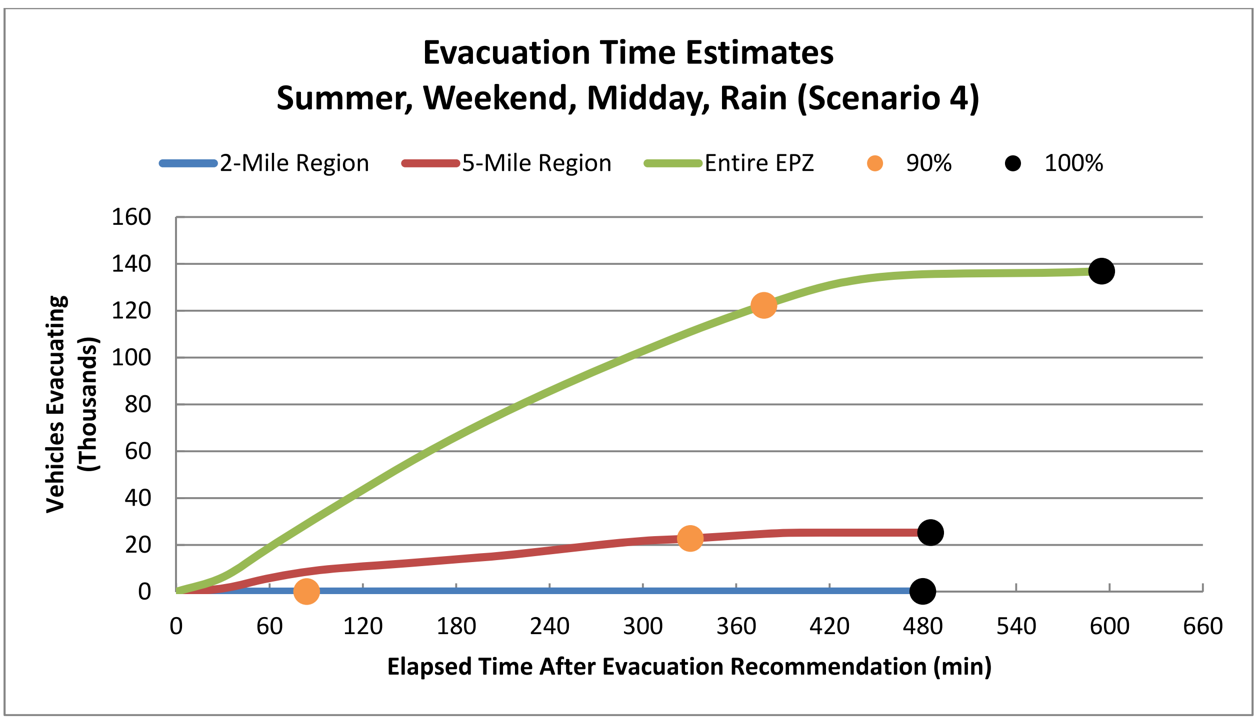


Figure 7-11. Evacuation Time Estimates - Scenario 4 for Region R03

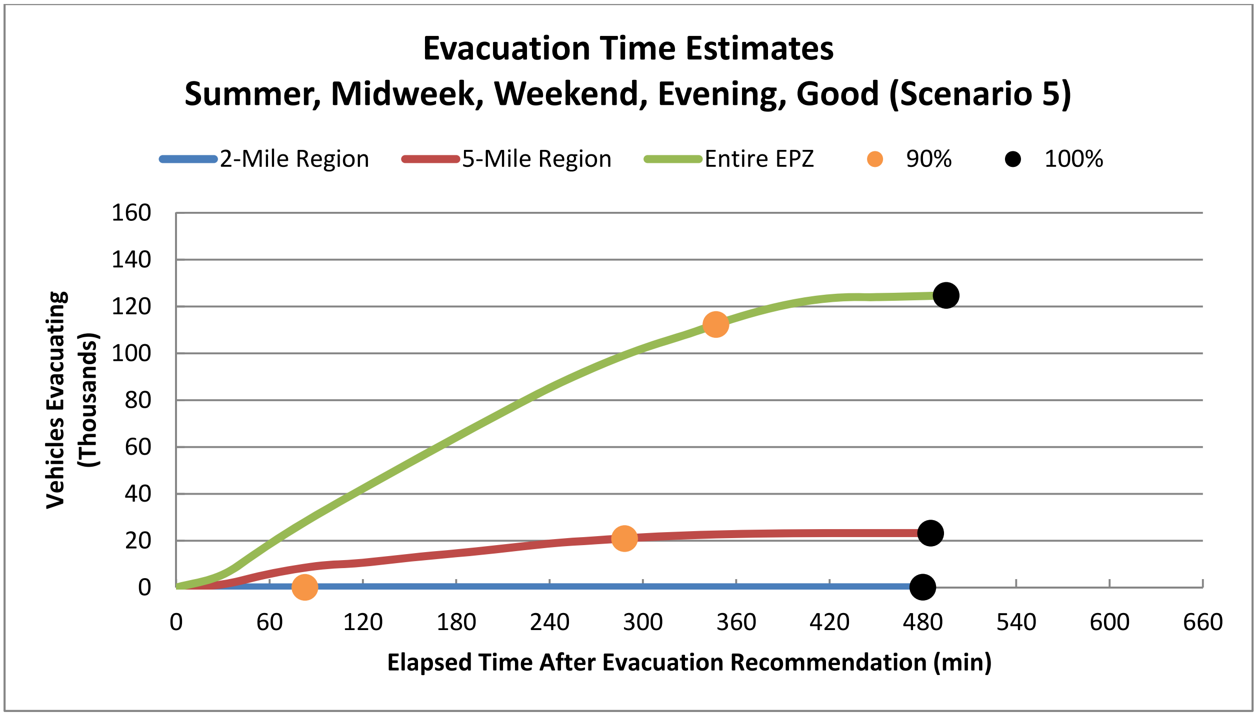


Figure 7-12. Evacuation Time Estimates - Scenario 5 for Region R03

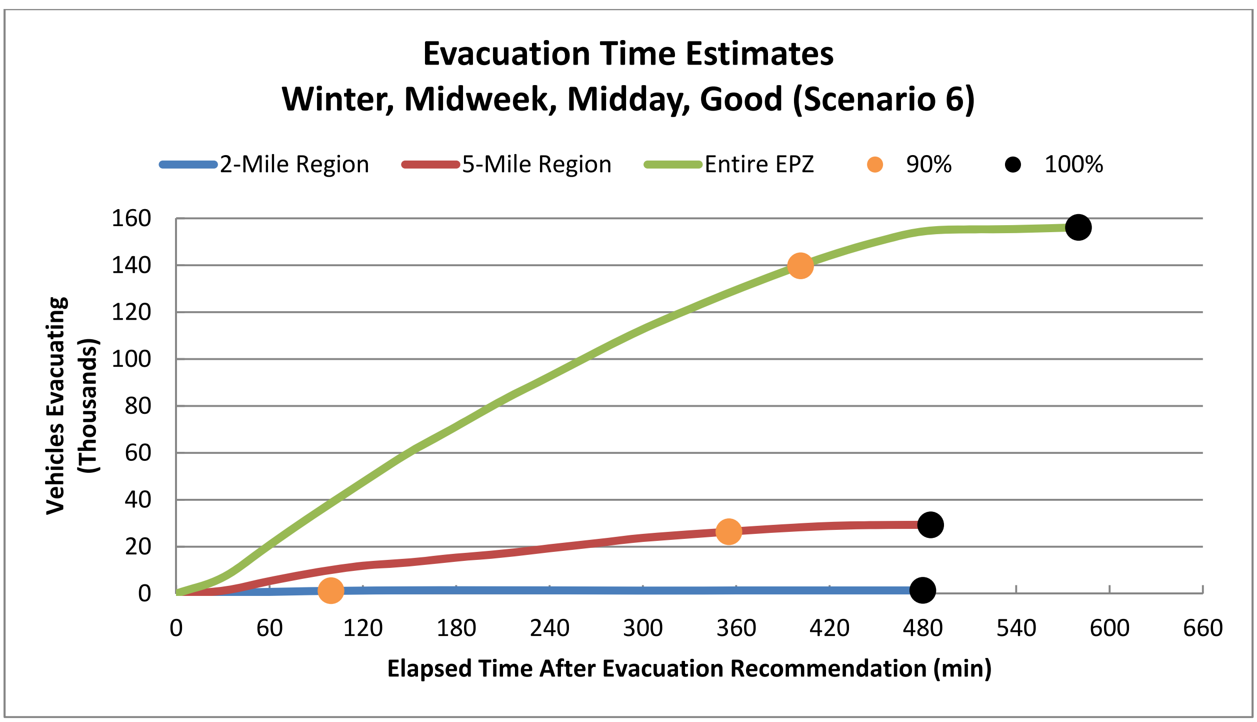


Figure 7-13. Evacuation Time Estimates - Scenario 6 for Region R03

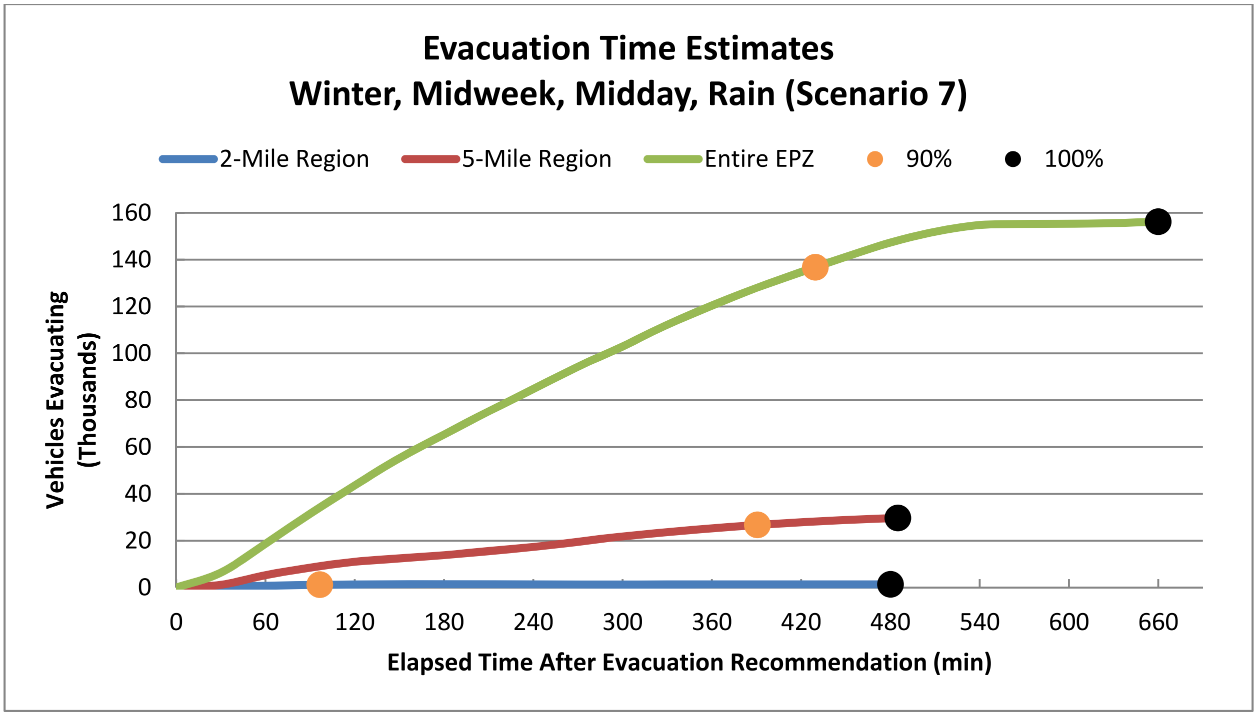


Figure 7-14. Evacuation Time Estimates - Scenario 7 for Region R03

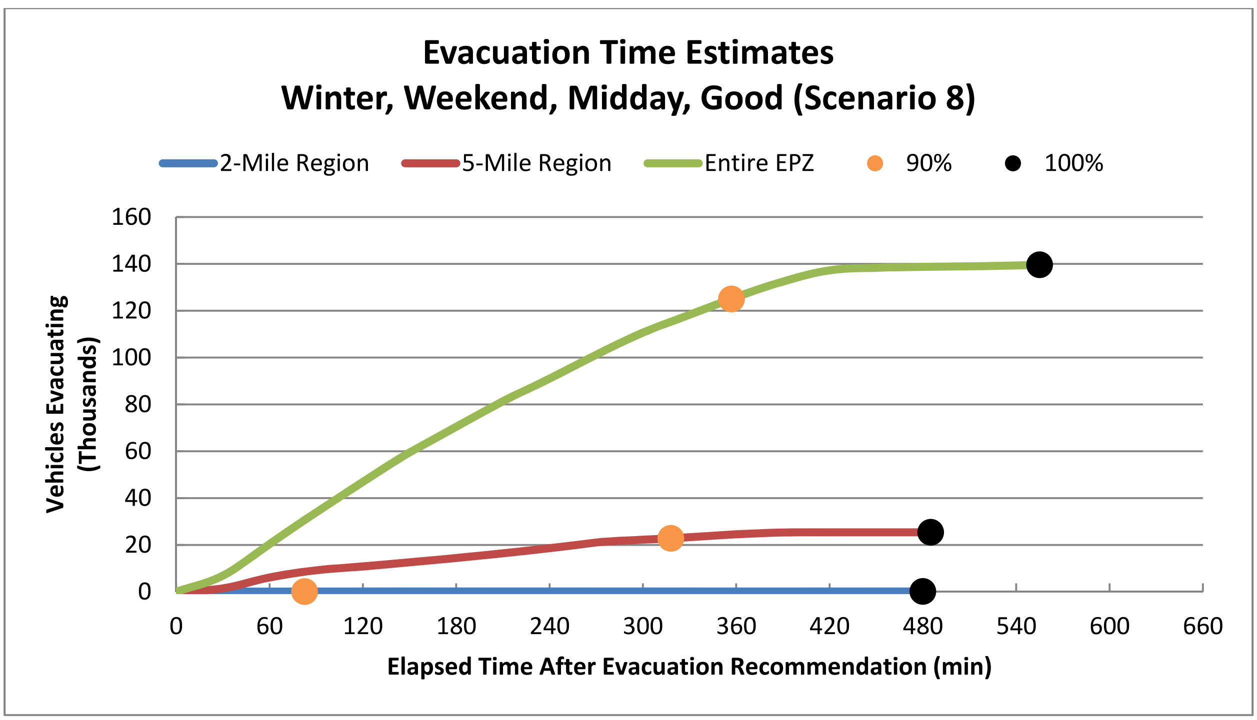


Figure 7-15. Evacuation Time Estimates - Scenario 8 for Region R03

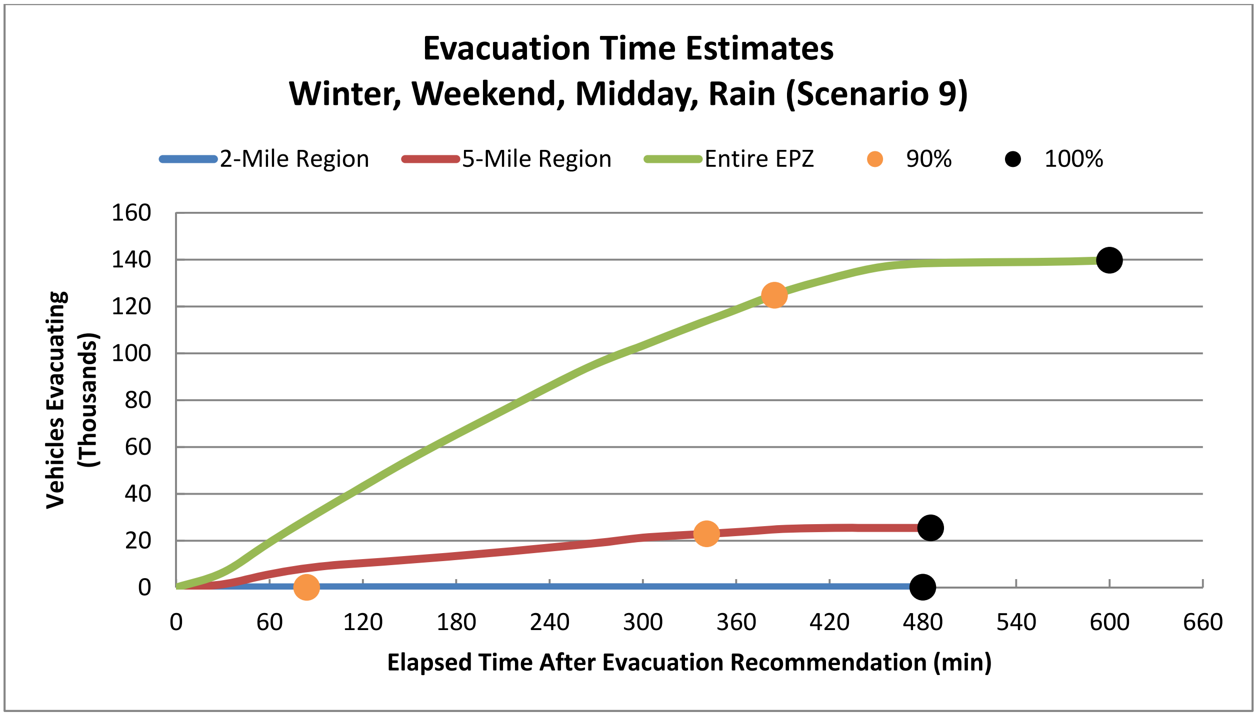


Figure 7-16. Evacuation Time Estimates - Scenario 9 for Region R03

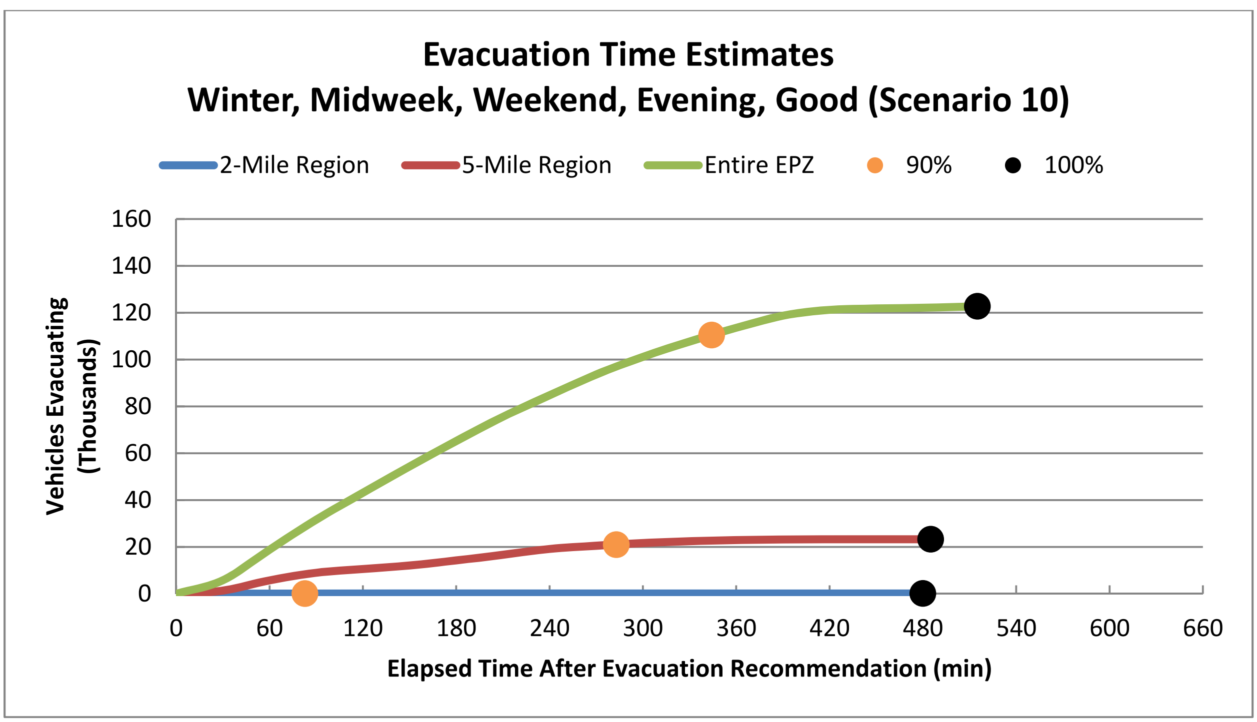


Figure 7-17. Evacuation Time Estimates - Scenario 10 for Region R03

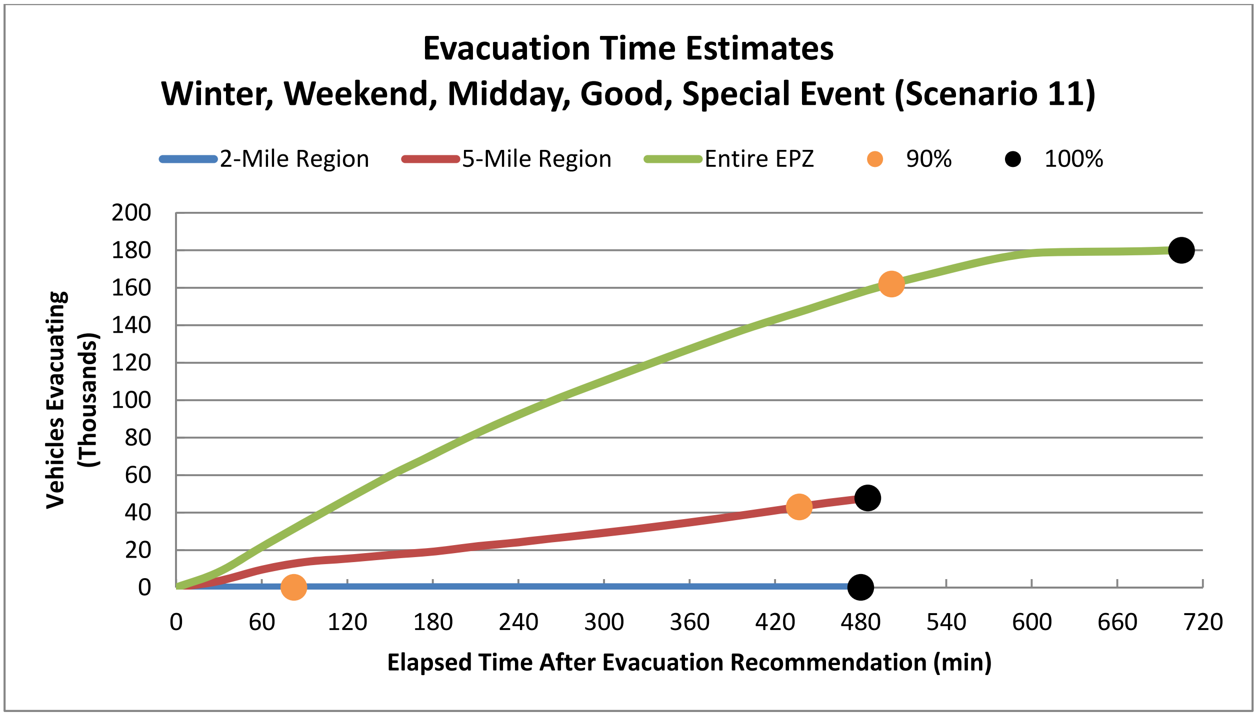


Figure 7-18. Evacuation Time Estimates - Scenario 11 for Region R03

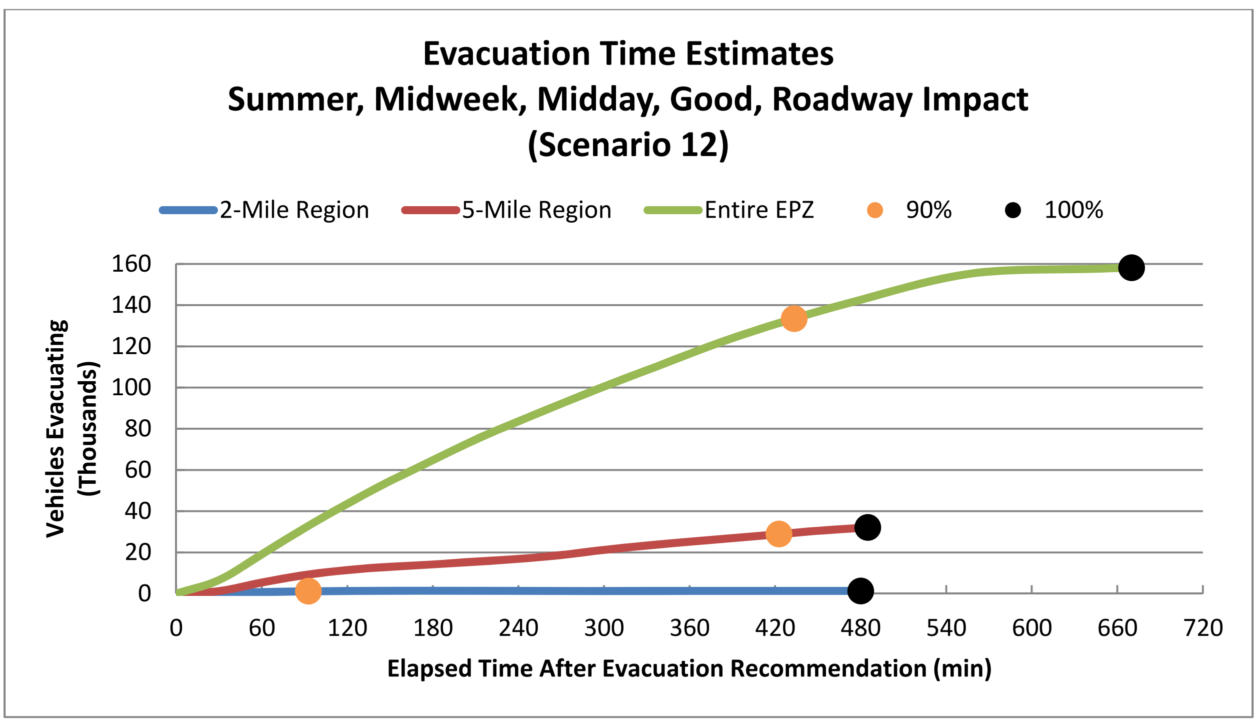


Figure 7-19. Evacuation Time Estimates - Scenario 12 for Region R03

8 TRANSIT-DEPENDENT AND SPECIAL FACILITY EVACUATION TIME ESTIMATES

This section details the analyses applied and the results obtained in the form of evacuation time estimates for transit vehicles. The demand for transit service reflects the needs of three population groups: (1) residents with no vehicles available; (2) residents of special facilities such as schools, medical facilities, and correctional facilities; and (3) homebound special needs population.

These transit vehicles mix with the general evacuation traffic that is comprised mostly of "passenger cars" (pc's). The presence of each transit vehicle in the evacuating traffic stream is represented within the modeling paradigm described in Appendix D as equivalent to two pc's. This equivalence factor represents the longer size and more sluggish operating characteristics of a transit vehicle, relative to those of a pc.

Transit vehicles must be mobilized in preparation for their respective evacuation missions. Specifically:

- Bus drivers must be alerted
- They must travel to the bus depot
- They must be briefed there and assigned to a route or facility

These activities consume time. Based on discussion with the offsite agencies, bus mobilization times vary between 90 and 120 minutes during school days. Therefore, it is estimated that bus mobilization time will average approximately 105 minutes extending from the ATE, to the time when buses first arrive at the facility to be evacuated.

During this mobilization period, other mobilization activities are taking place. One of these is the action taken by parents, neighbors, relatives and friends to pick up children from school prior to the arrival of buses, so that they may join their families. Virtually all studies of evacuations have concluded that this "bonding" process of uniting families is universally prevalent during emergencies and should be anticipated in the planning process. The current public information disseminated to residents of the Turkey Point Nuclear Power Plant EPZ indicates that schoolchildren will be evacuated to host schools (H.S.), and that parents should pick schoolchildren up at host schools. As discussed in Section 2, this study assumes a fast breaking general emergency. Therefore, children are evacuated to host schools. Picking up children at school could add to traffic congestion at the schools, delaying the departure of the buses evacuating schoolchildren, which may have to return in a subsequent "wave" to the EPZ to evacuate the transit-dependent population. This report provides estimates of buses under the assumption that no children will be picked up by their parents (in accordance with NUREG/CR-7002), to present an upper bound estimate of buses required. It is assumed that children at day-care centers are picked up by parents or guardians and that the time to perform this activity is included in the trip generation times discussed in Section 5.

The procedure for computing transit-dependent ETE is to:

- Estimate demand for transit service
- Estimate time to perform all transit functions

- Estimate route travel times to the EPZ boundary and to the host school/reception centers

8.1 Transit Dependent People Demand Estimate

The telephone survey (see Appendix F) results were used to estimate the portion of the population requiring transit service:

- Those persons in households that do not have a vehicle available.
- Those persons in households that do have vehicle(s) that would not be available at the time the evacuation is advised.

In the latter group, the vehicle(s) may be used by a commuter(s) who does not return (or is not expected to return) home to evacuate the household.

Table 8-1 presents estimates of transit-dependent people. Note:

- Estimates of persons requiring transit vehicles include schoolchildren. For those evacuation scenarios where children are at school when an evacuation is ordered, separate transportation is provided for the schoolchildren. The actual need for transit vehicles by residents is thereby less than the given estimates. However, estimates of transit vehicles are not reduced when schools are in session.
- It is reasonable and appropriate to consider that many transit-dependent persons will evacuate by ride-sharing with neighbors, friends or family. For example, nearly 80 percent of those who evacuated from Mississauga, Ontario who did not use their own cars, shared a ride with neighbors or friends. Other documents report that approximately 70 percent of transit dependent persons were evacuated via ride sharing. We will adopt a conservative estimate that 50 percent of transit dependent persons will ride share, in accordance with NUREG/CR-7002.

The estimated number of bus trips needed to service transit-dependent persons is based on an estimate of average bus occupancy of 30 persons at the conclusion of the bus run. Transit vehicle seating capacities typically equal or exceed 60 children on average (roughly equivalent to 40 adults). If transit vehicle evacuees are two thirds adults and one third children, then the number of “adult seats” taken by 30 persons is 20 + (2/3 x10) = 27. On this basis, the average load factor anticipated is (27/40) x 100 = 68 percent. Thus, if the actual demand for service exceeds the estimates of Table 8-1 by 50 percent, the demand for service can still be accommodated by the available bus seating capacity.

$$\left[20 + \left(\frac{2}{3} \times 10\right)\right] \div 40 \times 1.5 = 1.00$$

Table 8-1 indicates that transportation must be provided for 8,733 people. Therefore, a total of **291 bus runs** are required to transport this population to reception centers.

To illustrate this estimation procedure, we calculate the number of persons, P, requiring public transit or ride-share, and the number of buses, B, required for the Turkey Point Nuclear Power Plant EPZ:

$$P = No.of\ HH \times \sum_{i=0}^{n} \{(\%\ HH\ with\ i\ vehicles) \times [(Average\ HH\ Size) - i]\} \times A^i C^i$$

Where,

A = Percent of households with commuters

C = Percent of households who will not await the return of a commuter

$$P = 65{,}920 \times [0.07 \times 2.43 + 0.28 \times (2.31 - 1) \times 0.68 \times 0.29 + 0.45 \times (3.22 - 2) \times (0.68 \times 0.29)^2] = 65{,}920 \times 0.265 = 17{,}465$$

$$B = (0.5 \times P) \div 30 = 291$$

These calculations are explained as follows:

- All members (2.43 avg.) of households (HH) with no vehicles (7%) will evacuate by public transit or ride-share. The term 65,920 (number of households) x 0.07 x 2.43, accounts for these people.
- The members of HH with 1 vehicle away (28%), who are at home, equal (2.31-1). The number of HH where the commuter will not return home is equal to (65,920 x 0.28 x 1.31 x 0.68 x 0.29), as 68% of EPZ households have a commuter, 29% of which would not return home in the event of an emergency. The number of persons who will evacuate by public transit or ride-share is equal to the product of these two terms.
- The members of HH with 2 vehicles that are away (45%), who are at home, equal (3.22 – 2). The number of HH where neither commuter will return home is equal to 65,920 x 0.45 x 1.22 x $(0.68 \times 0.29)^2$. The number of persons who will evacuate by public transit or ride-share is equal to the product of these two terms (the last term is squared to represent the probability that neither commuter will return).
- Households with 3 or more vehicles are assumed to have no need for transit vehicles.
- The total number of persons requiring public transit is the sum of such people in HH with no vehicles, or with 1 or 2 vehicles that are away from home.

The estimate of transit-dependent population in Table 8-1 far exceeds the number of registered transit-dependent persons in the EPZ as provided by the counties (discussed below in Section 8.5). This is consistent with the findings of NUREG/CR-6953, Volume 2, in that a large majority of the transit-dependent population within the EPZs of U.S. nuclear plants does not register with their local emergency response agency.

8.2 School Population – Transit Demand

Table 8-2 presents the school population and transportation requirements for the direct evacuation of all schools within the EPZ for the 2010-2011 school year. This information was provided by Miami-Dade County. The column in Table 8-2 entitled "Buses Required" specifies the number of buses required for each school under the following set of assumptions and estimates:

- No students will be picked up by their parents prior to the arrival of the buses.
- While many high school students commute to school using private automobiles (as discussed in Section 2.4 of NUREG/CR-7002), the estimate of buses required for school evacuation do not consider the use of these private vehicles.
- Bus capacity, expressed in students per bus, is set to 70 for primary schools and 50 for middle and high schools.
- Those staff members who do not accompany the students will evacuate in their private vehicles.
- No allowance is made for student absenteeism, typically 3 percent daily.

It is recommended that the counties in the EPZ introduce procedures whereby the schools are contacted prior to the dispatch of buses from the depot (approximately one hour after the ATE), to ascertain the current estimate of students to be evacuated. In this way, the number of buses dispatched to the schools will reflect the actual number needed. The need for buses would be reduced by any high school students who have evacuated using private automobiles (if permitted by school authorities). Those buses originally allocated to evacuate schoolchildren that are not needed due to children being picked up by their parents, can be gainfully assigned to service other facilities or those persons who do not have access to private vehicles or to ride-sharing.

Table 8-3 presents a list of the host schools for each school in the EPZ. Students will be transported to these schools where they will be subsequently retrieved by their respective families.

8.3 Special Facility Demand

Table 8-4 presents the census of special facilities in the EPZ. 1,360 people have been identified as living in, or being treated in, these facilities. The capacity for each facility was provided by Miami-Dade County. Details of the number of ambulatory, wheelchair bound and bed-ridden patients at each facility were not available. For planning purposes, it was assumed that 85% of the patients at each facility are ambulatory, 10% are wheelchair bound and 5% are bed-ridden.

The transportation requirements for the special facility population are also presented in Table 8-4. The number of ambulance runs is determined by assuming that 2 patients can be accommodated per ambulance trip; the number of wheelchair bus runs assumes 15 wheelchairs per trip and the number of bus runs estimated assumes 30 ambulatory patients per trip.

8.4 Evacuation Time Estimates for Transit Dependent People

EPZ bus resources are assigned to evacuating schoolchildren (if school is in session at the time of the ATE) as the first priority in the event of an emergency. In the event that the allocation of buses dispatched from the depots to the various facilities and to the bus routes is somewhat "inefficient", or if there is a shortfall of available drivers, then there may be a need for some buses to return to the EPZ from the reception center after completing their first evacuation trip, to complete a "second wave" of providing transport service to evacuees. For this reason, the ETE for the transit-dependent population will be calculated for both a one wave transit evacuation and for two waves. Of course, if the impacted evacuation region is other than R03 (the entire EPZ), then there will likely be ample transit resources relative to demand in the impacted region and this discussion of a second wave would likely not apply.

When school evacuation needs are satisfied, subsequent assignments of buses to service the transit-dependent should be sensitive to their mobilization time. Clearly, the buses should be dispatched after people have completed their mobilization activities and are in a position to board the buses when they arrive at the pick-up points.

Evacuation time estimates for transit trips were developed using both good weather and adverse weather conditions. Figure 8-1 presents the chronology of events relevant to transit operations. The elapsed time for each activity will now be discussed with reference to Figure 8-1.

Activity: Mobilize Drivers (A→B→C)

Mobilization is the elapsed time from the ATE until the time the buses arrive at the facility to be evacuated. For a rapidly escalating radiological emergency with no observable indication before the fact, drivers would likely require 105 minutes to be contacted, to travel to the depot, be briefed, and to travel to the transit-dependent facilities, as discussed in Section 8.1. Mobilization time is slightly longer in adverse weather – 115 minutes when raining.

Activity: Board Passengers (C→D)

Based on discussions with offsite agencies, a loading time of 15 minutes (20 minutes for rain) for school buses is used.

For multiple stops along a pick-up route (transit-dependent bus routes) estimation of travel time must allow for the delay associated with stopping and starting at each pick-up point. The time, t, required for a bus to decelerate at a rate, "a", expressed in ft/sec/sec, from a speed, "v", expressed in ft/sec, to a stop, is t = v/a. Assuming the same acceleration rate and final speed following the stop yields a total time, T, to service boarding passengers:

$$T = t + B + t = B + 2t = B + \frac{2v}{a},$$

Where B = Dwell time to service passengers. The total distance, "s" in feet, travelled during the deceleration and acceleration activities is: $s = v^2/a$. If the bus had not stopped to service passengers, but had continued to travel at speed, v, then its travel time over the distance, s, would be: s/v = v/a. Then the total delay (i.e. pickup time, P) to service passengers is:

$$P = T - \frac{v}{a} = B + \frac{v}{a}$$

Assigning reasonable estimates:

- B = 50 seconds: a generous value for a single passenger, carrying personal items, to board per stop
- v = 25 mph = 37 ft/sec
- a = 4 ft/sec/sec, a moderate average rate

Then, P ≈ 1 minute per stop. Allowing 30 minutes pick-up time per bus run implies 30 stops per run, for good weather. It is assumed that bus acceleration and speed will be less in rain; total loading time is 40 minutes per bus in rain.

Activity: Travel to EPZ Boundary (D→E)

School Evacuation

Transportation resources available were provided by the EPZ county emergency management agencies and are summarized in Table 8-5. Also included in the table are the number of buses needed to evacuate schools, medical facilities, transit-dependent population, homebound special needs (discussed below in Section 8.5) and correctional facilities (discussed below in Section 8.6). These numbers indicate there are sufficient ambulance resources available to evacuate the bedridden population in a single wave. The ambulatory (including schoolchildren) and wheelchair bound population within the EPZ may require two waves of bus transportation. Miami-Dade County emergency management personnel indicated that Miami-Dade Transit has primary responsibility to evacuate the non-auto owning transit dependent residents in the EPZ who do not rideshare with a neighbor or friend. If Miami-Dade Transit does not have sufficient resources, school buses will be used to evacuate the remaining transit-dependent people.

As discussed above, it is highly unlikely that the entire EPZ would be evacuated at once. Thus, it is also unlikely that all of the resources identified in Table 8-5 would be needed at once. Nonetheless, two-wave ETE calculations are provided below for ambulatory and wheelchair bound people within the EPZ.

The buses servicing the schools are ready to begin their evacuation trips at 120 minutes after the ATE – 105 minutes mobilization time plus 15 minutes loading time – in good weather. The UNITES software discussed in Section 1.3 was used to define bus routes along the most likely path from a school being evacuated to the EPZ boundary, traveling toward the appropriate school reception center. This is done in UNITES by interactively selecting the series of nodes from the school to the EPZ boundary. Each bus route is given an identification number and is written to the DYNEV II input stream. DYNEV computes the route length and outputs the average speed for each 5 minute interval, for each bus route. The specified bus routes are documented in Table 8-6 (refer to the maps of the link-node analysis network in Appendix K for node locations). Data provided by DYNEV during the appropriate timeframe depending on the mobilization and loading times (i.e. 120 minutes after the ATE for good weather) were used to compute the average speed for each route, as follows:

$$Average\ Speed\ \left(\frac{mi.}{hr}\right) = \left[\frac{\sum_{i-1}^{n} length\ of\ link\ i\ (mi)}{\sum_{i-1}^{n} Delay\ on\ link\ i\ (min.) + \dfrac{length\ of\ link\ i\ (mi.)}{current\ speed\ on\ link\ i\ \left(\frac{mi.}{hr.}\right)} \times \dfrac{60\ min.}{1\ hr.}}\right] \times \frac{60\ min.}{1\ hr.}$$

The average speed computed (using this methodology) for the buses servicing each of the schools in the EPZ is shown in Table 8-7 and Table 8-8, and in Table 8-10 and Table 8-11 for the transit vehicles evacuating transit-dependent persons, which are discussed later. The travel time to the EPZ boundary was computed for each bus using the computed average speed and the distance to the EPZ boundary along the most likely route out of the EPZ. The travel time from the EPZ boundary to the reception center was computed assuming an average speed of 45 mph and 40 mph, for good weather and rain, respectively.

Table 8-7 (good weather) and Table 8-8 (rain) present the following evacuation time estimates (rounded up to the nearest 5 minutes) for schools in the EPZ: (1) The elapsed time from the ATE until the bus exits the EPZ; and (2) The elapsed time until the bus reaches the Host School. The evacuation time out of the EPZ can be computed as the sum of times associated with Activities A→B→C, C→D, and D→E (For example: 105 min. + 15 + 103 = 3:45 for Air Base Elementary, with good weather). The evacuation time to the host school is determined by adding the time associated with Activity E→F (discussed below), to this EPZ evacuation time.

Evacuation of Transit-Dependent Population

The buses dispatched from the depots to service the transit-dependent evacuees will be scheduled so that they arrive at their respective routes after their passengers have completed their mobilization. As shown in Figure 5-4 (Residents with no Commuters), about 90 percent of the evacuees will complete their mobilization when the buses will begin their routes, approximately 180 minutes after the ATE. The distribution of transit-dependent buses was based on population within each zip code with bus pick up locations. Each route was assigned 1 to 5 groups of buses depending on the number of buses needed. The start of service for these bus groups is separated by 20 minute headways, as shown in Table 8-10 and Table 8-11. The use of bus headways ensures that those people who take longer to mobilize will be picked up. Mobilization time is 10 minutes longer in rain to account for slower travel speeds and reduced roadway capacity.

Those buses servicing the transit-dependent evacuees will first travel along their pick-up routes grouped by zip code then proceed out of the EPZ. Transit-dependent pick-up locations are provided annually to EPZ residents in the emergency preparedness brochure (public information). Miami-Dade Transit has 6 predefined bus routes to service these pick-up locations. These 6 bus routes are shown graphically in Figure 8-2 and described in Table 8-9. Figure 8-2 presents the routes defined by Miami-Dade Transit to service the pre-defined pickup locations. The bus route numbers are the same as the zip code they service; see Table 8-9. It is assumed that residents will walk to and congregate at these pre-designated pick-up locations, and that they can arrive at the stops within the 180 minute bus mobilization time (good weather). These buses will use the Busway to evacuate once the route is complete.

As previously discussed, a pickup time of 30 minutes (good weather) is estimated for 30 individual stops to pick up passengers, to allow for flag stops wherein residents walk to the nearest major route and flag down passing buses, with an average of one minute of delay associated with each stop. Longer pickup times of 40 minutes were used for rain.

The travel distance along the respective pick-up routes within the EPZ is estimated using the UNITES software. Bus travel times within the EPZ are computed using average speeds computed by DYNEV, using the aforementioned methodology that was used for school evacuation.

Table 8-10 and Table 8-11 present the transit-dependent population evacuation time estimates for each bus route calculated using the above procedures for good weather and rain, respectively.

For example, the ETE for the bus route servicing zip code 33030 is computed as 180 + 38 + 30 = 4:10 for good weather (rounded up to nearest 5 minutes). Here, 38 minutes is the time to travel 18.8 miles at 29.5 mph, the average speed output by the model for this route at 180 minutes. The ETE for a second wave (discussed below) is presented in the event there is a shortfall of available buses or bus drivers, as previously discussed.

Activity: Travel to Reception Centers (E→F)

The distances from the EPZ boundary to the reception centers are measured using GIS software along the most likely route from the EPZ exit point to the reception center. The reception centers and host schools are mapped in Figure 10-1 and Figure 10-2, respectively. For a one-wave evacuation, this travel time outside the EPZ does not contribute to the ETE. For a two-wave evacuation, the ETE for buses must be considered separately, since it could exceed the ETE for the general public. Assumed bus speeds of 45 mph and 40 mph for good weather and rain, respectively, will be applied for this activity for buses servicing the transit-dependent population.

Activity: Passengers Leave Bus (F→G)

A bus can empty within 5 minutes. The driver takes a 10 minute break.

Activity: Bus Returns to Route for Second Wave Evacuation (G→C)

The buses assigned to return to the EPZ to perform a “second wave” evacuation of transit-dependent evacuees will be those that have already evacuated transit-dependent people who mobilized more quickly. The first wave of transit-dependent people depart the bus, and the bus then returns to the EPZ, travels to its route and proceeds to pick up more transit-dependent evacuees along the route. The travel time back to the EPZ is equal to the travel time to the reception center.

The second-wave ETE for the bus route servicing zip code 33030 is computed as follows for good weather:

- Bus arrives at reception center at 4:20 in good weather (4:10 to exit EPZ + 10 minute travel time to reception center).
- Bus discharges passengers (5 minutes) and driver takes a 10-minute rest: 15 minutes.
- Bus returns to EPZ and completes second route: 10 minutes (equal to travel time to reception center) + 25 minutes (18.8 miles @ 45.6 mph) = 35 minutes
- Bus completes pick-ups along route: 30 minutes.
- Bus exits EPZ at time 4:10 + 0:10 + 0:15 + 0:35 + 0:30 = 5:40 (rounded to nearest 5 minutes) after the ATE.

The ETE for the completion of the second wave for all transit-dependent bus routes are provided in Table 8-10 and Table 8-11. The average ETE for a two-wave evacuation of transit-dependent people does not exceed the ETE for the general population at the 90th percentile (see Table 7-1).

The relocation of transit-dependent evacuees from the reception centers to congregate care centers, if the counties decide to do so, is not considered in this study.

As shown in Table 8-5, there is a shortfall of school buses for evacuation of schoolchildren in a single wave. As such, a two wave evacuation is needed for schools. Due to the large number of schools in the EPZ, second-wave ETE were not computed for each school. Rather, the following representative ETE is provided to estimate the additional time needed for a second wave evacuation. Times and distances are based on averages for all schools in the EPZ:

- School buses arrive at the host schools at 4:10 (see average value in Table 8-7).
- Bus discharges passengers (5 minutes) and driver takes a 10-minute rest: 15 minutes.
- Bus returns to EPZ and completes second route: 15 minutes (equal to travel time to host school for good weather) + 145 minutes (12.4 miles @ 5.2 mph) = 160 minutes. The average distance to EPZ boundary is approximately 6.2 miles in Table 8-7. Thus 12.4 miles is the estimated distance to travel from the EPZ boundary to a school and then back to the EPZ boundary. 5.2 mph is the average speed output by the model at the time buses would begin the second wave of evacuation.
- Loading Time: 15 minutes.
- Bus exits EPZ at time 4:10 + 0:15 + 2:40 + 0:15 = 7:20 (rounded up to nearest 5 minutes) after the advisory to evacuate.
- Given the average single wave ETE for schools is 3:55 on average (Table 8-7), a second wave evacuation would require an additional 3 hour and 25 minutes, on average.

Evacuation of Special Facilities

The bus operations for this group are similar to those for school evacuation except:

- Buses are assigned on the basis of 30 patients to allow for staff to accompany the patients.
- The passenger loading time will be longer at approximately one minute per patient to account for the time to move patients from inside the facility to the vehicles.

Table 8-4 indicates that 50 bus runs, 45 wheelchair bus runs and 11 ambulance runs are needed to service all of the special facilities in the EPZ. Based on discussions with Miami-Dade County emergency management officials, Florida state law dictates that all medical facilities (hospitals, assisted living, etc.) must have detailed evacuation plans and adequate transportation resources to evacuate all residents of their facility in the event of an emergency. As such, these facilities will likely rely on private transportation providers. The Miami-Dade Department of Corrections and Miami-Dade Transit will assist those who may need transportation resources.

It is estimated that mobilization time averages 90 minutes. Specially trained medical support staff (working their regular shift) will be on site to assist in the evacuation of patients. Additional staff (if needed) could be mobilized over this same 90 minute timeframe.

Assuming the transportation providers are located in Miami, average travel times will be 45 minutes from the depot to the facility to be evacuated traveling counter-flow relative to evacuating traffic. Passenger loading time will be longer than that for schools and transit-dependents, approximately 30 minutes, to account for the time to move patients from inside the facility to the vehicles. Buses will be ready to begin their evacuation trip at 2:45 (45 minutes + 90 + 30).

Appendix E indicates that the medical facilities are approximately 8 miles from the plant, on average. Therefore, buses evacuating these facilities will have to travel at most 5 miles to leave the EPZ. The average travel speed at 2 hours and 45 minutes after the ATE is 10.1 mph. Therefore, the travel time out of the EPZ for buses evacuating special facilities is 30 minutes. The ETE for medical facilities is 3 hours and 15 minutes.

The ETE for the ambulatory patients at special facilities do not exceed the general population ETE.

It is assumed that special facility population is directly evacuated to appropriate host medical facilities. Relocation of this population to permanent facilities and/or passing through the reception center before arriving at the host facility are not considered in this analysis.

8.5 Special Needs Population

The county emergency management agencies have a combined registration for transit-dependent and homebound special needs persons. Residents of Miami-Dade County are encouraged to register via the annual mailing of the Safety Planning Booklet as well as other public information mechanisms. Registration and program qualifications are described online[1]. There are currently 150 registered special needs people within the EPZ, 128 of which would need transportation assistance to evacuate:

- 31 people are bed ridden and would require an ambulance
- 44 people are wheelchair bound and would require a wheelchair van or bus
- 53 people are ambulatory and would require a bus or van

There are currently no special needs persons within the Monroe County portion of the EPZ. If a call is received from a special needs person in the event of an emergency at the plant, the person would be picked up by Monroe County Social Services Transit and moved to an appropriate facility.

ETE for Homebound Special Needs Persons

Table 8-12 summarizes the ETE for homebound special needs people. The table is categorized by the type of vehicle required and then broken down by weather condition. The table takes into consideration the deployment of multiple vehicles to reduce the number of stops per vehicle. It is conservatively assumed that ambulatory and wheelchair bound special needs households are spaced 3 miles apart and bedridden households are spaced 5 miles apart. Van and bus speeds approximate 20 mph between households and ambulance speeds approximate 30 mph in good weather (10% slower in rain). Mobilization times of 90 minutes were used (100 minutes for rain). The last HH is assumed to be 5 miles from the EPZ boundary, and the network-wide average speed after the last pickup is used to compute travel time. ETE is computed by summing mobilization time, loading time at first household, travel to subsequent households, loading time at subsequent households, and travel time to EPZ boundary. All ETE are rounded to the nearest 5 minutes. As discussed in Section 8.4, Miami-Dade Transit buses are used to evacuate the wheelchair bound population since they can accommodate two wheelchairs per bus.

For example, assuming no more than one special needs person per HH implies that 53 ambulatory households need to be serviced. While only 2 buses are needed from a capacity perspective, if 10 buses are deployed to service these special needs HH, then each would require about 6 stops. The following outlines the ETE calculations:

1. Assume 10 buses are deployed, each with about 6 stops, to service a total of 53 HH.
2. The ETE is calculated as follows:
    a. Buses arrive at the first pickup location: 90 minutes
    b. Load HH members at first pickup: 5 minutes

[1] http://www.miamidade.gov/oem/special_needs.asp

c. Travel to subsequent pickup locations: 5 @ 9 minutes = 45 minutes
d. Load HH members at subsequent pickup locations: 5 @ 5 minutes = 25 minutes
e. Travel to EPZ boundary: 33 minutes (5 miles at 9.1 mph).

ETE: 90 + 5 + 45 + 25 + 33 = 3:20 rounded to the nearest 5 minutes

The following outlines the ETE calculations if a second wave is needed for the ambulatory population:

a. ETE to EPZ Boundary – 3:20 (3:40 – rain) (from Table 8-12)
b. Travel from EPZ Boundary to reception center: 10 minutes (12 minutes – rain) (average time of "Travel Time to R.C." from Table 8-10 and 8-11)
c. Unload ambulatory people at reception center: 30 minutes (6 people @ 5 min each)
d. Driver takes 10 minute rest: 10 minutes.
e. Travel time back to EPZ: 10 minutes (12 minutes – rain) (average time of "Travel Time to R.C." from Table 8-10 and 8-11)
f. Loading time at first household: 5 minutes
g. Bus travels to subsequent household: 5 stops @ 9 minutes = 45 minutes (50 minutes – rain)
h. Loading time at subsequent households: 5 stops @ 5 minutes = 25 minutes
i. Travel time to EPZ boundary at 5:35 (6:00 – rain): 5 miles @ 7.58 mph = 38 minutes (7.00 mph, 43 minutes – rain)

ETE: 3:20 + 10 + 30 + 10 + 10 + 5 + 45 + 25 + 38 = 6:15 rounded to the nearest 5 minutes

Rain ETE: 3:40 + 12 + 30 + 10 + 12 + 5 + 50 + 25 + 43 = 6:45 rounded to the nearest 5 minutes

The following outlines the ETE calculations if a second wave is needed for the wheelchair bound population:

a. ETE to EPZ Boundary – 2:20 (2:30 - rain) (from Table 8-12)
b. Travel from EPZ Boundary to reception center: 10 minutes (12 minutes – rain) (average time of "Travel Time to R.C." from Table 8-10 and 8-11)
c. Unload wheelchair bound people at reception center: 10 minutes (2 people @ 5 min each)
d. Driver takes 10 minute rest: 10 minutes.
e. Travel time back to EPZ: 10 minutes (12 minutes – rain) (average time of "Travel Time to R.C." from Table 8-10 and 8-11)
f. Loading time at first household: 5 minutes
g. Bus travels to second household: 9 minutes (10 – rain)
h. Loading time at second household: 5 minutes
i. Travel time to EPZ boundary at 3:19 (3:34– rain): 5 miles @ 8.93 mph = 34 minutes (7.93 mph, 38 minutes – rain)

ETE: 2:20 + 10 + 10 + 10 + 10 + 5 + 9 + 5 + 34 = 3:55 rounded to the nearest 5 minutes

Rain ETE: 2:30 + 12 + 10 + 10 + 12 + 5 + 10 + 5 + 38 = 4:15 rounded to the nearest 5 minutes

8.6 Correctional Facilities

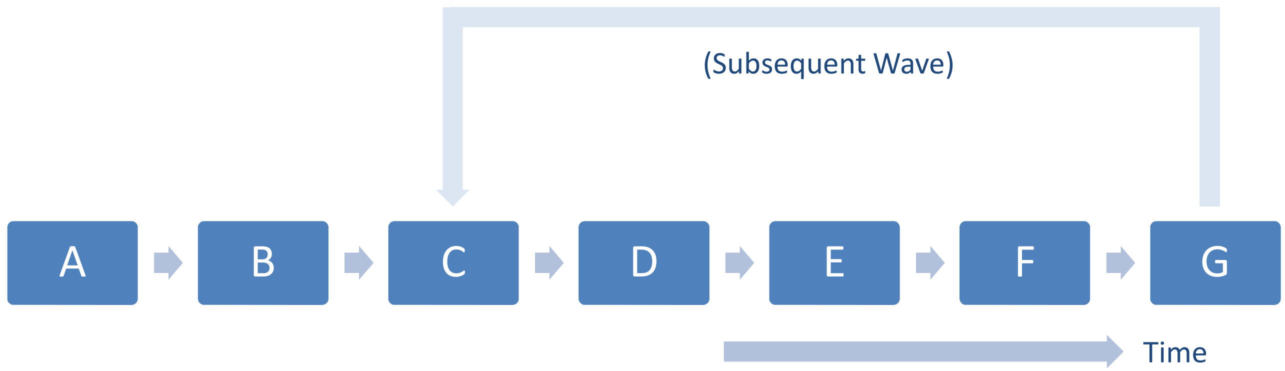
The Dade Juvenile Residential Facility has a capacity of 56 people. The following information was provided by facility management:

- Details of the evacuation plan for the facility are confidential
- Inmates would be relocated to an undisclosed facility in central Florida
- The facility owns two buses, which have sufficient capacity for the 56 inmates plus necessary staff

It is assumed that mobilization time for the facility is one hour and that loading the buses will require an additional half hour. Therefore, the buses will be departing at 90 minutes after the ATE. The average speed output by DYNEV (winter, midweek, midday, good weather) at this time is 16.4 miles per hour. The most likely route from the facility to central Florida is northbound along US Highway 1 to the Florida Turnpike, and then northbound out of the EPZ. This route is 19.0 miles long. The ETE in good weather is:

- Mobilization time = 60 minutes
- Loading time = 30 minutes
- Travel time = 70 minutes (19.0 miles at 16.4 miles per hour)
- ETE = 2:40 (hr:min, rounded to the nearest 5 minutes)

In rain, mobilization and loading time would each be 10 minutes longer (as was done for school ETE), and average speed would be slower (15.1 mph). ETE would be 3:00 (hr:min, rounded to the nearest 5 minutes).



Event	
A	Advisory to Evacuate
B	Bus Dispatched from Depot
C	Bus Arrives at Facility/Pick-up Route
D	Bus Departs for Reception Center
E	Bus Exits Region
F	Bus Arrives at Reception Center/Host School
G	Bus Available for “Second Wave” Evacuation Service
Activity	
A→B	Driver Mobilization
B→C	Travel to Facility or to Pick-up Route
C→D	Passengers Board the Bus
D→E	Bus Travels Towards Region Boundary
E→F	Bus Travels Towards Reception Center Outside the EPZ
F→G	Passengers Leave Bus; Driver Takes a Break

Figure 8-1. Chronology of Transit Evacuation Operations

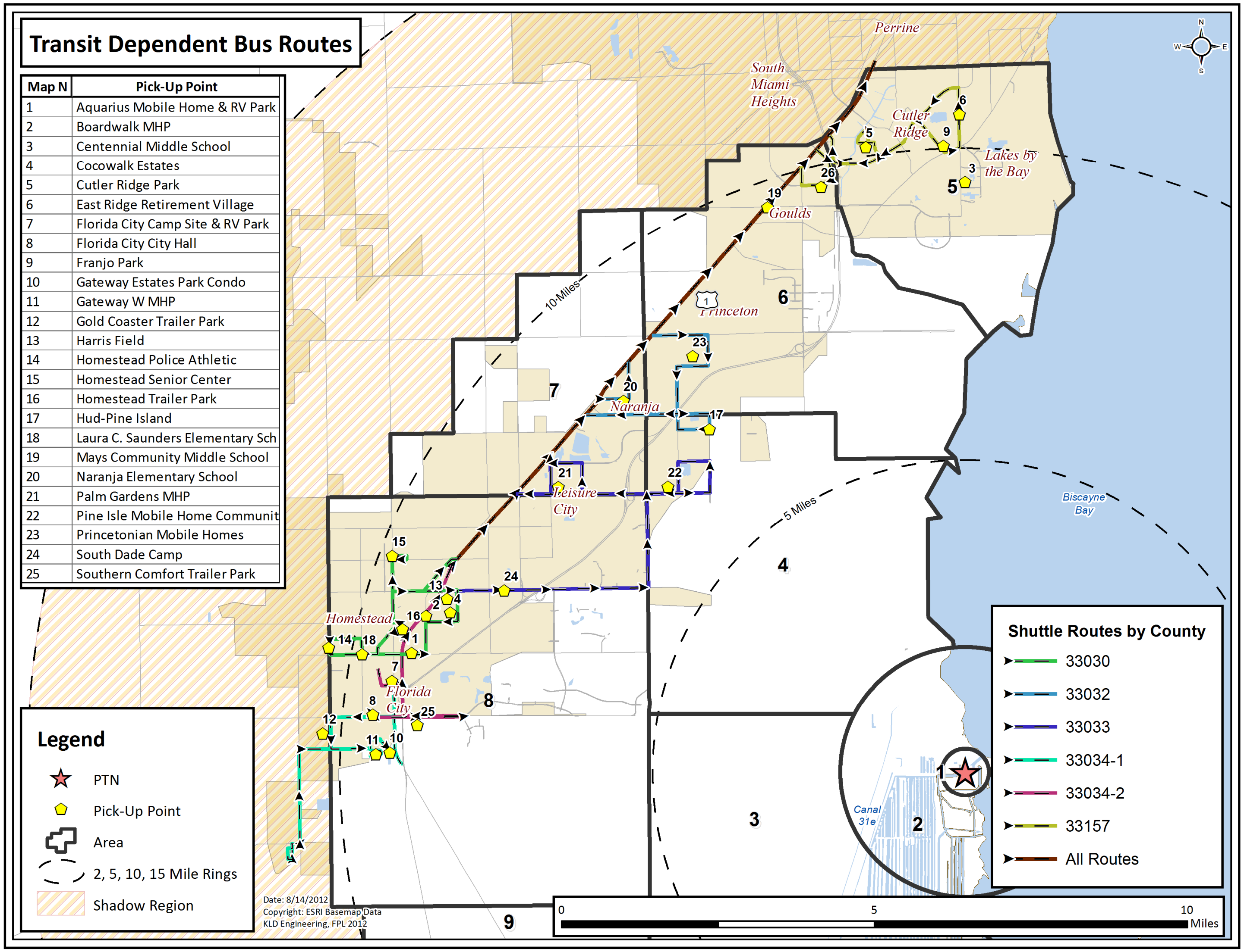


Figure 8-2. Transit-Dependent Bus Routes

Table 8-1. Transit-Dependent Population Estimates

2010 EPZ Population	Survey Average HH Size with Indicated No. of Vehicles			Estimated No. of Households	Survey Percent HH with Indicated No. of Vehicles			Survey Percent HH with Commuters	Survey Percent HH with Non-Returning Commuters	Total People Requiring Transport	Estimated Ridesharing Percentage	People Requiring Public Transit	Percent Population Requiring Public Transit
	0	1	2		0	1	2						
206,329	2.43	2.31	3.22	65,920	7%	28%	45%	68%	29%	17,465	50%	8,733	4.2%

Table 8-2. School Population Demand Estimates

Area	School Name	Enrollment	Buses Required
MIAMI-DADE COUNTY, FL			
4	Air Base Elementary	676	10
4	Mandarin Lakes K-8 Academy	1,376	20
4	Migrant Education Program	17	1
5	Balere Language Academy	151	3
5	Bel-Aire Elementary	522	8
5	Centennial Middle	976	20
5	Cutler Ridge Christian Academy	238	(b)
5	Cutler Ridge Elementary	905	13
5	Cutler Ridge Middle	1,008	21
5	Gulfstream Elementary	724	11
5	Our Lady of the Holy Rosary	460	(b)
5	Whigham, Dr. E.L. Elementary	798	12
5	Whispering Pines Elementary	758	11
6	Caribbean Elementary	811	12
6	Children's Rainbow	20	(b)
6	Coconut Palm K-8 Academy	1,400	20
6	Coral Reef Montessori Academy Charter School	335	5
6	Goulds Elementary School	545	8
6	Mays Middle	658	14
6	Pine Villa Elementary	623	9
7	Chapman Elementary	940	14
7	Naranja Elementary	637	10
7	Redland Middle	1,175	24
7	SIA Tech (Homestead Job Corps Center)	357	8
7	South Dade Center	N/A	N/A
7	South Dade Senior	3,266	66
7	South Dade Skill Center	N/A	N/A
8	Aspira South Youth Leadership Charter School	306	7
8	Avocado Elementary	782	12
8	Barrington Academy	94	2(c)
8	Campbell Dr Elementary	1,246	18
8	Campbell Dr Middle	1,072	22
8	Colonial Christian School	199	(b)
8	Cooper, Neva King Educational Center	101	3
8	Corporate Academy South	89	2
8	First Assembly Christian Academy	75	(b)

Area	School Name	Enrollment	Buses Required
8	First Presbyterian Church School	120	(b)
8	Florida City Elementary	857	13
8	Gateway Environmental K-8	1,239	18
8	Homestead Middle	966	20
8	Homestead Senior	2,184	44
8	Keys Gate Charter School	1,143	17
8	Lawrence Academy	15	1
8	Leisure City K-8 Center	1,318	19
8	MAST @ Homestead	457	10
8	Miami Community Charter School	50	1
8	Peskoe Elementary	1,114	16
8	Redland Center	N/A	0
8	Redland Christian Academy	215	(b)
8	Region VI Office	N/A	0
8	Rosa Parks Charter School	155	3
8	Sacred Heart	194	(b)
8	Saint John's Episcopal School	176	(b)
8	Saunders, Laura C. Elementary	919	14
8	South Dade Adult Center	N/A	0
8	The Charter School at Waterstone	1,117	16
outside[(a)]	Redland Elementary	996	15
outside[(a)]	Redondo Elementary	753	11
outside[(a)]	West Homestead Elementary	768	11
MONROE COUNTY, FL			
10	Academy at Ocean Reef	12	(b)
	TOTAL:	**38,108**	**615**

(a) According to Miami-Dade County, Redland Elementary, Redondo Elementary, and West Homestead Elementary are outside of the EPZ, but are nonetheless evacuated because they are close to the EPZ boundary. They have been included in areas 7, 8, and 8, respectively, for the ETE analysis.
(b) Parents pick up students.
(c) Most students are picked up by parents. There are 2 buses (capacity = 15 students for each bus) which evacuate those students who are not picked up.

Table 8-3. School Reception Centers

School	Host School
Miami-Dade County	
Air Base Elementary	Coral Reef Elementary
Aspira South Youth Leadership Charter School	N/A
Avocado Elementary	Pine Lake Elementary
Barrington Academy	N/A
Bel-Aire Elementary	Devon Aire Elementary
Campbell Drive Elementary	Palmetto Elementary
Campbell Drive Middle	Palmetto Senior
Caribbean Elementary	Pinecrest Elementary
Centennial Middle	Palmetto Middle
Chapman Elementary	Richmond Elementary
Coconut Palm K-8	Coral Reef Senior
Cooper, Neva King Educational Center	Pine Lake Elementary
Coral Reef Montessori Academy Charter School	N/A
Corporate Academy South	Colonial Drive Elementary
Cutler Ridge Elementary	R. Morgan Voc. Tech.
Cutler Ridge Middle	R. Morgan Voc. Tech
Florida City Elementary	Palmetto Elementary
Goulds Elementary School	Colonial Drive Elementary
Gateway Environmental K-8	Richmond Heights Middle
Gulfstream Elementary	Colonial Drive Elementary
Homestead Middle	Arvida Middle
Homestead Senior	Hommocks Middle
Leisure City K-8 Center	South Miami Heights Elementary
Mandarin Lakes K-8	Coral Reef Senior
MAST @ Homestead	N/A
Mays Middle	McMillan Middle
Migrant Education Program	Palmetto Middle
Naranja Elementary	Richmond Heights Middle
Peskoe Elementary	Richmond Heights Middle
Pine Villa Elementary	Martin, F.C. Elementary
Redland Elementary	South Miami Elementary
Redland Middle	South Miami Middle
Redondo Elementary	Winston Park Elementary
Saunders, Laura C. Elementary	Porter, G.L. Elementary
South Dade Senior	Miami Killian Senior
West Homestead Elementary	Pepper, Claude Elementary
Whigham, Dr. E.L. Elementary	Pinecrest Elementary
Whispering Pines Elementary	Howard Drive Elementary
Monroe County	
The Academy at Ocean Reef[a]	Key Largo Elementary

(a) Parents will pick up students at this school. In the unlikely event that parents are unable to pick up students, they will be transported to the host school.

Table 8-4. Special Facility Transit Demand

Area	Facility Name	Municipality	Cap-acity	Ambu-latory	Wheel-chair Bound	Bed-ridden	Bus Runs	Wheel-chair Bus Runs	Ambulance Runs
MIAMI-DADE COUNTY, FL									
4	Diaz Home Care ALF	Homestead	7	6	1	0	1	1	0
4	Merline's Place	Homestead	6	5	1	0	1	1	0
4	M J Quality Care	Homestead	8	7	1	0	1	1	0
4	Mother Golden Years III	Miami	6	5	1	0	1	1	0
5	Bel Air ALF	Miami	7	6	1	0	1	1	0
5	Bella Luna Retirement Home	Miami	9	8	1	0	1	1	0
5	Riverside Senior Care	Miami	7	6	1	0	1	1	0
5	Blue Point Home Care	Miami	6	5	1	0	1	1	0
5	Cutler Bay Village	Miami	28	24	3	1	1	1	1
5	Guardian Angel ALF	Cutler Bay	8	7	1	0	1	1	0
5	Caribbean ALF	Miami	6	5	1	0	1	1	0
5	East Ridge Retirement Village	Miami	60	51	6	3	2	1	2
5	Harmony Family Home	Miami	7	6	1	0	1	1	0
5	Health South Rehabilitation Hospital	Miami	60	51	6	3	2	1	2
5	Kenneth Home Inc.	Miami	8	7	1	0	1	1	0
5	Living Well ALF Corporation	Cutler Bay	6	5	1	0	1	1	0
5	Marlin Retirement ALF	Miami	8	7	1	0	1	1	0
5	Old Cutler Retirement Home	Miami	8	7	1	0	1	1	0
5	Paradise Villa ALF, Inc.	Cutler Bay	7	6	1	0	1	1	0
5	Perdue Medical Center	Cutler Bay	53	45	5	3	2	1	2
5	Rodeck One Inc.	Miami	8	7	1	0	1	1	0
5	The Haven	Miami	11	9	1	1	1	1	1
5	Welcome Home ALF Corp.	Cutler Bay	7	6	1	0	1	1	0
6	Diaz Home Care ALF	Homestead	7	6	1	0	1	1	0

Area	Facility Name	Municipality	Cap-acity	Ambu-latory	Wheel-chair Bound	Bed-ridden	Bus Runs	Wheel-chair Bus Runs	Ambulance Runs
6	Blanca Azuzena Homecare	Homestead	8	7	1	0	1	1	0
6	B& B Home Care, Inc.	Miami	7	6	1	0	1	1	0
6	Del Real Home Care, Inc.	Homestead	7	6	1	0	1	1	0
6	Duran Home Care Corp	Homestead	7	6	1	0	1	1	0
6	God Is First ALF, Inc.	Miami	6	5	1	0	1	1	0
6	Ifa Lola ALF	Cutler Bay	6	5	1	0	1	1	0
6	Ive Home	Miami	8	7	1	0	1	1	0
6	Ive Home II ALF	Cutler Bay	8	7	1	0	1	1	0
6	Rick and Dauvy ALF Inc.	Miami	6	5	1	0	1	1	0
6	Living Well ALF, Co.	Homestead	7	6	1	0	1	1	0
6	Meadow Wood Homes LLC	Homestead	7	6	1	0	1	1	0
6	Osmani M ALF LLC	Miami	7	6	1	0	1	1	0
6	My Sweet Home	Miami	8	7	1	0	1	1	0
6	Paula's Mansion ALF	Miami	6	5	1	0	1	1	0
6	Rafaela's Home ALF II	Miami	8	7	1	0	1	1	0
6	St. Mary Adult Care II	Miami	7	6	1	0	1	1	0
6	Suany's Home	Miami	8	7	1	0	1	1	0
6	Sunny Hills of Homestead	Princeton	105	89	11	5	3	1	3
6	Biscayne Villa Assisted Living	Miami	6	5	1	0	1	1	0
6	Sylvia's Senior Home	Miami	10	9	1	0	1	1	0
6	Vicky's ALF	Homestead	7	6	1	0	1	1	0
7	Advance ALF	Homestead	6	5	1	0	1	1	0
7	Naranja Group Home	Naranja	12	10	1	1	1	1	1
7	Maria Home Care Corp	Miami	7	6	1	0	1	1	0
7	Por Una Vida Mejor	Homestead	8	7	1	0	1	1	0
7	San Rafael Home Health Inc.	Homestead	7	6	1	0	1	1	0

Area	Facility Name	Municipality	Cap-acity	Ambu-latory	Wheel-chair Bound	Bed-ridden	Bus Runs	Wheel-chair Bus Runs	Ambulance Runs
7	Serenity Adult Home Care Services	Homestead	6	5	1	0	1	1	0
8	Alita and John Haran ALF	Homestead	6	5	1	0	1	1	0
8	Angele's Assisted Living Facility	Homestead	7	6	1	0	1	1	0
8	Emanuel Adult ALF Inc.	Homestead	7	6	1	0	1	1	0
8	Leixure City Homecare Inc.	Homestead	6	5	1	0	1	1	0
8	Heaven Assisted Living Facility	Homestead	7	6	1	0	1	1	0
8	New Horizon Assisted Living	Homestead	7	6	1	0	1	1	0
8	El Viejo Sol ALF Corp	Homestead	6	5	1	0	1	1	0
8	Heaven Assisted Living Facility	Homestead	7	6	1	0	1	1	0
8	Homestead Hospital	Homestead	120	102	12	6	4	1	3
8	Homestead Manor	Homestead	82	70	8	4	3	1	2
8	Kayleen and Denis Care	Homestead	10	9	1	0	1	1	0
8	Krome Apartments - Sunrise Community Inc.	Homestead	12	10	1	1	1	1	1
8	Kayleen and Denis Care	Homestead	10	9	1	0	1	1	0
8	MD ALF	Miami	6	5	1	0	1	1	0
8	Mi Renacer ALF	Homestead	8	7	1	0	1	1	0
8	Mother Golden Years II	Homestead	6	5	1	0	1	1	0
8	Palace Gardens-North	Homestead	224	191	22	11	7	2	6
8	Pina & Fuerte Adult Care	Homestead	7	6	1	0	1	1	0
8	Sara Home Care	Homestead	16	14	2	0	1	1	0
8	Signature Healthcare of Brookwood Gardens	Homestead	120	102	12	6	4	1	3
8	Sol Radiante Inc.	Homestead	6	5	1	0	1	1	0
8	Swankridge Care Center	Homestead	12	10	1	1	1	1	1
8	Swankridge Holistic Research & Care Center	Homestead	12	10	1	1	1	1	1

Area	Facility Name	Municipality	Cap-acity	Ambu-latory	Wheel-chair Bound	Bed-ridden	Bus Runs	Wheel-chair Bus Runs	Ambulance Runs
8	Sweet Mansion ALF Inc.	Homestead	7	6	1	0	1	1	0
8	The Gil Family Home	Miami	6	5	1	0	1	1	0
		Miami-Dade County Subtotal:	***1360***	***1160***	***153***	***47***	***50***	***45***	***11***
		TOTAL:	**1360**	**1160**	**153**	**47**	**50**	**45**	**11**

Table 8-5. Summary of Transportation Needs

Transportation Resource	Drivers	Buses	Wheelchair Buses	Ambulances
Resources Available				
Transportation Center 9233	324	146	0	0
Transportation Center 9231		47	0	0
Transportation Center 9235	253	178	0	0
Transportation Center 9236		83	0	0
Transportation Center 9237		123	0	0
Miami-Dade County	-	0	0	36
Miami-Dade Transit	As Needed[2]			
TOTAL:	**577**	**577**	**0**	**36**
Resources Needed				
Schools (Table 8-2):		615	0	0
Medical Facilities[1] (Table 8-4):		50	45	11
Transit-Dependent Population (Table 8-9):		291	0	0
Homebound Special Needs (Table 8-12):		10	22	16
Correctional Facilities (Section 8.6):		2	0	0
TOTAL TRANSPORTATION NEEDS:		**968**	**67**	**27**

1. It is a Florida state law that medical facilities have a plan for how they will evacuate. Most facilities contract with a private transportation provider. For this reason, the medical facility resources needed are not included in the total transportation needs
2. Miami-Dade Transit provides transportation assistance for anyone who cannot evacuate or find shelter on their own and requires evacuation assistance according to the Emergency Evacuation Assistance Program. Miami-Dade Transit buses can accommodate up to two wheelchairs.

Table 8-6. Bus Route Descriptions

Bus Route Number	Description	Nodes Traversed from Route Start to EPZ Boundary
1	Avocado Elementary School	159, 144, 288, 359, 181, 515, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
2	Bel-Aire Elementary School	217, 111, 660, 268, 12, 13, 14, 11, 9
3	Campbell Drive Middle School	340, 177, 176, 178, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
4	Campbell Drive Elementary School	803, 802, 338, 180, 178, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
5	Caribbean Elementary School	101, 639, 216, 415, 215, 12, 268, 660, 111, 105, 109
6	Centennial Middle School	275, 121, 120, 119, 108, 106, 107
7	Chapman Elementary School	384, 383, 42, 43, 45, 44, 41, 40, 39, 34, 33, 32, 31, 29, 25, 24, 18, 219, 11, 9, 643, 7, 103, 104
8	Coconut Palm K-8 Academy	200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
9	Cooper, Neva King Educational Center	674, 139, 158, 66, 67, 673, 155, 167, 166, 172, 170, 174, 176, 178, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, `493,506, 494, 215,12, 268,660, 111, 105, 109
10	Corporate Academy South	695, 164, 507, 158, 66, 68, 62, 63, 344, 60, 56, 57, 53, 52, 47, 46, 44, 41, 40, 39, 34, 33, 32, 31, 29, 25, 24, 18, 219, 11
11	Cutler Ridge Elementary School	637, 16, 267, 19, 15, 496, 495, 215, 415, 216, 639, 101, 100
12	Cutler Ridge Middle School	269, 217, 111, 416
13	Florida City Elementary	153, 519, 139, 158, 66, 67, 673, 155, 167, 166, 172, 170, 174, 176, 178, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111,105,1096, 49
14	Gateway Environmental K-8	355, 353, 809, 340, 807, 59, 61, 94, 58, 209, 56, 57, 53, 52, 47, 46, 44, 41, 40, 39, 34, 33, 32, 31, 29, 25, 24, 18, 219, 11, 9
15	Goulds Elementary School	683, 631, 255, 211, 214, 490, 489, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109

Bus Route Number	Description	Nodes Traversed from Route Start to EPZ Boundary
16	Gulfstream Elementary School	638, 637, 269, 217, 111, 416
17	Homestead Middle School	136, 678, 677, 161, 511, 162, 168, 166, 172, 170, 174, 176, 178, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494,215,12, 268, 660, 111, 105,109
18	Homestead Senior High School	164, 507, 158, 66, 68, 62, 63, 344, 60, 56, 57, 53, 52, 47, 46, 44, 41, 40, 39, 34, 33, 32, 31, 29, 25, 24, 18, 219, 11, 9
19	Leisure City K-8 Center	347, 183, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
20	Mandarin Lakes K-8 Academy	685, 221, 36, 32, 31, 29, 25, 24, 18, 219, 11, 9
21	Mays Middle School	207, 208, 493, 506, 494, 215, 12, 13, 14, 11, 9
22	Migrant Educational Program	805, 222, 686, 687, 334, 203, 190, 196, 654, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
23	Naranja Elementary School	189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
24	Peskoe Elementary School	365, 364, 48, 49, 51, 52, 47, 46, 44, 41, 40, 39, 34, 33, 32, 31, 29, 25, 24, 18, 219, 11, 9
25	Pine Villa Elementary School	211, 214, 490, 489, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
26	Redland Elementary School	283, 282, 713, 281, 194, 411, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
27	Redland Middle School	282, 713, 281, 194, 411, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
28	Redondo Elementary School	315, 150, 135, 742, 740, 361, 145, 512, 176, 178, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268,660,111, 105, 109
29	Saunders, Laura C. Elementary	509, 138, 676, 137, 161, 677, 678, 136, 135, 134, 133, 625, 286
30	South Dade Senior High School	288, 359, 181, 515, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109

Bus Route Number	Description	Nodes Traversed from Route Start to EPZ Boundary
31	West Homestead Elementary School	318, 152, 509, 138, 155, 167, 166, 172, 170, 174, 176, 178, 179, 337, 184, 806, 187, 202, 189, 192, 655, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111,105,109
32	Whigham Dr. E.L. Elementary	378, 275, 121, 120, 119, 108, 106, 107
33	Whispering Pines Elementary School	737, 119, 108, 106, 107
34	Air Base Elementary	686, 687, 334, 203, 190, 196, 654, 197, 193, 656, 198, 200, 632, 205, 206, 207, 208, 493, 506, 494, 215, 12, 268, 660, 111, 105, 109
48	Shuttle 33032 Part 1	189, 190, 196, 654
49	Shuttle 33032 Part 2	373, 222, 686, 687, 334, 203, 202
50	Shuttle 33032 Part 3	409, 410, 712, 411, 657, 420, 332, 201, 633, 635, 412, 413, 414, 415, 416, 417, 418, 419
51	Shuttle 33033 Part 1	171, 340, 807, 59, 61, 94, 399, 210, 370, 692, 367, 50, 49, 48, 364, 350, 347, 183
52	Shuttle 33033 Part 2	178, 514, 515, 516, 517, 518, 409, 410, 712, 411, 657, 420, 332, 201, 633, 635, 412, 413, 414, 415, 416, 417, 418, 419
53	Shuttle 33034-1 Part 1	601, 304, 303, 302, 297, 296, 295, 153, 519
54	Shuttle 33034-1 Part 2	519, 509, 510, 137, 511, 711, 513, 743, 512, 514, 515, 516, 517, 518, 409, 410, 712, 411, 657, 420, 332, 201, 633, 635, 412, 413, 414, 415, 416, 417, 418, 419
55	Shuttle 33034-2	139, 519, 509, 510, 137, 511, 711, 513, 743, 512, 514, 515, 516, 517, 518, 409, 410, 712, 411, 657, 420, 332, 201, 633, 635, 412, 413, 414, 415, 416, 417, 418, 419
56	Shuttle 33157 Part 1	261, 214, 490, 489, 208, 493, 506, 494, 215, 495, 496, 15, 19, 267, 16, 637, 269, 119, 737, 118, 117, 121, 120
57	Shuttle 33157 Part 2	119, 269, 637, 16, 267, 19, 15, 496, 495, 215, 415
58	Shuttle 33157 Part 3	415, 416, 417, 418, 419
59	Shuttle 33030 Part 1	362, 513, 154, 170, 171, 169, 613, 612, 155, 138, 509, 510, 675, 676, 162, 511, 161, 677, 678, 136
60	Shuttle 33030 Part 2	513, 743, 512, 514, 515, 516, 517, 518, 409, 410, 712, 411, 657, 420, 332, 201, 633, 635, 412, 413, 414, 415, 416, 417, 418, 419

Table 8-7. School Evacuation Time Estimates - Good Weather

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to H.S. (mi.)	Travel Time from EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
MIAMI-DADE COUNTY SCHOOLS									
Air Base Elementary	105	15	10.4	6.1	103	**3:45**	3.5	5	**3:50**
Aspira South Youth Leadership Charter School	105	15	7.9	10.6	45	**2:45**	12.3	17	**3:05**
Avocado Elementary School	105	15	11.3	2.5	276	**6:40**	2.9	4	**6:40**
Balere Language Academy	105	15	0.9	3.6	15	**2:15**	12.3	17	**2:35**
Barrington Academy	105	15	2.9	1.5	114	**3:55**	25.5	34	**4:30**
Bel-Aire Elementary School	105	15	1	38.3	2	**2:05**	6.9	10	**2:15**
Campbell Drive Elementary School	105	15	10.8	4.6	142	**4:25**	5.4	8	**4:30**
Campbell Drive Middle School	105	15	12.1	2.7	265	**6:25**	5.4	8	**6:35**
Caribbean Elementary School	105	15	2.7	6.5	25	**2:25**	8.1	11	**2:40**
Centennial Middle School	105	15	2.5	8.3	19	**2:20**	5.2	7	**2:30**
Chapman Elementary School	105	15	7.6	14.0	33	**2:35**	1.4	2	**2:35**
Coconut Palm K-8 Academy	105	15	4.8	2.5	115	**3:55**	2.3	4	**4:00**
Cooper, Neva King Educational Center	105	15	4.3	3.1	84	**3:25**	13.4	18	**3:45**
Coral Reef Montessori Academy Charter School	105	15	1.5	1.6	56	**3:00**	12.3	17	**3:15**
Corporate Academy South	105	15	13.8	7.9	106	**3:50**	2.3	4	**3:50**
Cutler Ridge Elementary School	105	15	1.9	3.1	37	**2:40**	2.3	4	**2:45**
Cutler Ridge Middle School	105	15	1.2	5.4	14	**2:15**	2.3	4	**2:20**
Florida City Elementary	105	15	3.7	3.1	72	**3:15**	20.3	28	**3:40**
Gateway Environmental K-8	105	15	12.5	2.7	282	**6:45**	5.4	8	**6:50**
Goulds Elementary School	105	15	3.8	1.6	139	**4:20**	2.6	4	**4:25**
Gulfstream Elementary School	105	15	2.5	2.9	52	**2:55**	2.3	4	**3:00**
Homestead Middle	105	15	2.9	1.5	115	**3:55**	15.5	21	**4:20**
Homestead Senior	105	15	12.3	2.6	0	**2:00**	12.2	17	**2:20**

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to H.S. (mi.)	Travel Time from EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
Keys Gate Charter School	105	15	11.2	11.2	60	**3:00**	12.3	17	**3:20**
Lawrence Academy	105	15	5.3	3.1	105	**3:45**	23.0	31	**4:20**
Leisure City K-8 Center	105	15	9.1	1.8	303	**7:05**	2.4	4	**7:10**
Mandarin Lakes K-8 Academy	105	15	7.8	5.7	82	**3:25**	8.4	12	**3:35**
MAST @ Homestead	105	15	10.2	3.3	186	**5:10**	12.3	17	**5:25**
Mays Middle School	105	15	1.8	1.6	67	**3:10**	2.3	4	**3:15**
Miami Community Charter School	105	15	3.6	3.1	70	**3:10**	25.0	34	**3:45**
Migrant Educational Program	105	15	10.8	3.4	192	**5:15**	5.3	8	**5:20**
Naranja Elementary School	105	15	7.3	2.1	211	**5:35**	5.3	8	**5:40**
Peskoe Elementary School	105	15	8.7	10.6	50	**2:50**	4.6	7	**3:00**
Pine Villa Elementary School	105	15	2.3	2.8	50	**2:50**	2.3	4	**2:55**
Redland Elementary[(a)]	105	15	10.3	2.4	261	**6:25**	20.8	28	**6:50**
Redland Middle	105	15	0.0	6.7	1	**2:05**	20.2	27	**2:30**
Redondo Elementary[(a)]	105	15	12.3	2.6	286	**6:50**	2.3	4	**6:50**
Saunders, Laura C. Elementary	105	15	3.8	1.5	150	**4:30**	15.3	21	**4:55**
South Dade Senior High School	105	15	2.3	1.5	90	**3:30**	16.3	22	**3:55**
West Homestead Elementary[(a)]	105	15	13.7	2.1	388	**8:30**	3.3	5	**8:35**
Whigham, Dr. E.L. Elementary	105	15	2.8	8.4	21	**2:25**	6.3	9	**2:30**
Whispering Pines Elementary	105	15	0.8	6.0	8	**2:10**	5.1	7	**2:15**
Maximum for EPZ:						**8:30**	**Maximum:**		**8:35**
Average for EPZ:						**3:55**	**Average:**		**4:10**

(a) According to Miami-Dade County, Redland Elementary, Redondo Elementary, and West Homestead Elementary are outside of the EPZ, but are nonetheless evacuated because they are close to the EPZ boundary.

Table 8-8. School Evacuation Time Estimates – Rain

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to H.S. (mi.)	Travel Time from EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
MIAMI-DADE COUNTY SCHOOLS									
Air Base Elementary	115	20	10.4	6.5	96	**3:55**	3.5	6	**4:00**
Aspira South Youth Leadership Charter School	115	20	7.9	11.6	42	**3:00**	12.3	19	**3:20**
Avocado Elementary School	115	20	11.3	2.5	267	**6:45**	2.9	5	**6:50**
Balere Language Academy	115	20	0.9	3.1	18	**2:35**	12.3	19	**2:55**
Barrington Academy	115	20	2.9	1.5	115	**4:10**	25.5	39	**4:50**
Bel-Aire Elementary School	115	20	1	27.4	3	**2:20**	6.9	11	**2:30**
Campbell Drive Elementary School	115	20	10.8	4.8	135	**4:30**	5.4	9	**4:40**
Campbell Drive Middle School	115	20	12.1	2.8	258	**6:35**	5.4	9	**6:45**
Caribbean Elementary School	115	20	2.7	7.2	23	**2:40**	8.1	13	**2:55**
Centennial Middle School	115	20	2.5	7.7	20	**2:35**	5.2	8	**2:45**
Chapman Elementary School	115	20	7.6	13.6	34	**2:50**	1.4	3	**2:55**
Coconut Palm K-8 Academy	115	20	4.8	2.7	108	**4:05**	2.3	4	**4:10**
Cooper, Neva King Educational Center	115	20	4.3	3.3	79	**3:35**	13.4	21	**3:55**
Coral Reef Montessori Academy Charter School	115	20	1.5	1.6	56	**3:15**	12.3	19	**3:30**
Corporate Academy South	115	20	13.8	8.9	93	**3:50**	2.3	4	**3:55**
Cutler Ridge Elementary School	115	20	1.9	2.9	40	**2:55**	2.3	4	**3:00**
Cutler Ridge Middle School	115	20	1.2	6.0	13	**2:30**	2.3	4	**2:35**
Florida City Elementary	115	20	3.7	3.3	69	**3:25**	20.3	31	**3:55**
Gateway Environmental K-8	115	20	12.5	2.7	275	**6:50**	5.4	9	**7:00**
Goulds Elementary School	115	20	3.8	1.7	135	**4:30**	2.6	4	**4:35**
Gulfstream Elementary School	115	20	2.5	2.9	52	**3:10**	2.3	4	**3:15**
Homestead Middle	115	20	2.9	1.6	111	**4:10**	15.5	24	**4:30**

School	Driver Mobilization Time (min)	Loading Time (min)	Dist. To EPZ Bdry (mi)	Average Speed (mph)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bdry to H.S. (mi.)	Travel Time from EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
Homestead Senior	115	20	12.3	2.7	0	**2:15**	12.2	19	**2:35**
Keys Gate Charter School	115	20	11.2	11.5	59	**3:15**	12.3	19	**3:35**
Lawrence Academy	115	20	5.3	3.3	97	**3:55**	23.0	35	**4:30**
Leisure City K-8 Center	115	20	9.1	2.3	239	**6:15**	2.4	4	**6:20**
Mandarin Lakes K-8 Academy	115	20	7.8	5.9	80	**3:35**	8.4	13	**3:50**
MAST @ Homestead	115	20	10.2	3.5	176	**5:15**	12.3	19	**5:30**
Mays Middle School	115	20	1.8	8.2	14	**2:30**	2.3	4	**2:35**
Miami Community Charter School	115	20	3.6	3.3	67	**3:25**	25.0	38	**4:00**
Migrant Educational Program	115	20	10.8	2.5	259	**6:35**	5.3	8	**6:45**
Naranja Elementary School	115	20	7.3	2.1	205	**5:40**	5.3	8	**5:50**
Peskoe Elementary School	115	20	8.7	12.0	44	**3:00**	4.6	7	**3:10**
Pine Villa Elementary School	115	20	2.3	1.6	87	**3:45**	2.3	4	**3:50**
Redland Elementary(a)	115	20	10.3	6.1	101	**4:00**	20.8	32	**4:30**
Redland Middle	115	20	0.0	1.7	1	**2:20**	20.2	31	**2:50**
Redondo Elementary(a)	115	20	12.3	2.8	266	**6:45**	2.3	4	**6:45**
Saunders, Laura C. Elementary	115	20	3.8	1.7	135	**4:30**	15.3	23	**4:55**
South Dade Senior High School	115	20	2.3	1.5	91	**3:50**	16.3	25	**4:15**
West Homestead Elementary(a)	115	20	13.7	2.2	380	**8:35**	3.3	5	**8:40**
Whigham, Dr. E.L. Elementary	115	20	2.8	7.7	22	**2:40**	6.3	10	**2:50**
Whispering Pines Elementary	115	20	0.8	6.7	8	**2:25**	5.1	8	**2:35**
					Maximum for EPZ:	**8:35**		**Maximum:**	**8:40**
					Average for EPZ:	**4:00**		**Average:**	**4:15**

(a) According to Miami-Dade County, Redland Elementary, Redondo Elementary, and West Homestead Elementary are outside of the EPZ, but are nonetheless evacuated because they are close to the EPZ boundary.

Table 8-9. Summary of Transit-Dependent Bus Routes

Route (Zip Code)	No. of Buses	Bus Pick Up Locations Serviced	Length (mi.)
33030	48	Harris Field, Cocowalk, Boardwalk, Aquarius, Laura Saunders Elementary, Police Athletic League Gym, Homestead Trailer Park, and Homestead Senior Center	18.8
33032	67	Naranja Elementary, Princetonian Mobile Home Park, and Hud-Pine Island	14.0
33033	95	Harris Field, South Dade Camp, Pine Island MHP, and Palm Gardens MHP	19.3
33034 #1	26	Florida City City Hall, Goldcoaster MHP, Andrew Center, Gateway West MHP, Gateway Estates MHP	19.9
33034 #2	26	City Hall, Southern Comfort Trailer Park, Florida City Camp Site and RV Park	16.6
33157	29	Southland Mall, Cutler Ridge Park, and East Ridge Retirement Village	9.7
Total:	291		

Table 8-10. Transit-Dependent Evacuation Time Estimates - Good Weather

Route Number	Bus Number	One-Wave: Mobilization (min)	One-Wave: Route Length (miles)	One-Wave: Speed (mph)	One-Wave: Route Travel Time (min)	One-Wave: Pickup Time (min)	One-Wave: ETE (hr:min)	Two-Wave: Distance to R. C. (miles)	Two-Wave: Travel Time to R. C. (min)	Two-Wave: Unload (min)	Two-Wave: Driver Rest (min)	Two-Wave: Route Travel Time (min)	Two-Wave: Pickup Time (min)	Two-Wave: ETE (hr:min)
33030	1-16	180	18.8	29.5	38	30	**4:10**	7.8	10	5	10	35	30	**5:40**
	17-32	200	18.8	30.0	38	30	**4:30**	7.8	10	5	10	35	30	**6:00**
	33-48	220	18.8	31.8	36	30	**4:50**	7.8	10	5	10	35	30	**6:20**
33032	1-33	180	14.0	20.6	41	30	**4:15**	7.8	10	5	10	41	30	**5:50**
	33-67	200	14.0	21.4	39	30	**4:30**	7.8	10	5	10	34	30	**6:00**
33033	1-19	160	19.3	23.7	49	30	**4:00**	7.8	10	5	10	51	30	**5:50**
	20-39	180	19.3	26.6	44	30	**4:15**	7.8	10	5	10	51	30	**6:05**
	40-59	200	19.3	26.7	43	30	**4:35**	7.8	10	5	10	49	30	**6:20**
	60-79	220	19.3	27.3	42	30	**4:55**	7.8	10	5	10	48	30	**6:40**
	80-95	240	19.3	27.6	42	30	**5:15**	7.8	10	5	10	47	30	**6:55**
33034 #1	1-13	180	19.9	41.7	29	30	**4:00**	7.8	10	5	10	36	30	**5:35**
	14-26	200	19.9	42.6	28	30	**4:20**	7.8	10	5	10	36	30	**5:50**
33034 #2	1-13	180	16.6	47.5	21	30	**3:55**	7.8	10	5	10	31	30	**5:20**
	14-26	200	16.6	47.5	21	30	**4:15**	7.8	10	5	10	31	30	**5:40**
33157	1-15	180	9.7	18.9	31	30	**4:05**	7.8	10	5	10	36	30	**5:35**
	16-31	200	9.7	19.3	30	30	**4:25**	7.8	10	5	10	36	30	**5:55**
	32-48	220	9.7	19.7	30	30	**4:40**	7.8	10	5	10	34	30	**6:10**
						Maximum ETE:	**5:15**						**Maximum ETE:**	**6:55**
						Average ETE:	**4:25**						**Average ETE:**	**6:00**

Table 8-11. Transit-Dependent Evacuation Time Estimates – Rain

Route Number	Bus Number	One-Wave						Two-Wave						
		Mobilization (min)	Route Length (miles)	Speed (mph)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)	Distance to R. C. (miles)	Travel Time to R. C. (min)	Unload (min)	Driver Rest (min)	Route Travel Time (min)	Pickup Time (min)	ETE (hr:min)
33030	1-16	190	18.8	29.6	38	40	**4:30**	7.8	12	5	10	36	40	**6:15**
	17-32	210	18.8	30.5	37	40	**4:50**	7.8	12	5	10	36	40	**6:35**
	33-48	230	18.8	32.4	35	40	**5:05**	7.8	12	5	10	36	40	**6:50**
33032	1-33	190	14.0	21.0	40	40	**4:30**	7.8	12	5	10	35	40	**6:15**
	33-67	210	14.0	22.0	38	40	**4:50**	7.8	12	5	10	43	40	**6:40**
33033	1-19	170	19.3	26.5	44	40	**4:15**	7.8	12	5	10	52	40	**6:15**
	20-39	190	19.3	26.6	43	40	**4:35**	7.8	12	5	10	51	40	**6:35**
	40-59	210	19.3	26.8	43	40	**4:55**	7.8	12	5	10	50	40	**6:50**
	60-79	230	19.3	27.4	42	40	**5:15**	7.8	12	5	10	48	40	**7:10**
	80-95	250	19.3	27.7	42	40	**5:35**	7.8	12	5	10	45	40	**7:25**
33034 #1	1-13	190	19.9	40.7	29	40	**4:20**	7.8	12	5	10	38	40	**6:05**
	14-26	210	19.9	42.7	28	40	**4:40**	7.8	12	5	10	38	40	**6:25**
33034 #2	1-13	190	16.6	42.1	24	40	**4:15**	7.8	12	5	10	33	40	**5:55**
	14-26	210	16.6	46.0	22	40	**4:35**	7.8	12	5	10	33	40	**6:15**
33157	1-15	190	9.7	19.1	30	40	**4:25**	7.8	12	5	10	37	40	**6:05**
	16-31	210	9.7	19.4	30	40	**4:45**	7.8	12	5	10	35	40	**6:25**
	32-48	230	9.7	20.0	29	40	**5:00**	7.8	12	5	10	34	40	**6:40**
						Maximum ETE:	**5:35**						**Maximum ETE:**	**7:25**
						Average ETE:	**4:45**						**Average ETE:**	**6:30**

Table 8-12. Homebound Special Needs Population Evacuation Time Estimates

Population	People Requiring Vehicle	Vehicles deployed	Stops	Weather Conditions	Mobilization Time (min)	Loading Time at 1st Stop (min)	Travel to Subsequent Stops (min)	Total Loading Time at Subsequent Stops (min)	Travel Time to EPZ Boundary (min)	ETE (hr:min)
Ambulatory	53	10	6	Normal	90	5	45	25	34	**3:20**
				Rain	100		50		39	**3:40**
Wheelchair Bound	44	22	2	Normal	90	5	9	5	27	**2:20**
				Rain	100		10		31	**2:30**
Bedridden	31	16	2	Normal	30	15	10	15	21	**1:35**
				Rain	40		11		26	**1:50**
Maximum ETE:										**3:40**
Average ETE:										**2:50**

9 TRAFFIC MANAGEMENT STRATEGY

This section discusses the suggested traffic control and management strategy that is designed to expedite the movement of evacuating traffic. The resources required to implement this strategy include:

- Personnel with the capabilities of performing the planned control functions of traffic guides (preferably, not necessarily, law enforcement officers).
- Traffic control devices to assist these personnel in the performance of their tasks. These devices should comply with the guidance of the Manual of Uniform Traffic Control Devices (MUTCD) published by the Federal Highway Administration (FHWA) of the U.S.D.O.T. All state and most county transportation agencies have access to the MUTCD, which is available on-line: http://mutcd.fhwa.dot.gov which provides access to the official PDF version.
- A plan that defines all locations, provides necessary details and is documented in a format that is readily understood by those assigned to perform traffic control.

The functions to be performed in the field are:

1. Facilitate evacuating traffic movements that safely expedite travel out of the EPZ.
2. Discourage traffic movements that move evacuating vehicles in a direction which takes them significantly closer to the power plant, or which interferes with the efficient flow of other evacuees.

We employ the terms "facilitate" and "discourage" rather than "enforce" and "prohibit" to indicate the need for flexibility in performing the traffic control function. There are always legitimate reasons for a driver to prefer a direction other than that indicated. For example:

- A driver may be traveling home from work or from another location, to join other family members prior to evacuating.
- An evacuating driver may be travelling to pick up a relative, or other evacuees.
- The driver may be an emergency worker en route to perform an important activity.

The implementation of a plan must also be flexible enough for the application of sound judgment by the traffic guide.

The traffic management plan is the outcome of the following process:

1. The existing TCPs and ACPs identified by the offsite agencies in their existing emergency plans serve as the basis of the traffic management plan, as per NUREG/CR-7002.
2. Computer analysis of the evacuation traffic flow environment (see Figures 7-3 through 7-7).

    This analysis identifies the best routing and those critical intersections that experience pronounced congestion. Any critical intersections that are not identified in the existing offsite plans are suggested as additional TCPs and ACPs
3. The existing TCPs and ACPs, and how they were applied in this study, are discussed in Appendix G.

4. Prioritization of TCPs and ACPs.

   Application of traffic and access control at some TCPs and ACPs will have a more pronounced influence on expediting traffic movements than at other TCPs and ACPs. For example, TCPs controlling traffic originating from areas in close proximity to the power plant could have a more beneficial effect on minimizing potential exposure to radioactivity than those TCPs located far from the power plant. These priorities should be assigned by state/county emergency management representatives and by law enforcement personnel.

The ETE simulations discussed in Section 7 indicate that the evacuation routes are oversaturated and experience pronounced traffic congestion during evacuation due to the limited capacity of the roadways and the large volume of evacuating traffic. The Florida Turnpike, US Highway 1 and Krome Ave are the most heavily used evacuation routes. The ramps to the Florida Turnpike are significant bottlenecks. The traffic signals along US Highway 1 and Krome Ave are also significant bottlenecks. Nearly all of the traffic signals in the EPZ are actuated traffic signals and will adjust their timing to changing traffic patterns. Traffic control at signalized intersections will not have a pronounced impact on the evacuation process as most of the intersections have significant volume on the east-west approaches as well as the north-south approaches. Thus, no additional TCPs or ACPs are deemed necessary as a result of this study.

The use of intelligent transportation systems (ITS) technologies can reduce manpower and equipment needs, while still facilitating the evacuation process. Dynamic message signs (DMS) can be placed within the EPZ to provide information to travelers regarding traffic conditions, route selection, and reception center information. DMS can also be placed outside of the EPZ to warn motorists to avoid using routes that may conflict with the flow of evacuees away from the power plant. Highway advisory radio (HAR) can be used to broadcast information to evacuees en route through their vehicle stereo systems. Automated traveler information systems (ATIS) can also be used to provide evacuees with information. Internet websites can provide traffic and evacuation route information before the evacuee begins his trip, while on board navigation systems (GPS units), cell phones, and pagers can be used to provide information en route. These are only several examples of how ITS technologies can benefit the evacuation process. Consideration should be given that ITS technologies be used to facilitate the evacuation process, and any additional signage placed should consider evacuation needs.

The ETE analysis treated all controlled intersections that are existing TCP locations in the offsite agency plans as being controlled by actuated signals.

Chapters 2N and 5G, and Part 6 of the 2009 MUTCD are particularly relevant and should be reviewed during emergency response training.

The ETE calculations reflect the assumption that all "external-external" trips are interdicted and diverted after 2 hours have elapsed from the ATE.

All transit vehicles and other responders entering the EPZ to support the evacuation are assumed to be unhindered by personnel manning ACPs and TCPs.

Study Assumptions 5 and 6 in Section 2.3 discuss ACP and TCP staffing schedules and operations.

10 EVACUATION ROUTES

Evacuation routes are comprised of two distinct components:

- Routing from an area being evacuated to the boundary of the evacuation region and thence out of the EPZ.
- Routing of transit-dependent evacuees from the EPZ boundary to reception centers.

Evacuees will select routes within the EPZ in such a way as to minimize their exposure to risk. This expectation is met by the DYNEV II model routing traffic away from the location of the plant, to the extent practicable. The DTRAD model satisfies this behavior by routing traffic so as to balance traffic demand relative to the available highway capacity to the extent possible. See Appendices B through D for further discussion.

The routing of transit-dependent evacuees from the EPZ boundary to reception centers is designed to minimize the amount of travel outside the EPZ, from the points where these routes cross the EPZ boundary.

Figure 10-1 shows the general population reception centers. Figure 10-2 shows the host schools for evacuated schoolchildren. The major evacuation routes for the EPZ are presented in Figure 10-3.

It is assumed that all school evacuees will be taken to the appropriate host school and subsequently picked up by parents or guardians. Transit-dependent evacuees are transported to the reception center for their county. This study does not consider the transport of evacuees from reception centers to more permanent shelters, if the counties do make the decision to relocate evacuees.

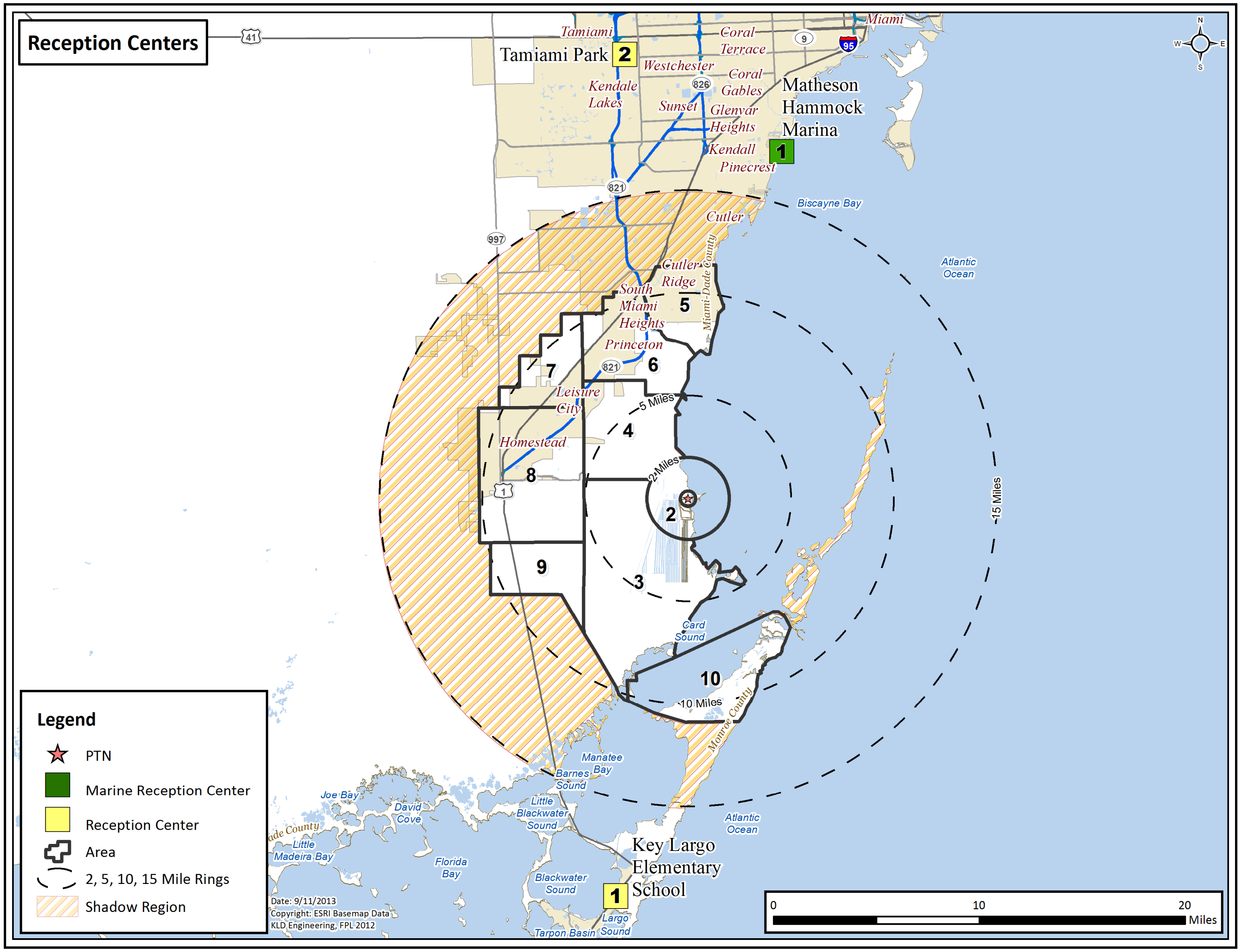


Figure 10-1. General Population Reception Centers

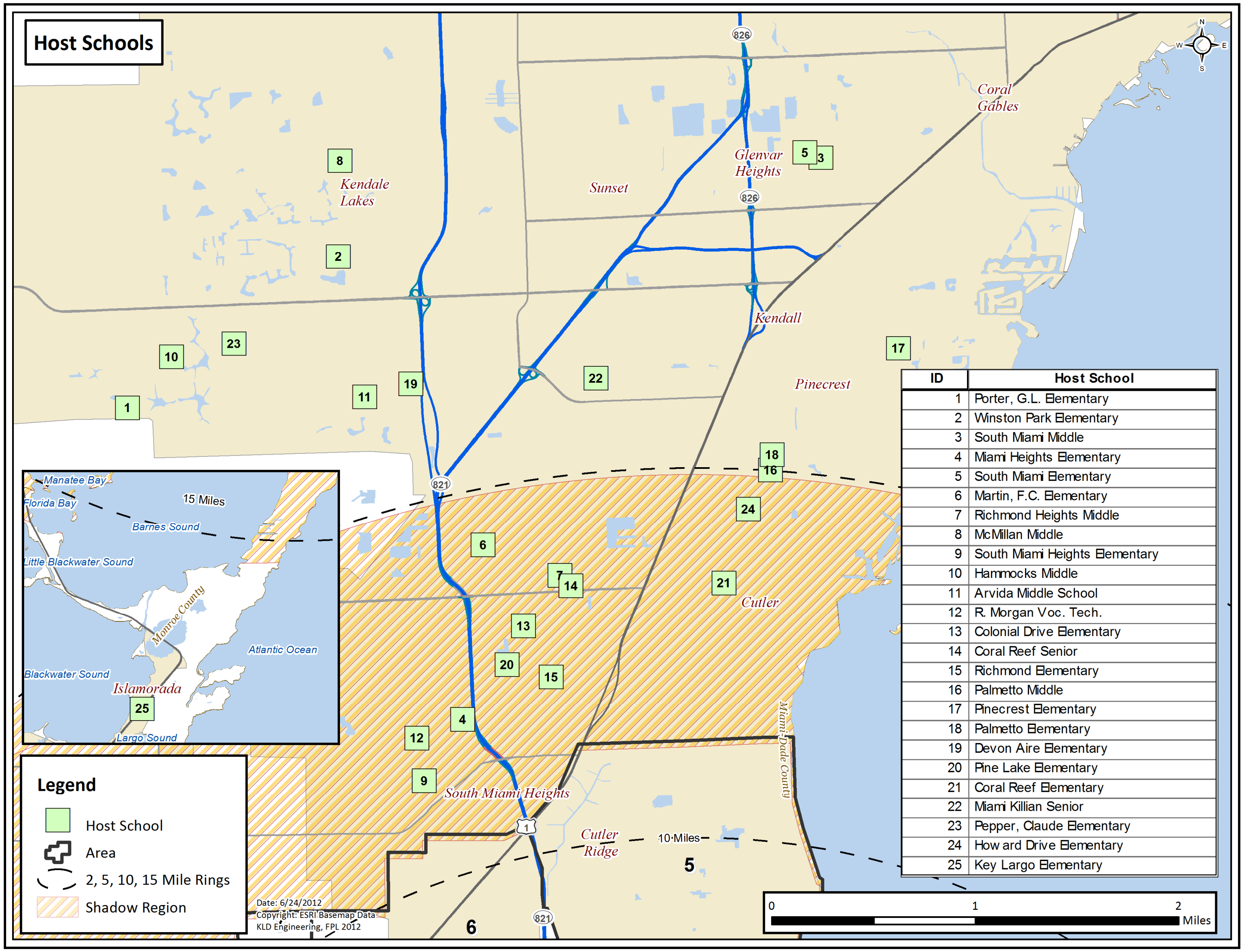


Figure 10-2. Host Schools

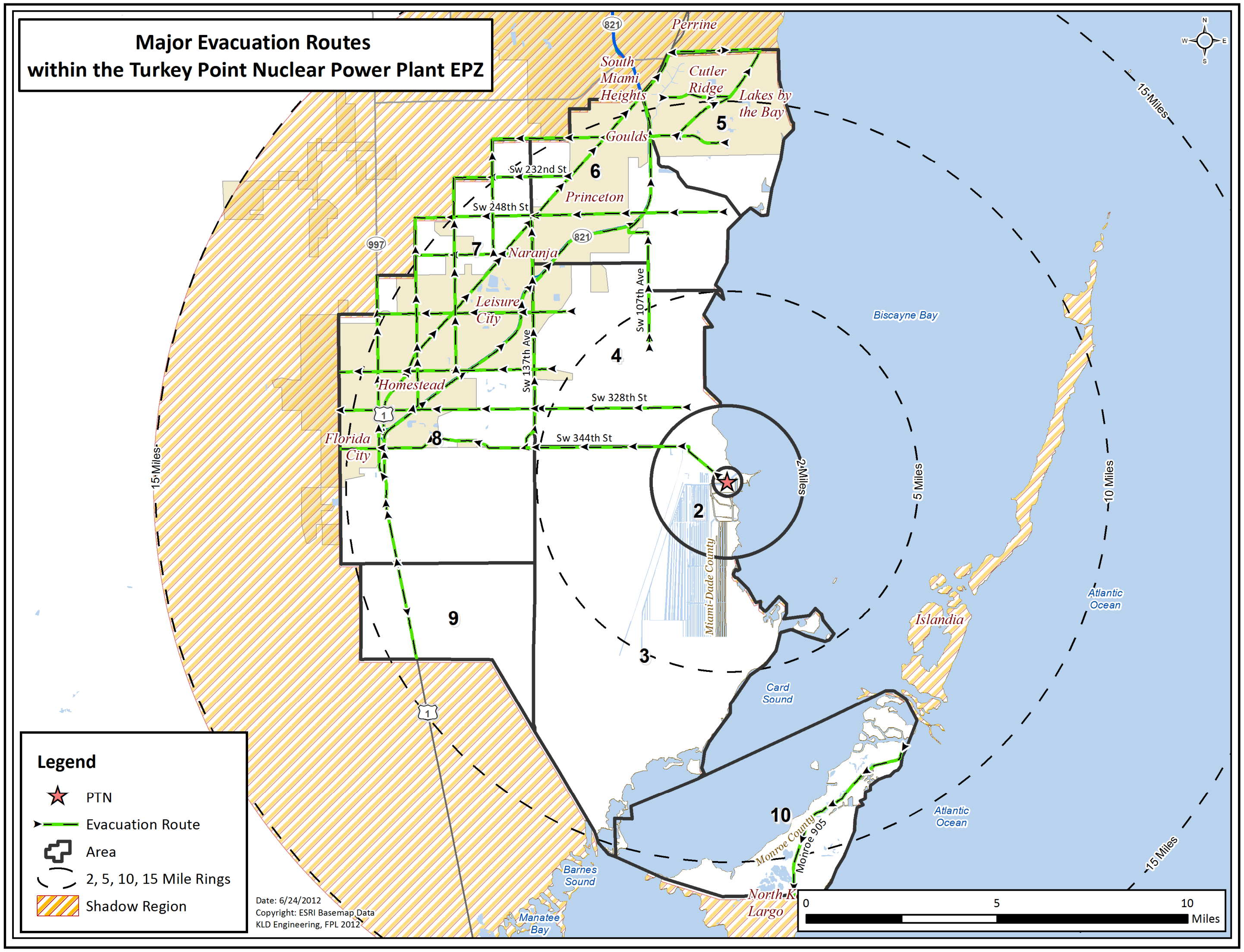


Figure 10-3. Evacuation Route Map

11 SURVEILLANCE OF EVACUATION OPERATIONS

There is a need for surveillance of traffic operations during the evacuation. There is also a need to clear any blockage of roadways arising from accidents or vehicle disablement. Surveillance can take several forms.

1. Traffic control personnel, located at traffic control and access control points, provide fixed-point surveillance.
2. Ground patrols may be undertaken along well-defined paths to ensure coverage of those highways that serve as major evacuation routes.
3. Aerial surveillance of evacuation operations may also be conducted using helicopter or fixed-wing aircraft, if available.
4. Cellular phone calls (if cellular coverage exists) from motorists may also provide direct field reports of road blockages.

These concurrent surveillance procedures are designed to provide coverage of the entire EPZ as well as the area around its periphery. It is the responsibility of the counties to support an emergency response system that can receive messages from the field and be in a position to respond to any reported problems in a timely manner. This coverage should quickly identify, and expedite the response to any blockage caused by a disabled vehicle.

Tow Vehicles

In a low-speed traffic environment, any vehicle disablement is likely to arise due to a low-speed collision, mechanical failure or the exhaustion of its fuel supply. In any case, the disabled vehicle can be pushed onto the shoulder, thereby restoring traffic flow. Past experience in other emergencies indicates that evacuees who are leaving an area often perform activities such as pushing a disabled vehicle to the side of the road without prompting.

While the need for tow vehicles is expected to be low under the circumstances described above, it is still prudent to be prepared for such a need. Consideration should be given that tow trucks with a supply of gasoline be deployed at strategic locations within, or just outside, the EPZ. These locations should be selected so that:

- They permit access to key, heavily loaded, evacuation routes.
- Responding tow trucks would most likely travel counter-flow relative to evacuating traffic.

Consideration should also be given that the state and local emergency management agencies encourage gas stations to remain open during the evacuation.

12 CONFIRMATION TIME

It is necessary to confirm that the evacuation process is effective in the sense that the public is complying with the advisory to evacuate. The EPZ county and state radiological emergency plans do not discuss a procedure for confirming evacuation. Should procedures not already exist, we suggest an alternative or complementary approach.

The procedure we suggest employs a stratified random sample and a telephone survey. The size of the sample is dependent on the expected number of households that do not comply with the advisory to evacuate. We believe it is reasonable to assume, for the purpose of estimating sample size that at least 80 percent of the population within the EPZ will comply with the advisory to evacuate. On this basis, an analysis could be undertaken (see Table 12-1) to yield an estimated sample size of approximately 300.

The confirmation process should start at about 3½ hours after the advisory to evacuate, which is when approximately 90 percent of evacuees have completed their mobilization activities (see Table 5-8). At this time, virtually all evacuees will have departed on their respective trips and the local telephone system will be largely free of traffic.

As indicated in Table 12-1, approximately 7½ person hours are needed to complete the telephone survey. If six people are assigned to this task, each dialing a different set of telephone exchanges (e.g., each person can be assigned a different set of areas), then the confirmation process will extend over a timeframe of about 75 minutes. Thus, the confirmation should be completed before the evacuated area is cleared. Of course, fewer people would be needed for this survey if the evacuation region were only a portion of the EPZ. Use of modern automated computer controlled dialing equipment or other technologies (e.g., reverse 911 or equivalent) can significantly reduce the manpower requirements and the time required to undertake this type of confirmation survey.

If this method is indeed used by the offsite agencies, consideration should be given to maintain a list of telephone numbers within the EPZ in the EOC at all times. Such a list could be purchased from vendors and should be periodically updated. As indicated above, the confirmation process should not begin until 3½ hours after the advisory to evacuate, to ensure that households have had enough time to mobilize. This 3½-hour timeframe will enable telephone operators to arrive at their workplace, obtain a call list and prepare to make the necessary phone calls.

Should the number of telephone responses (i.e., people still at home) exceed 20 percent, then the telephone survey should be repeated after an hour's interval until the confirmation process is completed.

Other techniques should also be considered. After traffic volumes decline, the personnel manning TCPs can be redeployed to travel through residential areas to observe and to confirm evacuation activities.

Table 12-1. Estimated Number of Telephone Calls Required for Confirmation of Evacuation

Problem Definition

Estimate number of phone calls, n, needed to ascertain the proportion, F of households that have not evacuated.

Reference: Burstein, H., Attribute Sampling, McGraw Hill, 1971

Given:

- No. of households plus other facilities, N, within the EPZ (est.) = 66,000
- Est. proportion, F, of households that will not evacuate = 0.20
- Allowable error margin, e: 0.05
- Confidence level, α: 0.95 (implies A = 1.96)

Applying Table 10 of cited reference,

$$p = F + e = 0.25; \;\; q = 1 - p = 0.75$$

$$n = \frac{A^2 pq + e}{e^2} = 308$$

Finite population correction:

$$n_F = \frac{nN}{n + N - 1} = 307$$

Thus, some 300 telephone calls will confirm that approximately 20 percent of the population has not evacuated. If only 10 percent of the population does not comply with the advisory to evacuate, then the required sample size, n_F = 215.

Est. Person Hours to complete 300 telephone calls

Assume:

- Time to dial using touch tone (random selection of listed numbers): 30 seconds
- Time for 6 rings (no answer): 36 seconds
- Time for 4 rings plus short conversation: 60 sec.
- Interval between calls: 20 sec.

Person Hours:

$$\frac{300[30 + 0.8(36) + 0.2(60) + 20]}{3600} = 7.6$$

13 RECOMMENDATIONS

The following recommendations are offered:

1. Examination of the general population ETE in Section 7 shows that the ETE for 100 percent of the population is generally 2 to 6½ hours longer than for 90 percent of the population. This non-linearity reflects the fact that there is significant traffic congestion within the EPZ (see Section 7.3), which delays the departure of evacuees. NUREG/CR-7002 recommends using the 90th percentile ETE to make PAD because of the long tail of the mobilization curve which is typically caused by those relatively few stragglers who delay the start of their evacuation trip at most nuclear power plant sites. The significant difference between the 90th and 100th percentile ETE for PTN is the result of traffic congestion within the EPZ, not mobilization time. See Appendix J and Figures J-1 through J-12 for additional information.
2. Staged evacuation would be beneficial for evacuating the population within the 5-mile region of PTN. As discussed in Section 7.6, the ETE for the 5-mile region are significantly longer when evacuating additional areas beyond 5 miles due to the routing of vehicles from beyond 5 miles into the 5-mile region to access the Florida Turnpike. Although staged evacuation is disadvantageous to those beyond 5 miles, it does expedite the evacuation of those evacuees from within the 5-mile region.
3. A NASCAR race at the Homestead-Miami Speedway has a significant impact on ETE for regions that extend beyond 5 miles. The 90th percentile ETE increases by as much as 2 hours and 20 minutes and the 100th percentile ETE by as much as 2½ hours.
4. A lane closure on the Florida Turnpike northbound has a material effect on ETE for keyhole regions with wind towards the north and west. The 90th percentile ETE increases by as much as 1½ hours for these regions. In the event of a lane closure on the turnpike, it is recommended that state and local police mitigate the problem by using the shoulder as an additional lane if feasible.
5. Counties should implement procedures whereby schools are contacted prior to dispatch of buses from the depots to get an accurate count of students needing transportation and the number of buses required (see Section 8).
6. Table 8-5 indicates the total transportation resources needed and available for evacuation of the transit-dependent population within the EPZ. If sufficient resources are not available at the time an evacuation is ordered, two waves of evacuating vehicles would be required. ETE for two wave evacuation exceed the 90th percentile ETE for the general population and should be considered when making protective action decisions (see Section 8.4). Mutual aid agreements with neighboring counties and assistance from the state should be considered to address any shortfalls in transportation resources.
7. ITS technologies such as DMS, HAR, ATIS, etc. should be used to facilitate the evacuation process (see Section 9). The placement of additional signage should consider evacuation needs.
8. The counties should establish strategic locations to position tow trucks provided with gasoline containers in the event of a disabled vehicle during the evacuation process (see Section 11) and should encourage gas stations to remain open during the evacuation.

9. Counties/state should establish a system/procedure to confirm that the ATE is being adhered to (see the approach suggested by KLD in Section 12). Should the approach recommended in Section 12 be used, consideration should be given to keep a list of telephone numbers within the EPZ in the EOC at all times.
10. The ETE are significantly impacted at the 90^{th} and 100^{th} percentiles by shadow evacuation (see Appendix M, section M.2). Public outreach could be used to encourage those advised to shelter-in-place to do so and not delay the evacuation of those most at risk.
11. The contraflow of major evacuation routes can reduce ETE. When planning for contraflow, one must consider the ETE benefit as well as the manpower/equipment needed to accomplish the contraflow. See Appendix M, section M.5.

APPENDIX A

Glossary of Traffic Engineering Terms

A. GLOSSARY OF TRAFFIC ENGINEERING TERMS

Table A-1. Glossary of Traffic Engineering Terms

Term	Definition
Analysis Network	A graphical representation of the geometric topology of a physical roadway system, which is comprised of directional links and nodes.
Link	A network link represents a specific, one-directional section of roadway. A link has both physical (length, number of lanes, topology, etc.) and operational (turn movement percentages, service rate, free-flow speed) characteristics.
Measures of Effectiveness	Statistics describing traffic operations on a roadway network.
Node	A network node generally represents an intersection of network links. A node has control characteristics, i.e., the allocation of service time to each approach link.
Origin	A location attached to a network link, within the EPZ or shadow region, where trips are generated at a specified rate in vehicles per hour (vph). These trips enter the roadway system to travel to their respective destinations.
Prevailing Roadway and Traffic Conditions	Relates to the physical features of the roadway, the nature (e.g., composition) of traffic on the roadway and the ambient conditions (weather, visibility, pavement conditions, etc.).
Service Rate	Maximum rate at which vehicles, executing a specific turn maneuver, can be discharged from a section of roadway at the prevailing conditions, expressed in vehicles per second (vps) or vehicles per hour (vph).
Service Volume	Maximum number of vehicles which can pass over a section of roadway in one direction during a specified time period with operating conditions at a specified level of service (The service volume at the upper bound of level of service, E, equals capacity). Service Volume is usually expressed as vehicles per hour (vph).
Signal Cycle Length	The total elapsed time to display all signal indications, in sequence. The cycle length is expressed in seconds.
Signal Interval	A single combination of signal indications. The interval duration is expressed in seconds. A signal phase is comprised of a sequence of signal intervals, usually green, yellow, red.

Term	Definition
Signal Phase	A set of signal indications (and intervals) which services a particular combination of traffic movements on selected approaches to the intersection. The phase duration is expressed in seconds.
Traffic (Trip) Assignment	A process of assigning traffic to paths of travel in such a way as to satisfy all trip objectives (i.e., the desire of each vehicle to travel from a specified origin in the network to a specified destination) and to optimize some stated objective or combination of objectives. In general, the objective is stated in terms of minimizing a generalized "cost". For example, "cost" may be expressed in terms of travel time.
Traffic Density	The number of vehicles that occupy one lane of a roadway section of specified length at a point in time, expressed as vehicles per mile (vpm).
Traffic (Trip) Distribution	A process for determining the destinations of all traffic generated at the origins. The result often takes the form of a trip table, which is a matrix of origin-destination traffic volumes.
Traffic Simulation	A computer model designed to replicate the real-world operation of vehicles on a roadway network, so as to provide statistics describing traffic performance. These statistics are called measures of effectiveness.
Traffic Volume	The number of vehicles that pass over a section of roadway in one direction, expressed in vehicles per hour (vph). Where applicable, traffic volume may be stratified by turn movement.
Travel Mode	Distinguishes between private auto, bus, rail, pedestrian and air travel modes.
Trip Table or Origin-Destination Matrix	A rectangular matrix or table, whose entries contain the number of trips generated at each specified origin, during a specified time period, that are attracted to (and travel toward) each of its specified destinations. These values are expressed in vehicles per hour (vph) or in vehicles.
Turning Capacity	The capacity associated with that component of the traffic stream which executes a specified turn maneuver from an approach at an intersection.

APPENDIX B

DTRAD: Dynamic Traffic Assignment and Distribution Model

B. DYNAMIC TRAFFIC ASSIGNMENT AND DISTRIBUTION MODEL

This section describes the integrated dynamic trip assignment and distribution model named DTRAD (Dynamic Traffic Assignment and Distribution) that is expressly designed for use in analyzing evacuation scenarios. DTRAD employs logit-based path-choice principles and is one of the models of the DYNEVII System. The DTRAD module implements path-based *dynamic traffic assignment* (DTA) so that time dependent origin-destination (OD) trips are "assigned" to routes over the network based on prevailing traffic conditions.

To apply the DYNEV II System, the analyst must specify the highway network, link capacity information, the time-varying volume of traffic generated at all origin centroids and, optionally, a set of accessible candidate destination nodes on the periphery of the EPZ for selected origins. DTRAD calculates the optimal dynamic trip distribution (i.e., trip destinations) and the optimal dynamic trip assignment (i.e., trip routing) of the traffic generated at each origin node traveling to its set of candidate destination nodes, so as to minimize evacuee travel "cost".

Overview of Integrated Distribution and Assignment Model

The underlying premise is that the selection of destinations and routes is intrinsically coupled in an evacuation scenario. That is, people in vehicles seek to travel out of an area of potential risk as rapidly as possible by selecting the "best" routes. The model is designed to identify these "best" routes in a manner that realistically distributes vehicles from origins to destinations and routes them over the highway network, in a consistent and optimal manner, reflecting evacuee behavior.

For each origin, a set of "candidate destination nodes" is selected by the software logic and by the analyst to reflect the desire by evacuees to travel away from the power plant and to access major highways. The specific destination nodes within this set that are selected by travelers and the selection of the connecting paths of travel, are both determined by DTRAD. This determination is made by a logit-based path choice model in DTRAD, so as to minimize the trip "cost", as discussed later.

The traffic loading on the network and the consequent operational traffic environment of the network (density, speed, throughput on each link) vary over time as the evacuation takes place. The DTRAD model, which is interfaced with the DYNEV simulation model, executes a succession of "sessions" wherein it computes the optimal routing and selection of destination nodes for the conditions that exist at that time.

Interfacing the DYNEV Simulation Model with DTRAD

The DYNEV II system reflects NRC guidance that evacuees will seek to travel in a general direction away from the location of the hazardous event. An algorithm was developed to support the DTRAD model in dynamically varying the trip table (O-D matrix) over time from one DTRAD session to the next. Another algorithm executes a "mapping" from the specified "geometric" network (link-node analysis network) that represents the physical highway system, to a "path" network that represents the vehicle [turn] movements. DTRAD computations are performed on the "path" network: DYNEV simulation model, on the "geometric" network.

DTRAD Description

DTRAD is the DTA module for the DYNEV II System.

When the road network under study is large, multiple routing options are usually available between trip origins and destinations. The problem of loading traffic demands and propagating them over the network links is called Network Loading and is addressed by DYNEVII using macroscopic traffic simulation modeling. Traffic assignment deals with computing the distribution of the traffic over the road network for given O-D demands and is a model of the route choice of the drivers. Travel demand changes significantly over time, and the road network may have time dependent characteristics, e.g., time-varying signal timing or reduced road capacity because of lane closure, or traffic congestion. To consider these time dependencies, DTA procedures are required.

The DTRAD DTA module represents the dynamic route choice behavior of drivers, using the specification of dynamic origin-destination matrices as flow input. Drivers choose their routes through the network based on the travel cost they experience (as determined by the simulation model). This allows traffic to be distributed over the network according to the time-dependent conditions. The modeling principles of D-TRAD include:

- It is assumed that drivers not only select the best route (i.e., lowest cost path) but some also select less attractive routes. The algorithm implemented by DTRAD archives several "efficient" routes for each O-D pair from which the drivers choose.
- The choice of one route out of a set of possible routes is an outcome of "discrete choice modeling". Given a set of routes and their generalized costs, the percentages of drivers that choose each route is computed. The most prevalent model for discrete choice modeling is the logit model. DTRAD uses a variant of Path-Size-Logit model (PSL). PSL overcomes the drawback of the traditional multinomial logit model by incorporating an additional deterministic path size correction term to address path overlapping in the random utility expression.
- DTRAD executes the TA algorithm on an abstract network representation called "the path network" which is built from the actual physical link-node analysis network. This execution continues until a stable situation is reached: the volumes and travel times on the edges of the path network do not change significantly from one iteration to the next. The criteria for this convergence are defined by the user.
- Travel "cost" plays a crucial role in route choice. In DTRAD, path cost is a linear summation of the generalized cost of each link that comprises the path. The generalized cost for a link, a, is expressed as

  $$c_a = \alpha t_a + \beta l_a + \gamma s_a ,$$

  where c_a is the generalized cost for link a, and α, β, and γ are cost coefficients for link travel time, distance, and supplemental cost, respectively. Distance and supplemental costs are defined as invariant properties of the network model, while travel time is a dynamic property dictated by prevailing traffic conditions. The DYNEV simulation model computes travel times on all edges in the network and DTRAD uses that information to constantly update the costs of paths. The route choice decision model in the next simulation iteration uses these updated values to adjust the route choice behavior. This way, traffic demands are dynamically re-assigned based on time dependent conditions. The interaction between the DTRAD traffic assignment and DYNEV II simulation models is depicted in Figure B-1. Each round of interaction is called a Traffic Assignment Session (TA session). A TA session is composed of multiple iterations, marked as loop B in the figure.

- The supplemental cost is based on the "survival distribution" (a variation of the exponential distribution).The Inverse Survival Function is a "cost" term in DTRAD to represent the potential risk of travel toward the plant:

  $s_a = - \beta \ln (p), 0 \leq p \leq l ; \beta > 0$

  $p = \frac{d_n}{d_0}$

  d_n = Distance of node, n, from the plant
  d_0 =Distance from the plant where there is zero risk
  β = Scaling factor

The value of d_o = 15 miles, the outer distance of the shadow region. Note that the supplemental cost, s_a, of link, a, is (high, low), if its downstream node, n, is (near, far from) the power plant.

Network Equilibrium

In 1952, John Wardrop wrote:

> *Under equilibrium conditions traffic arranges itself in congested networks in such a way that no individual trip-maker can reduce his path costs by switching routes.*

The above statement describes the "User Equilibrium" definition, also called the "Selfish Driver Equilibrium". It is a hypothesis that represents a [hopeful] condition that evolves over time as drivers search out alternative routes to identify those routes that minimize their respective "costs". It has been found that this "equilibrium" objective to minimize costs is largely realized by most drivers who routinely take the same trip over the same network at the same time (i.e., commuters). Effectively, such drivers "learn" which routes are best for them over time. Thus, the traffic environment "settles down" to a near-equilibrium state.

Clearly, since an emergency evacuation is a sudden, unique event, it does not constitute a long-term learning experience which can achieve an equilibrium state. Consequently, DTRAD was not designed as an equilibrium solution, but to represent drivers in a new and unfamiliar situation, who respond in a flexible manner to real-time information (either broadcast or observed) in such a way as to minimize their respective costs of travel.

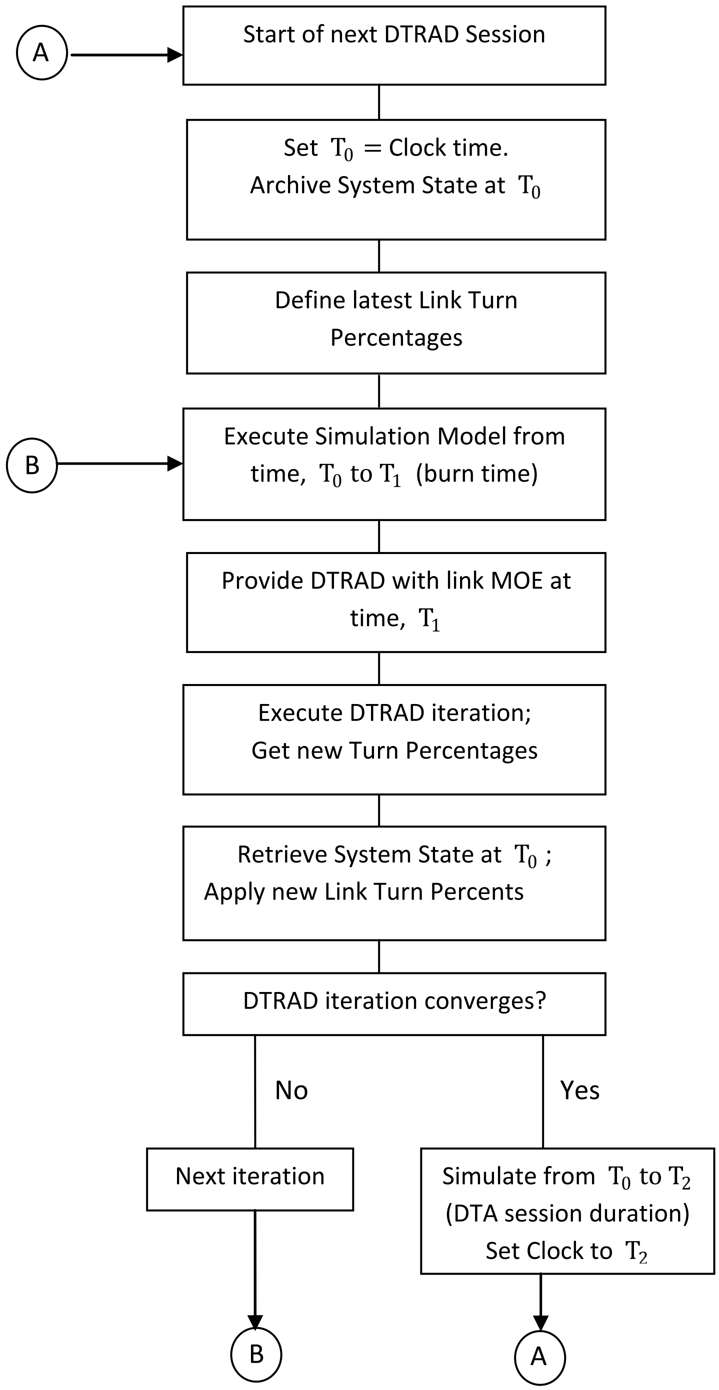


Figure B-1. Flow Diagram of Simulation-DTRAD Interface

APPENDIX C

DYNEV Traffic Simulation Model

C. DYNEV TRAFFIC SIMULATION MODEL

The DYNEV traffic simulation model is a *macroscopic* model that describes the operations of traffic flow in terms of aggregate variables: vehicles, flow rate, mean speed, volume, density, queue length, *on each link*, for each turn movement, during each time interval (simulation time step). The model generates trips from "sources" and from Entry Links and introduces them onto the analysis network at rates specified by the analyst based on the mobilization time distributions. The model simulates the movements of all vehicles on all network links over time until the network is empty. At intervals, the model outputs measures of effectiveness such as those listed in Table C-1.

Model Features Include:

- Explicit consideration is taken of the variation in density over the time step; an iterative procedure is employed to calculate an average density over the simulation time step for the purpose of computing a mean speed for moving vehicles.
- Multiple turn movements can be serviced on one link; a separate algorithm is used to estimate the number of (fractional) lanes assigned to the vehicles performing each turn movement, based, in part, on the turn percentages provided by the DTRAD model.
- At any point in time, traffic flow on a link is subdivided into two classifications: queued and moving vehicles. The number of vehicles in each classification is computed. Vehicle spillback, stratified by turn movement for each network link, is explicitly considered and quantified. The propagation of stopping waves from link to link is computed within each time step of the simulation. There is no "vertical stacking" of queues on a link.
- Any link can accommodate "source flow" from zones via side streets and parking facilities that are not explicitly represented. This flow represents the evacuating trips that are generated at the source.
- The relation between the number of vehicles occupying the link and its storage capacity is monitored every time step for every link and for every turn movement. If the available storage capacity on a link is exceeded by the demand for service, then the simulator applies a "metering" rate to the entering traffic from both the upstream feeders and source node to ensure that the available storage capacity is not exceeded.
- A "path network" that represents the specified traffic movements from each network link is constructed by the model; this path network is utilized by the DTRAD model.
- A two-way interface with DTRAD: (1) provides link travel times; (2) receives data that translates into link turn percentages.
- Provides MOE to animation software, EVAN
- Calculates ETE statistics

All traffic simulation models are data-intensive. Table C-2 outlines the necessary input data elements.

To provide an efficient framework for defining these specifications, the physical highway environment is represented as a network. The unidirectional links of the network represent roadway sections: rural, multi-lane, urban streets or freeways. The nodes of the network generally represent intersections or points along a section where a geometric property changes (e.g. a lane drop, change in grade or free flow speed).

Figure C-1 is an example of a small network representation. The freeway is defined by the sequence of links, (20,21), (21,22), and (22,23). Links (8001, 19) and (3, 8011) are Entry and Exit links, respectively. An arterial extends from node 3 to node 19 and is partially subsumed within a grid network. Note that links (21,22) and (17,19) are grade-separated.

C.1 Methodology

C.1.1 The Fundamental Diagram

It is necessary to define the fundamental diagram describing flow-density and speed-density relationships. Rather than "settling for" a triangular representation, a more realistic representation that includes a "capacity drop", (I-R)Q_{max}, at the critical density when flow conditions enter the forced flow regime, is developed and calibrated for each link. This representation, shown in Figure C-2, asserts a constant free speed up to a density, k_f, and then a linear reduction in speed in the range, $k_f \leq k \leq k_c = 45$ vpm, the density at capacity. In the flow-density plane, a quadratic relationship is prescribed in the range, $k_c < k \leq k_s = 95$ vpm which roughly represents the "stop-and-go" condition of severe congestion. The value of flow rate, Q_s, corresponding to k_s, is approximated at $0.7\,RQ_{max}$. A linear relationship between k_s and k_j completes the diagram shown in Figure C-2. Table C-3 is a glossary of terms.

The fundamental diagram is applied to <u>moving</u> traffic on every link. The specified calibration values for each link are: (1) Free speed, v_f ; (2) Capacity, Q_{max} ; (3) Critical density, $k_c = 45$ vpm ; (4) Capacity Drop Factor, R = 0.9 ; (5) Jam density, k_j . Then, $v_c = \frac{Q_{max}}{k_c}$, $k_f = k_c - \frac{(V_f - V_c)\,k_c^2}{Q_{max}}$. Setting $\bar{k} = k - k_c$, then $Q = RQ_{max} - \frac{RQ_{max}}{8333}\,\bar{k}^2$ for $0 \leq \bar{k} \leq \bar{k}_s = 50$. It can be shown that $Q = \left(0.98 - 0.0056\,\bar{k}\right) RQ_{max}$ for $\bar{k}_s \leq \bar{k} \leq \bar{k}_j$, where $\bar{k}_s = 50$ and $\bar{k}_j = 175$.

C.1.2 The Simulation Model

The simulation model solves a sequence of "unit problems". Each unit problem computes the movement of traffic on a link, for each specified turn movement, over a specified time interval (TI) which serves as the simulation time step for all links. Figure C-3 is a representation of the unit problem in the time-distance plane. Table C-3is a glossary of terms that are referenced in the following description of the unit problem procedure.

The formulation and the associated logic presented below are designed to solve the unit problem for each sweep over the network (discussed below), for each turn movement serviced on each link that comprises the evacuation network, and for each TI over the duration of the evacuation.

Given = Q_b , M_b , L , TI , E_0 , LN , G/C , h , L_v , R_0 , L_c , E , M
Compute = O , Q_e , M_e
Define $O = O_Q + O_M + O_E$; $E = E_1 + E_2$

1. For the first sweep, s = 1, of this TI, get initial estimates of mean density, k_0 , the R – factor, R_0 and entering traffic, E_0 , using the values computed for the final sweep of the prior TI. For each subsequent sweep, $s > 1$, calculate $E = \sum_i P_i \; O_i + S$ where P_i , O_i are the relevant turn percentages from feeder link, i , and its total outflow (possibly metered) over this TI; S is the total source flow (possibly metered) during the current TI.
   Set iteration counter, n = 0, $k = k_0$, and $E = E_0$.

2. Calculate $v(k)$ such that $k \leq 130$ using the analytical representations of the fundamental diagram.
   Calculate $\text{Cap} = \frac{Q_{max}(TI)}{3600} \left(G/C\right) \text{LN}$, in vehicles, this value may be reduced due to metering
   Set $R = 1.0$ if $G/C < 1$ or if $k \leq k_c$; Set $R = 0.9$ only if $G/C = 1$ and $k > k_c$
   Calculate queue length, $L_b = Q_b \frac{L_v}{LN}$

3. Calculate $t_1 = TI - \frac{L}{V}$. If $t_1 \prec 0$, set $t_1 = E_1 = O_E = 0$; Else, $E_1 = E \frac{t_1}{TI}$.

4. Then $E_2 = E - E_1$; $t_2 = TI - t_1$

5. If $Q_b \geq \text{Cap}$, then
   $O_Q = \text{Cap}$, $O_M = O_E = 0$
   If $t_1 > 0$, then
      $Q'_e = Q_b + M_b + E_1 - \text{Cap}$
   Else
      $Q'_e = Q_b - \text{Cap}$
   End if
   Calculate Q_e and M_e using Algorithm A (below)

6. Else $(Q_b \prec \text{Cap})$
   $O_Q = Q_b$, $\text{RCap} = \text{Cap} - O_Q$

7. If $M_b \leq \text{RCap}$, then

8. If $t_1 > 0$, $O_M = M_b$, $O_E = \min\left(RCap - M_b, \frac{t_1\ Cap}{TI}\right) \geq 0$

$Q'_e = E_1 - O_E$

If $Q'_e > 0$, then

Calculate Q_e, M_e with Algorithm A

Else

$Q_e = 0$, $M_e = E_2$

End if

Else $(t_1 = 0)$

$O_M = \left(\frac{v(TI) - L_b}{L - L_b}\right) M_b$ and $O_E = 0$

$M_e = M_b - O_M + E$; $Q_e = 0$

End if

9. Else $(M_b > RCap)$

$O_E = 0$

If $t_1 > 0$, then

$O_M = RCap$, $Q'_e = M_b - O_M + E_1$

Calculate Q_e and M_e using Algorithm A

10. Else $(t_1 = 0)$

$M_d = \left[\left(\frac{v(TI) - L_b}{L - L_b}\right) M_b\right]$

If $M_d > RCap$, *then*

$O_M = RCap$

$Q'_e = M_d - O_M$

Apply Algorithm A to calculate Q_e and M_e

Else

$O_M = M_d$

$M_e = M_b - O_M + E$ and $Q_e = 0$

End if

End if

End if

End if

11. Calculate a new estimate of average density, $\bar{k}_n = \frac{1}{4}[k_b + 2\,k_m + k_e]$,

where k_b = density at the beginning of the TI

k_e = density at the end of the TI

k_m = density at the mid-point of the TI

All values of density apply only to the <u>moving</u> vehicles.

If $|\bar{k}_n - \bar{k}_{n-1}| > \in$ and $n < N$

where N = max number of iterations, and ϵ is a convergence criterion, then

12. set $n = n + 1$, and return to step 2 to perform iteration, n, using $k = \bar{k}_n$.

End if

Computation of unit problem is now complete. Check for excessive inflow causing spillback.

13. If $Q_e + M_e > \frac{(L-W)\,LN}{L_v}$, then

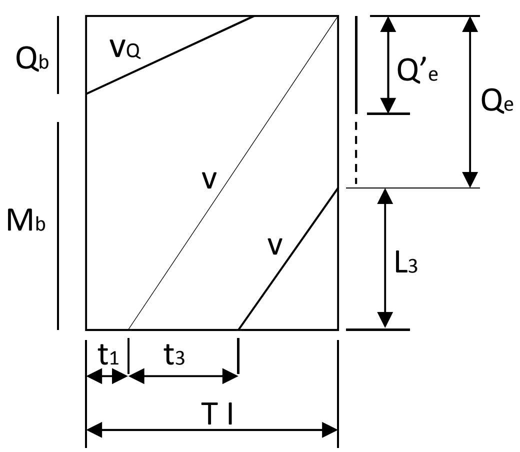
The number of excess vehicles that cause spillback is: $SB = Q_e + M_e - \frac{(L-W)\cdot LN}{L_v}$, where W is the width of the upstream intersection. To prevent spillback, meter the outflow from the feeder approaches and from the source flow, S, during this TI by the amount, SB. That is, set

$$M = 1 - \frac{SB}{(E+S)} \geq 0 \text{, where M is the metering factor (over all movements).}$$

This metering factor is assigned appropriately to all feeder links and to the source flow, to be applied during the next network sweep, discussed later.

Algorithm A

This analysis addresses the flow environment over a TI during which moving vehicles can join a standing or discharging queue. For the case shown, $Q_b \leq Cap$, with $t_1 > 0$ and a queue of length, Q'_e, formed by that portion of M_b and E that reaches the stop-bar within the TI, but could not discharge due to inadequate capacity. That is, $Q_b + M_b + E_1 > Cap$. This queue length, $Q'_e = Q_b + M_b + E_1 - Cap$ can be extended to Q_e by traffic entering the approach during the current TI, traveling at speed, v, and reaching the rear of the queue within the TI. A portion of the entering vehicles, $E_3 = E\,\frac{t_3}{TI}$, will likely join the queue. This analysis calculates t_3, Q_e and M_e for the input values of L, TI, v, E, t, L_v, LN, Q'_e .



When $t_1 > 0$ and $Q_b \leq Cap$:

Define: $L'_e = Q'_e\,\frac{L_v}{LN}$. From the sketch, $L_3 = v(TI - t_1 - t_3) = L - (Q'_e + E_3)\frac{L_v}{LN}$.

Substituting $E_3 = \frac{t_3}{TI}\,E$ yields: $-vt_3 + \frac{t_3}{TI}\,E\,\frac{L_v}{LN} = L - v(TI - t_1) - L'_e$. Recognizing that the first two terms on the right hand side cancel, solve for t_3 to obtain:

$$t_3 = \frac{L'_e}{\left[v - \frac{E}{TI}\frac{L_v}{LN}\right]} \qquad \text{such that} \quad 0 \le t_3 \le TI - t_1$$

If the denominator, $\left[v - \frac{E}{TI}\frac{L_v}{LN}\right] \le 0$, set $t_3 = TI - t_1$.

$$\text{Then, } Q_e = Q'_e + E\,\frac{t_3}{TI} \quad , \qquad M_e = E\left(1 - \frac{t_1 + t_3}{TI}\right)$$

The complete Algorithm A considers all flow scenarios; space limitation precludes its inclusion, here.

C.1.3 Lane Assignment

The "unit problem" is solved for each turn movement on each link. Therefore it is necessary to calculate a value, LN_x , of allocated lanes for each movement, x. If in fact all lanes are specified by, say, arrows painted on the pavement, either as full lanes or as lanes within a turn bay, then the problem is fully defined. If however there remain un-channelized lanes on a link, then an analysis is undertaken to subdivide the number of these physical lanes into turn movement specific virtual lanes, LN_x.

C.2 Implementation

C.2.1 Computational Procedure

The computational procedure for this model is shown in the form of a flow diagram as Figure C-4. As discussed earlier, the simulation model processes traffic flow for each link independently over TI that the analyst specifies; it is usually 60 seconds or longer. The first step is to execute an algorithm to define the sequence in which the network links are processed so that as many links as possible are processed after their feeder links are processed, within the same network sweep. Since a general network will have many closed loops, it is not possible to guarantee that every link processed will have all of its feeder links processed earlier.

The processing then continues as a succession of time steps of duration, TI, until the simulation is completed. Within each time step, the processing performs a series of "sweeps" over all network links; this is necessary to ensure that the traffic flow is synchronous over the entire network. Specifically, the sweep ensures continuity of flow among all the network links; in the context of this model, this means that the values of E, M, and S are all defined for each link such that they represent the synchronous movement of traffic from each link to all of its outbound links. These sweeps also serve to compute the metering rates that control spillback.

Within each sweep, processing solves the "unit problem" for each turn movement on each link. With the turn movement percentages for each link provided by the DTRAD model, an algorithm allocates the number of lanes to each movement serviced on each link. The timing at a signal, if any, applied at the downstream end of the link, is expressed as a G/C ratio, the signal timing needed to define this ratio is an input requirement for the model. The model also has the capability of representing, with macroscopic fidelity, the actions of actuated signals responding to the time-varying competing demands on the approaches to the intersection.

The solution of the unit problem yields the values of the number of vehicles, O, that discharge from the link over the time interval and the number of vehicles that remain on the link at the end of the time interval as stratified by queued and moving vehicles: $\mathrm{Q_e}$ and $\mathrm{M_e}$. The procedure considers each movement separately (multi-piping). After all network links are processed for a given network sweep, the updated consistent values of entering flows, E; metering rates, M; and source flows, S are defined so as to satisfy the "no spillback" condition. The procedure then performs the unit problem solutions for all network links during the following sweep.

Experience has shown that the system converges (i.e. the values of E, M and S "settle down" for all network links) in just two sweeps if the network is entirely under-saturated or in four sweeps in the presence of extensive congestion with link spillback. (The initial sweep over each link uses the final values of E and M, of the prior TI). At the completion of the final sweep for a TI, the procedure computes and stores all measures of effectiveness for each link and turn movement for output purposes. It then prepares for the following time interval by defining the values of $\mathrm{Q_b}$ and $\mathrm{M_b}$ for the start of the next TI as being those values of $\mathrm{Q_e}$ and $\mathrm{M_e}$ at the end of the prior TI. In this manner, the simulation model processes the traffic flow over time until the end of the run. Note that there is no space-discretization other than the specification of network links.

C.2.2 Interfacing with Dynamic Traffic Assignment (DTRAD)

The **DYNEV II** system reflects NRC guidance that evacuees will seek to travel in a general direction away from the location of the hazardous event. Thus, an algorithm was developed to identify an appropriate set of destination nodes for each origin based on its location and on the expected direction of travel. This algorithm also supports the DTRAD model in dynamically varying the Trip Table (O-D matrix) over time from one DTRAD session to the next.

Figure B-1 depicts the interaction of the simulation model with the DTRAD model in the **DYNEV II** system. As indicated, **DYNEV II** performs a succession of DTRAD "sessions"; each such session computes the turn link percentages for each link that remain constant for the session duration, $[\mathrm{T_0}, \mathrm{T_2}]$, specified by the analyst. The end product is the assignment of traffic volumes from each origin to paths connecting it with its destinations in such a way as to minimize the network-wide cost function. The output of the DTRAD model is a set of updated link turn percentages which represent this assignment of traffic.

As indicated in Figure B-1, the simulation model supports the DTRAD session by providing it with operational link MOE that are needed by the path choice model and included in the DTRAD cost function. These MOE represent the operational state of the network at a time, $\mathrm{T_1} \leq \mathrm{T_2}$, which lies within the session duration, $[\mathrm{T_0}, \mathrm{T_2}]$. This "burn time", $\mathrm{T_1} - \mathrm{T_0}$, is selected by the analyst. For each DTRAD iteration, the simulation model computes the change in network operations over this burn time using the latest set of link turn percentages computed by the DTRAD model. Upon convergence of the DTRAD iterative procedure, the simulation model accepts the latest turn percentages provided by the DTA model, returns to the origin time, T_0, and executes until it arrives at the end of the DTRAD session duration at time, T_2. At this time the next DTA session is launched and the whole process repeats until the end of the **DYNEV II** run.

Additional details are presented in Appendix B.

Table C-1. Selected Measures of Effectiveness Output by DYNEV II

Measure	Units	Applies To
Vehicles Discharged	Vehicles	Link, Network, Exit Link
Speed	Miles/Hours (mph)	Link, Network
Density	Vehicles/Mile/Lane	Link
Level of Service	LOS	Link
Content	Vehicles	Network
Travel Time	Vehicle-hours	Network
Evacuated Vehicles	Vehicles	Network, Exit Link
Trip Travel Time	Vehicle-minutes/trip	Network
Capacity Utilization	Percent	Exit Link
Attraction	Percent of total evacuating vehicles	Exit Link
Max Queue	Vehicles	Node, Approach
Time of Max Queue	Hours:minutes	Node, Approach
Route Statistics	Length (mi); Mean Speed (mph); Travel Time (min)	Route
Mean Travel Time	Minutes	Evacuation Trips; Network

Table C-2. Input Requirements for the DYNEV II Model

HIGHWAY NETWORK

- Links defined by upstream and downstream node numbers
- Link lengths
- Number of lanes (up to 9) and channelization
- Turn bays (1 to 3 lanes)
- Destination (exit) nodes
- Network topology defined in terms of downstream nodes for each receiving link
- Node Coordinates (X,Y)
- Nuclear Power Plant Coordinates (X,Y)

GENERATED TRAFFIC VOLUMES

- On all entry links and source nodes (origins), by Time Period

TRAFFIC CONTROL SPECIFICATIONS

- Traffic signals: link-specific, turn movement specific
- Signal control treated as fixed time or actuated
- Location of traffic control points (these are represented as actuated signals)
- Stop and Yield signs
- Right-turn-on-red (RTOR)
- Route diversion specifications
- Turn restrictions
- Lane control (e.g. lane closure, movement-specific)

DRIVER'S AND OPERATIONAL CHARACTERISTICS

- Driver's (vehicle-specific) response mechanisms: free-flow speed, discharge headway
- Bus route designation.

DYNAMIC TRAFFIC ASSIGNMENT

- Candidate destination nodes for each origin (optional)
- Duration of DTA sessions
- Duration of simulation "burn time"
- Desired number of destination nodes per origin

INCIDENTS

- Identify and Schedule of closed lanes
- Identify and Schedule of closed links

Table C-3. Glossary

Cap	The maximum number of vehicles, of a particular movement, that can discharge from a link within a time interval.
E	The number of vehicles, of a particular movement, that enter the link over the time interval. The portion, E_{TI}, can reach the stop-bar within the TI.
G/C	The green time: cycle time ratio that services the vehicles of a particular turn movement on a link.
h	The mean queue discharge headway, seconds.
k	Density in vehicles per lane per mile.
$\bar{k}$	The average density of <u>moving</u> vehicles of a particular movement over a TI, on a link.
L	The length of the link in feet.
L_b , L_e	The queue length in feet of a particular movement, at the [beginning, end] of a time interval.
LN	The number of lanes, expressed as a floating point number, allocated to service a particular movement on a link.
L_v	The mean effective length of a queued vehicle including the vehicle spacing, feet.
M	Metering factor (Multiplier): 1.
M_b , M_e	The number of moving vehicles on the link, of a particular movement, that are moving at the [beginning, end] of the time interval. These vehicles are assumed to be of equal spacing, over the length of link upstream of the queue.
O	The total number of vehicles of a particular movement that are discharged from a link over a time interval.
O_Q , O_M , O_E	The components of the vehicles of a particular movement that are discharged from a link within a time interval: vehicles that were Queued at the beginning of the TI; vehicles that were Moving within the link at the beginning of the TI; vehicles that Entered the link during the TI.
P_x	The percentage, expressed as a fraction, of the total flow on the link that executes a particular turn movement, x.

Q_b , Q_e	The number of queued vehicles on the link, of a particular turn movement, at the [beginning, end] of the time interval.
Q_{max}	The maximum flow rate that can be serviced by a link for a particular movement in the absence of a control device. It is specified by the analyst as an estimate of link capacity, based upon a field survey, with reference to the HCM.
R	The factor that is applied to the capacity of a link to represent the "capacity drop" when the flow condition moves into the forced flow regime. The lower capacity at that point is equal to RQ_{max} .
RCap	The remaining capacity available to service vehicles of a particular movement after that queue has been completely serviced, within a time interval, expressed as vehicles.
S_x	Service rate for movement x, vehicles per hour (vph).
t_1	Vehicles of a particular turn movement that enter a link over the first t_1 seconds of a time interval, can reach the stop-bar (in the absence of a queue down-stream) within the same time interval.
TI	The time interval, in seconds, which is used as the simulation time step.
v	The mean speed of travel, in feet per second (fps) or miles per hour (mph), of moving vehicles on the link.
v_Q	The mean speed of the last vehicle in a queue that discharges from the link within the TI. This speed differs from the mean speed of moving vehicles, v.
W	The width of the intersection in feet. This is the difference between the link length which extends from stop-bar to stop-bar and the block length.

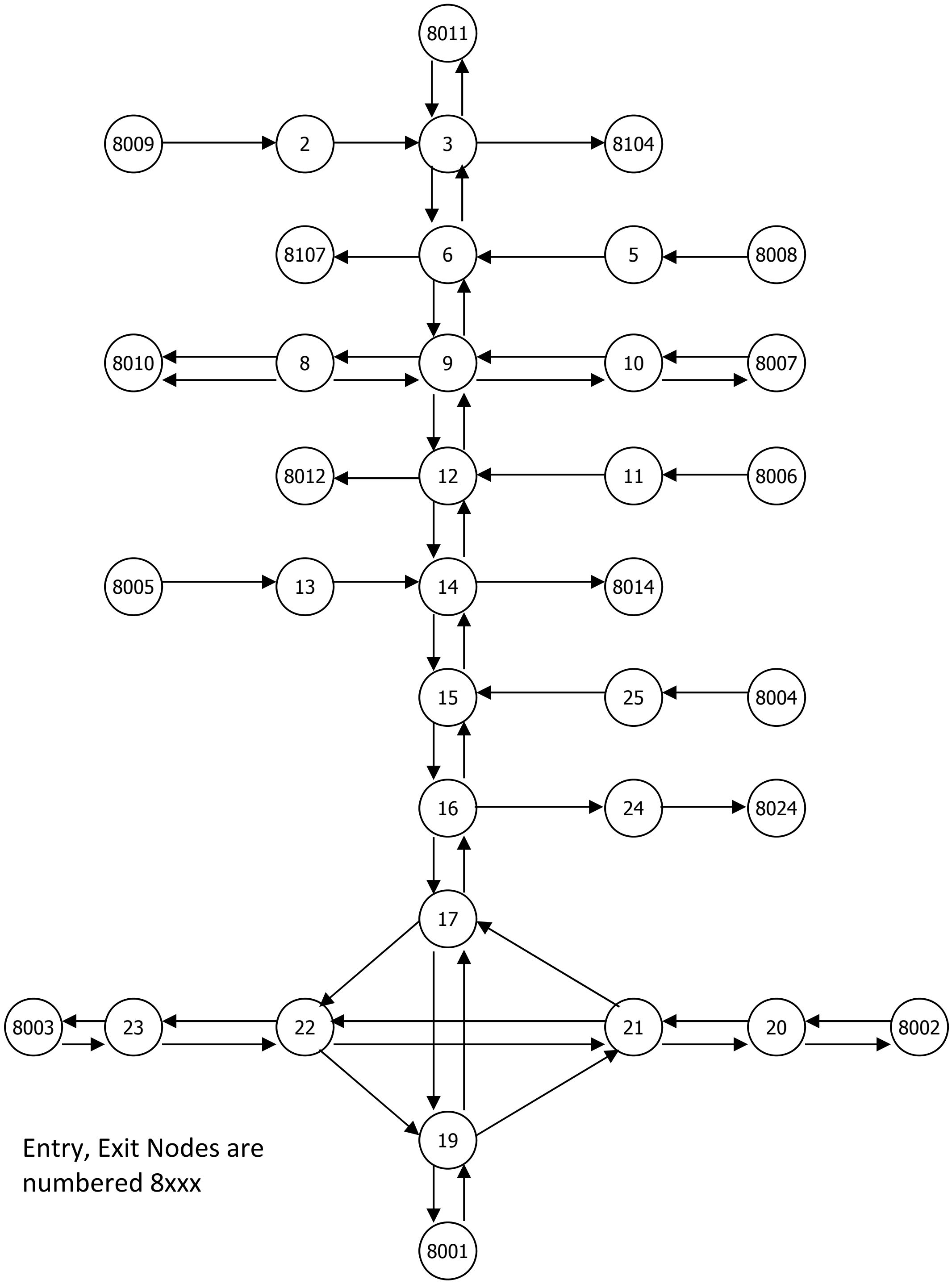


Figure C-1. Representative Analysis Network

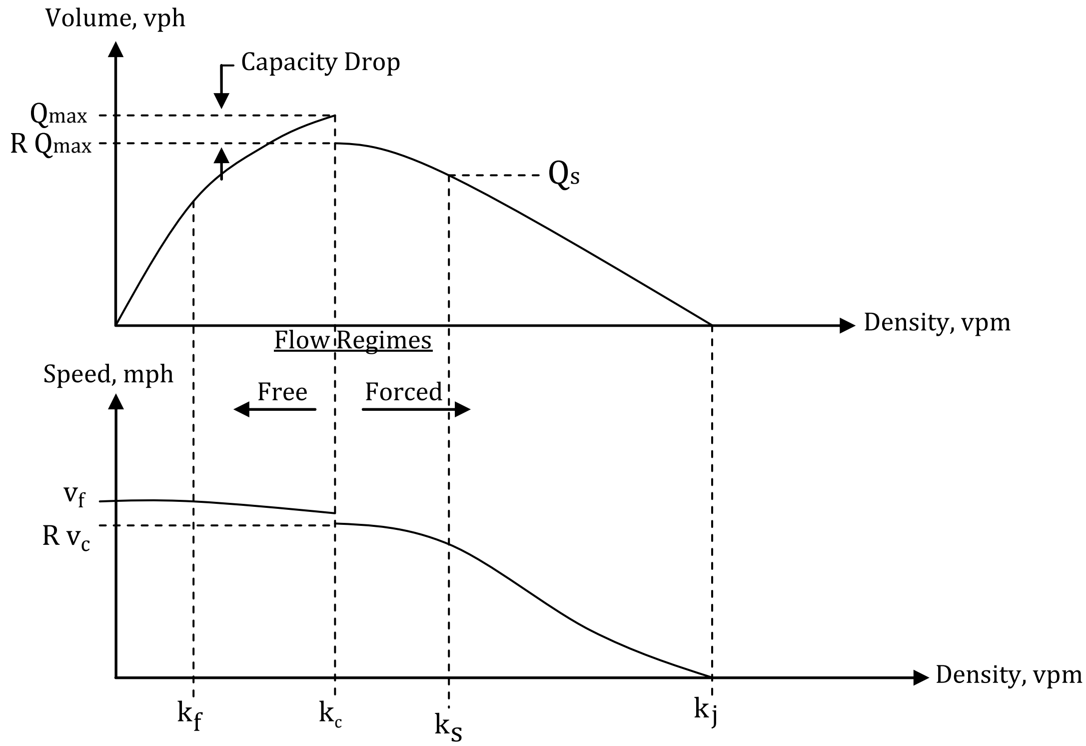


Figure C-2. Fundamental Diagrams

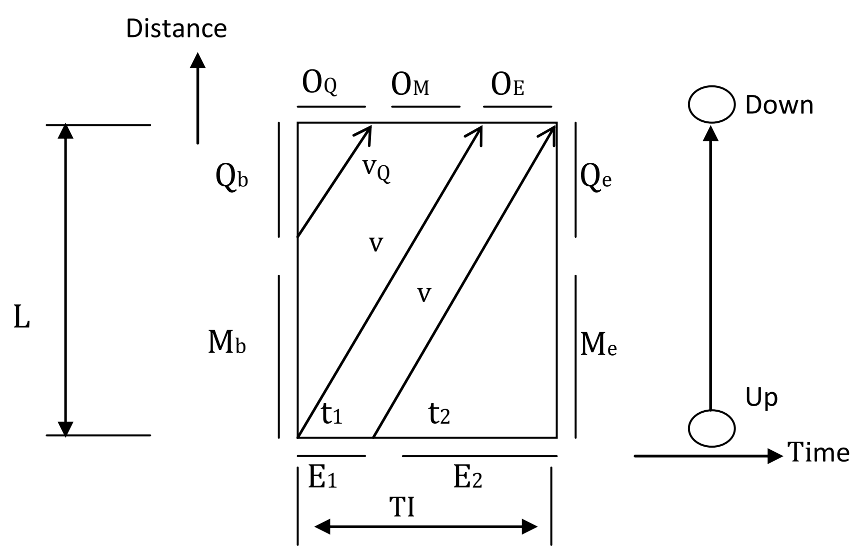


Figure C-3. A UNIT Problem Configurations with t_1>0

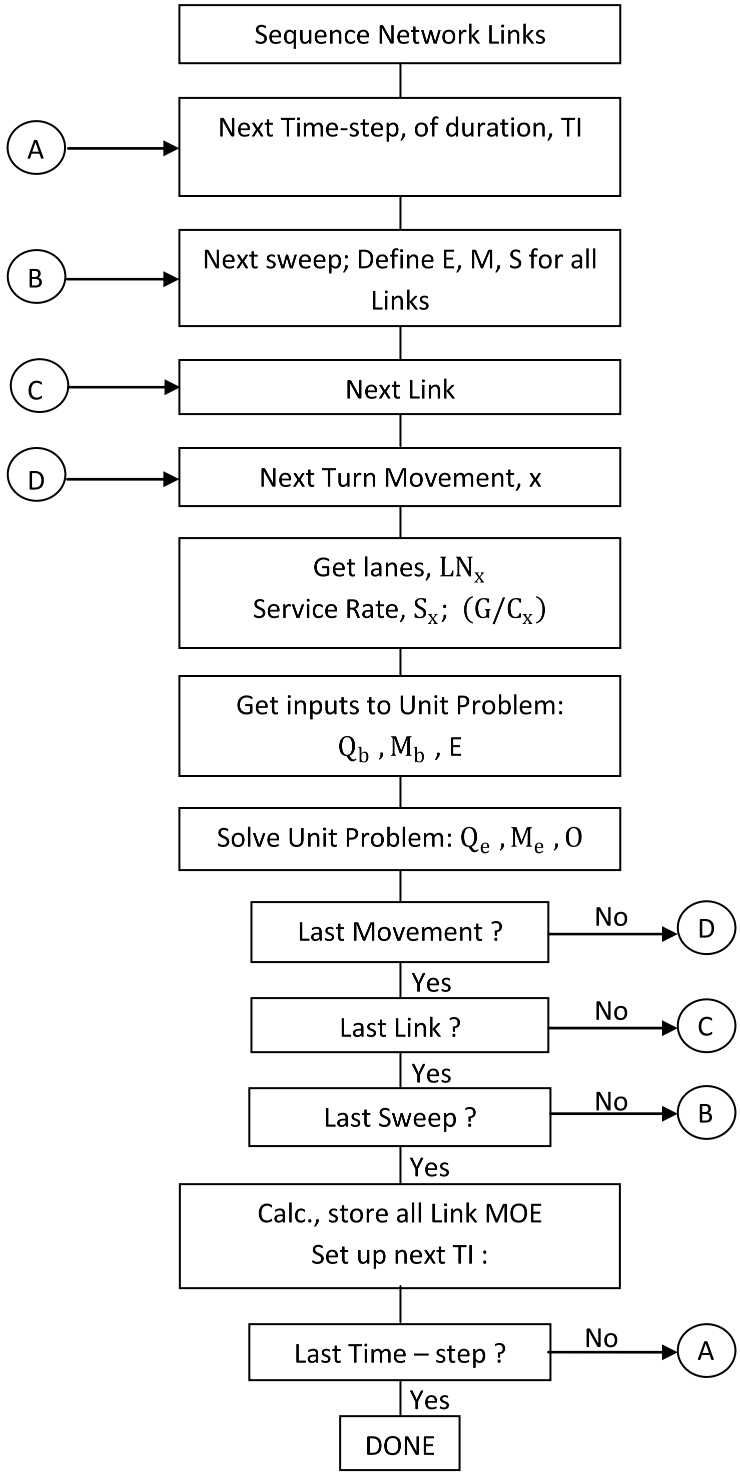


Figure C-4. Flow of Simulation Processing (See Glossary: Table C-3)

APPENDIX D

Detailed Description of Study Procedure

D. DETAILED DESCRIPTION OF STUDY PROCEDURE

This appendix describes the activities that were performed to compute Evacuation Time Estimates. The individual steps of this effort are represented as a flow diagram in Figure D-1. Each numbered step in the description that follows corresponds to the numbered element in the flow diagram.

Step 1

The first activity was to obtain EPZ boundary information and create a GIS base map. The base map extends beyond the shadow region which extends approximately 15 miles (radially) from the power plant location. The base map incorporates the local roadway topology, a suitable topographic background and the EPZ boundary.

Step 2

2010 Census block information was obtained in GIS format. This information was used to estimate the resident population within the EPZ and shadow region and to define the spatial distribution and demographic characteristics of the population within the study area. Employee data were estimated using the journey to work Florida Edition website[1], and from phone calls to major employers. Transient data were obtained from local/state emergency management agencies and from phone calls to transient attractions. Information concerning schools, medical and other types of special facilities within the EPZ was obtained from county and municipal sources, augmented by telephone contacts with the identified facilities.

Step 3

A kickoff meeting was conducted with major stakeholders (state and local emergency managers, on-site and off-site utility emergency managers, local and state law enforcement agencies). The purpose of the kickoff meeting was to present an overview of the work effort, identify key agency personnel, and indicate the data requirements for the study. Specific requests for information were presented to local emergency managers. Unique features of the study area were discussed to identify the local concerns that should be addressed by the ETE study.

Step 4

Next, a physical survey of the roadway system in the study area was conducted to determine the geometric properties of the highway sections, the channelization of lanes on each section of roadway, whether there are any turn restrictions or special treatment of traffic at intersections, the type and functioning of traffic control devices, gathering signal timings for pre-timed traffic signals, and to make the necessary observations needed to estimate realistic values of roadway capacity.

[1] http://www.j2w.usf.edu/default.asp?l=f

Step 5

A telephone survey of households within the EPZ was conducted to identify household dynamics, trip generation characteristics, and evacuation-related demographic information of the EPZ population. This information was used to determine important study factors including the average number of evacuating vehicles used by each household, and the time required to perform pre-evacuation mobilization activities.

Step 6

A computerized representation of the physical roadway system, called a link-node analysis network, was developed using the UNITES software developed by KLD. Once the geometry of the network was completed, the network was calibrated using the information gathered during the road survey (Step 4). Estimates of highway capacity for each link and other link-specific characteristics were introduced to the network description. Traffic signal timings were input accordingly. The link-node analysis network was imported into a GIS map. 2010 Census data were overlaid in the map, and origin centroids where trips would be generated during the evacuation process were assigned to appropriate links.

Step 7

The EPZ is subdivided into 10 Areas. Based on wind direction and speed, regions (groupings of areas) that may be advised to evacuate, were developed.

The need for evacuation can occur over a range of time-of-day, day-of-week, seasonal and weather-related conditions. Scenarios were developed to capture the variation in evacuation demand, highway capacity and mobilization time, for different time of day, day of the week, time of year, and weather conditions.

Step 8

The input stream for the DYNEV II model, which integrates the dynamic traffic assignment and distribution model, DTRAD, with the evacuation simulation model, was created for a prototype evacuation case – the evacuation of the entire EPZ for a representative scenario.

Step 9

After creating this input stream, the DYNEV II System was executed on the prototype evacuation case to compute evacuating traffic routing patterns consistent with the appropriate NRC guidelines. DYNEV II contains an extensive suite of data diagnostics which check the completeness and consistency of the input data specified. The analyst reviews all warning and error messages produced by the model and then corrects the database to create an input stream that properly executes to completion.

The model assigns destinations to all origin centroids consistent with a (general) radial evacuation of the EPZ and shadow region. The analyst may optionally supplement and/or replace these model-assigned destinations, based on professional judgment, after studying the topology of the analysis highway network. The model produces link and network-wide measures of effectiveness as well as estimates of evacuation time.

Step 10

The results generated by the prototype evacuation case are critically examined. The examination includes observing the animated graphics (using the EVAN software which operates on data produced by DYNEV II) and reviewing the statistics output by the model. This is a labor-intensive activity, requiring the direct participation of skilled engineers who possess the necessary practical experience to interpret the results and to determine the causes of any problems reflected in the results.

Essentially, the approach is to identify those bottlenecks in the network that represent locations where congested conditions are pronounced and to identify the cause of this congestion. This cause can take many forms, either as excess demand due to high rates of trip generation, improper routing, a shortfall of capacity, or as a quantitative flaw in the way the physical system was represented in the input stream. This examination leads to one of two conclusions:

- The results are satisfactory; or
- The input stream must be modified accordingly.

This decision requires, of course, the application of the user's judgment and experience based upon the results obtained in previous applications of the model and a comparison of the results of the latest prototype evacuation case iteration with the previous ones. If the results are satisfactory in the opinion of the user, then the process continues with Step 13. Otherwise, proceed to Step 11.

Step 11

There are many "treatments" available to the user in resolving apparent problems. These treatments range from decisions to reroute the traffic by assigning additional evacuation destinations for one or more sources, imposing turn restrictions where they can produce significant improvements in capacity, changing the control treatment at critical intersections so as to provide improved service for one or more movements, or in prescribing specific treatments for channelizing the flow so as to expedite the movement of traffic along major roadway systems. Such "treatments" take the form of modifications to the original prototype evacuation case input stream. All treatments are designed to improve the representation of evacuation behavior.

Step 12

As noted above, the changes to the input stream must be implemented to reflect the modifications undertaken in Step 11. At the completion of this activity, the process returns to Step 9 where the DYNEV II System is again executed.

Step 13

Evacuation of transit-dependent evacuees and special facilities are included in the evacuation analysis. Fixed routing for transit buses and for school buses, ambulances, and other transit vehicles are introduced into the final prototype evacuation case data set. DYNEV II generates route-specific speeds over time for use in the estimation of evacuation times for the transit dependent and special facility population groups.

Step 14

The prototype evacuation case was used as the basis for generating all region and scenario-specific evacuation cases to be simulated. This process was automated through the UNITES user interface. For each specific case, the population to be evacuated, the trip generation distributions, the highway capacity and speeds, and other factors are adjusted to produce a customized case-specific data set.

Step 15

All evacuation cases are executed using the DYNEV II System to compute ETE. Once results were available, quality control procedures were used to assure the results were consistent, dynamic routing was reasonable, and traffic congestion/bottlenecks were addressed properly.

Step 16

Once vehicular evacuation results are accepted, average travel speeds for transit and special facility routes were used to compute evacuation time estimates for transit-dependent permanent residents, schools, hospitals, and other special facilities.

Step 17

The simulation results are analyzed, tabulated and graphed. The results were then documented, as required by NUREG/CR-7002.

Step 18

Following the completion of documentation activities, the ETE criteria checklist (see Appendix N) was completed. An appropriate report reference is provided for each criterion provided in the checklist.

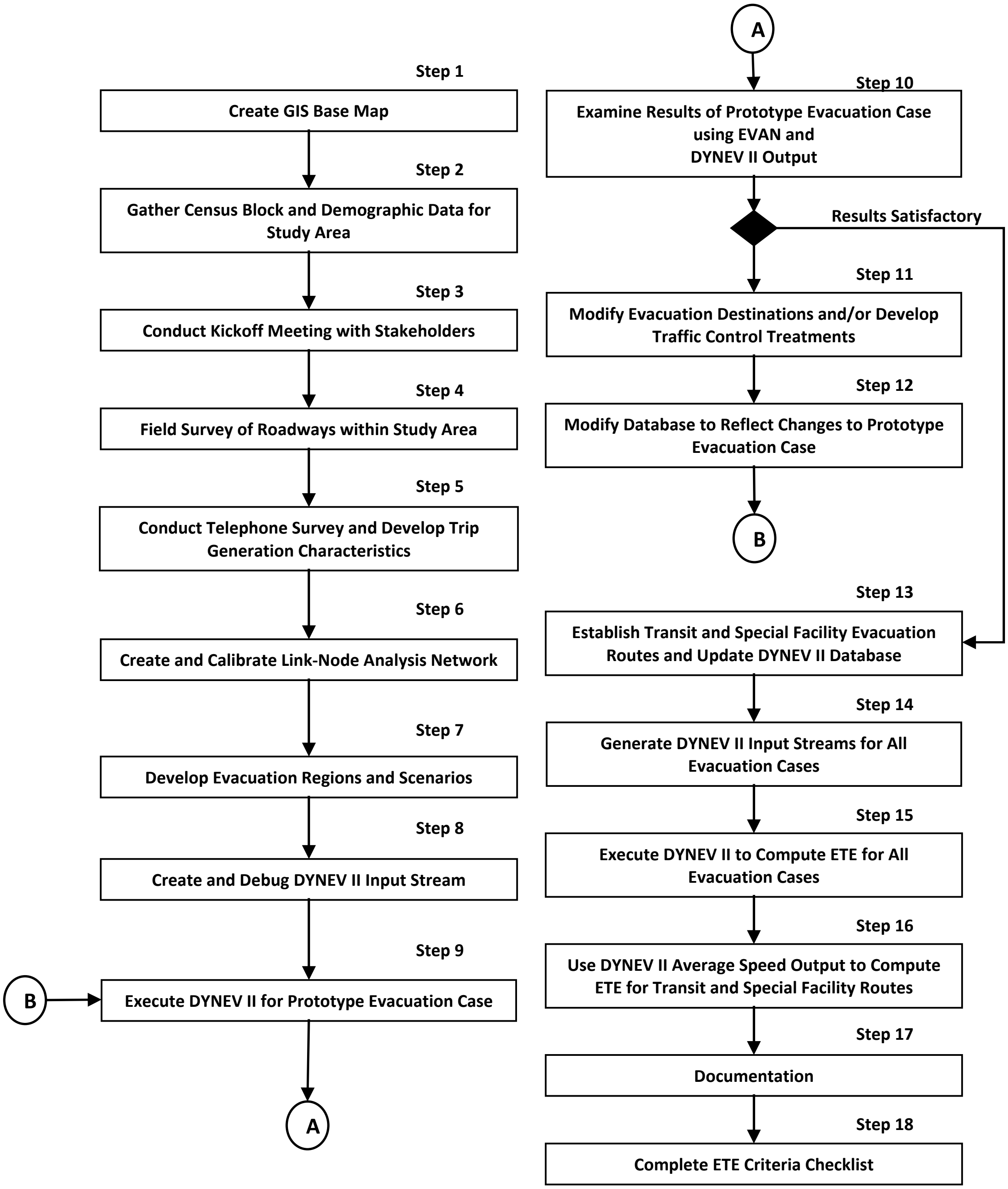


Figure D-1. Flow Diagram of Activities

APPENDIX E

Special Facility Data

E. SPECIAL FACILITY DATA

The following tables list population information, as of June 2012, for special facilities that are located within the PTN EPZ. Special facilities are defined as schools, hospitals and other medical care facilities, major employers and correctional facilities. Transient population data is included in the tables for recreational areas and lodging facilities. Employment data is included in the tables for major employers. Each table is grouped by county. The location of the facility is defined by its straight-line distance (miles) and direction (magnetic bearing) from the center point of the plant. Maps of each school, medical facility, recreational area, lodging facility, major employer, and correctional facility are also provided.

Table E-1. Schools within the EPZ

Area	Distance (miles)	Dire-ction	School Name	Street Address	Municipality	Phone	Enroll-ment
MIAMI-DADE COUNTY, FL							
4	7.5	NW	Air Base Elementary	12829 SW 272nd St	Homestead	305-258-3676	676
4	6.8	NNW	Mandarin Lakes K-8 Academy	12225 SW 280th St	Homestead	305-257-0377	1,376
4	6.7	NNW	Migrant Education Program	28205 SW 125th Ave	Homestead	305-258-4115	17
5	10.6	N	Balere Language Academy	10600 Caribbean Blvd	Miami	305-232-9797	151
5	11.3	N	Bel-Aire Elementary	10205 SW 194th St	Miami	305-233-5401	522
5	10.2	N	Centennial Middle	8601 SW 212th St	Miami	305-235-1581	976
5	10.7	WNW	Cutler Ridge Christian Academy	10301 Caribbean Blvd	Miami	305-251-1534	238
5	10.8	N	Cutler Ridge Elementary	20210 Coral Sea Rd	Miami	305-235-4611	905
5	11.3	N	Cutler Ridge Middle	19400 Gulfstream Rd	Miami	305-235-4761	1,008
5	10.3	N	Gulfstream Elementary	20900 SW 97th Ave	Miami	305-235-6811	724
5	12.1	N	Our Lady of the Holy Rosary	18455 Franjo Rd	Homestead	305-235-5442	460
5	9.7	N	Whigham, Dr. E.L. Elementary	21545 SW 87th Ave	Miami	305-234-4840	798
5	11.5	N	Whispering Pines Elementary	18929 SW 89th Rd	Miami	305-238-7382	758
6	11.2	NNW	Caribbean Elementary	11990 SW 200th St	Miami	305-233-7131	811
6	9.7	WNW	Children's Rainbow	22940 Old Dixie Hwy	Miami	305-258-0194	20
6	8.8	NNW	Coconut Palm K-8 Academy	24440 SW 124th Ave	Miami	305-257-0501	1,400
6	10.0	NNW	Coral Reef Montessori Academy Charter School	10853 SW 216 St	Miami	305-255-0064	335
6	8.9	NNW	Goulds Elementary School	23555 SW 112th Ave	Miami	305-257-4400	545
6	10.2	NNW	Mays Middle	11700 SW 216th St	Miami	305-233-2300	658
6	10.1	NNW	Pine Villa Elementary	21799 SW 117th Court	Miami	305-258-5366	623
7	8.1	NW	Chapman Elementary	27190 SW 140th Ave	Homestead	305-245-1055	940
7	8.5	NW	Naranja Elementary	13990 SW 264th St	Naranja	305-258-3401	637
7	10.7	NW	Redland Middle	16001 SW 248th St	Homestead	305-247-6112	1,175
7	8.1	NW	SIA Tech (Homestead Job Corps Center)	12350 SW 285th St	Homestead	305-258-9477	357
7	8.1	NW	South Dade Center	28520 SW 148th Ave	Homestead	N/A	N/A

Area	Distance (miles)	Dire-ction	School Name	Street Address	Municipality	Phone	Enroll-ment
7	9.6	NW	South Dade Senior	28401 SW 167th Ave	Homestead	305-247-4244	3,266
7	8.5	NW	South Dade Skill Center	28300 SW 152nd Ave	Leisure City	N/A	N/A
8	7.5	NW	Aspira South Youth Leadership Charter School	14112-14114 SW 288th St	Leisure City	305-246-1111	306
8	9.6	WNW	Avocado Elementary	16969 SW 294th St	Homestead	305-247-4942	782
8	9.8	WNW	Barrington Academy	344 SW 4th Ave	Homestead	305-248-3400	94
8	8.1	WNW	Campbell Dr Elementary	15790 SW 307th St	Leisure City	305-245-0270	1,246
8	8.0	WNW	Campbell Dr Middle	900 NE 23rd Ave	Homestead	305-248-7911	1,072
8	9.6	WNW	Colonial Christian School	17105 SW 296th St	Homestead	305-246-8606	199
8	9.3	WNW	Cooper, Neva King Educational Center	151 NW 5th St	Homestead	305-247-4307	101
8	8.1	WNW	Corporate Academy South	2351 SE 12 Ave	Homestead	305-246-4348	89
8	9.9	W	First Assembly Christian Academy	824 West Palm Dr	Florida City	305-248-2273	75
8	10.0	WNW	First Presbyterian Church School	47 NW 16th St	Homestead	305-246-4094	120
8	9.6	WNW	Florida City Elementary	364 NW 6th Ave	Florida City	305-247-4676	857
8	7.7	WNW	Gateway Environmental K-8	955 SE 18th Ave	Homestead	305-257-6000	1,239
8	9.9	WNW	Homestead Middle	650 NW 2nd Ave	Homestead	305-247-4221	966
8	8.1	WNW	Homestead Senior	2351 SE 12th Ave	Homestead	305-245-7000	2,184
8	6.7	WNW	Keys Gate Charter School	2000 SE 28th Ave	Homestead	305-230-1616	1,143
8	9.8	W	Lawrence Academy	777 West Palm Dr	Florida City	305-247-4800	15
8	8.1	NW	Leisure City K-8 Center	14950 SW 288th St	Homestead	305-247-5431	1,318
8	9.8	WNW	MAST @ Homestead	1220 NW 1st Ave	Homestead	305-257-4500	457
8	10.1	W	Miami Community Charter School	101 S Redland Rd	Florida City	305-245-2552	50
8	7.6	NW	Peskoe Elementary	29035 SW 144 Ave	Homestead	305-242-8340	1,114
8	8.8	WNW	Redland Center	29355 Dixie Hwy	Miami	N/A	N/A
8	10.7	WNW	Redland Christian Academy	17700 SW 280th St	Homestead	305-247-7399	215
8	8.0	WNW	Region VI Office	30910 SW 8th St	Homestead	N/A	N/A

Area	Distance (miles)	Dire-ction	School Name	Street Address	Municipality	Phone	Enroll-ment
8	9.8	W	Rosa Parks Charter School	713 W Palm Dr	Florida City	305-246-3336	155
8	9.3	WNW	Sacred Heart	300 SE 1st Dr	Homestead	305-247-2678	194
8	9.6	WNW	Saint John's Episcopal School	145 NE 10th St	Homestead	305-247-5445	176
8	9.8	WNW	Saunders, Laura C. Elementary	505 SW 8th St	Homestead	305-247-3933	919
8	9.6	WNW	South Dade Adult Center	109 NE 8th St	Homestead	N/A	N/A
8	6.8	NW	The Charter School at Waterstone	855 Waterstone Way	Homestead	305-248-6206	1,117
outside[(a)]	10.9	NW	Redland Elementary	24501 SW 162nd Ave	Homestead	305-247-8141	996
outside[(a)]	11.0	WNW	Redondo Elementary	18480 SW 304th St	Homestead	305-247-5943	753
outside[(a)]	10.7	WNW	West Homestead Elementary	1550 SW 6th St	Homestead	305-248-0812	768
						Miami-Dade County Subtotal:	*38,096*
MONROE COUNTY, FL							
10	9.1	SSE	Academy at Ocean Reef	395 South Harbor Dr	Key Largo	305-367-2409	12
						Monroe County Subtotal:	*12*
						EPZ TOTAL:	**38,108**

(a) According to Miami-Dade County, Redland Elementary, Redondo Elementary, and West Homestead Elementary are outside of the EPZ, but are nonetheless evacuated because they are close to the EPZ boundary. They have been included in areas 7, 8, and 8, respectively, for the ETE analysis.

Table E-2. Medical Facilities within the EPZ

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Cap-acity	Ambul-atory Patients	Wheel-chair Patients	Bed-ridden Patients
MIAMI-DADE COUNTY, FL										
4	8.0	NW	Diaz Home Care ALF	13481 SW 268th Ter	Homestead	305-258-7790	7	6	1	0
4	7.3	NW	Merline's Place	28412 SW 135th Ave	Homestead	305-274-4326	6	5	1	0
4	8.0	NW	M J Quality Care	13231 SW 278th Ter	Homestead	305-794-0011	8	7	1	0
4	7.5	NW	Mother Golden Years III	13621 SW 281st Ter	Miami	305-807-7138	6	5	1	0
5	11.6	N	Bel Air ALF	8830 Caribbean Blvd	Miami	305-255-8737	7	6	1	0
5	11.6	N	Bella Luna Retirement Home	18700 SW 93rd Ct	Miami	305-969-7482	9	8	1	0
5	9.0	N	Riverside Senior Care	22712 SW 103rd Ct	Miami	786-210-8271	7	6	1	0
5	9.6	N	Blue Point Home Care	21910 SW 97th Ct	Miami	305-971-5826	6	5	1	0
5	10.0	N	Cutler Bay Village	10425 SW 212th St	Miami	305-992-7672	28	24	3	1
5	10.0	N	Guardian Angel ALF	10265 Nicaragua Dr	Cutler Bay	786-344-3318	8	7	1	0
5	10.6	N	Caribbean ALF	9860 Caribbean Blvd	Miami	305-971-9667	6	5	1	0
5	11.2	N	East Ridge Retirement Village	19301 SW 87th Ave	Miami	305-238-2623	60	51	6	3
5	10.3	N	Harmony Family Home	9245 SW 208th Ter	Miami	786-242-5577	7	6	1	0
5	10.4	N	Health South Rehabilitation Hospital	20601 Old Cutler Rd	Miami	305-251-3800	60	51	6	3
5	10.5	N	Kenneth Home Inc	10051 Haitian Dr	Miami	786-543-0325	8	7	1	0
5	10.0	N	Living Well ALF Corporation	21280 Old Cutler Road	Cutler Bay	305-232-7420	6	5	1	0
5	10.4	N	Marlin Retirement ALF	20610 Marlin Rd	Miami	305-519-8517	8	7	1	0
5	9.8	N	Old Cutler Retirement Home	21640 Old Cutler Rd	Miami	305-232-1411	8	7	1	0
5	10.0	N	Paradise Villa ALF, Inc.	21164 SW 92nd Pl	Cutler Bay	305-971-6477	7	6	1	0
5	11.1	N	Perdue Medical Center	19590 Old Cutler Rd	Cutler Bay	786-466-3500	53	45	5	3
5	10.4	N	Rodeck One Inc	9700 Montego Bay Dr	Miami	305-969-4446	8	7	1	0
5	10.7	N	The Haven	10601 Caribbean Blvd	Miami	305-235-5872	11	9	1	1
5	10.0	N	Welcome Home ALF Corp.	8950 SW 215th Terrace	Cutler Bay	786-355-2630	7	6	1	0
6	7.0	NNW	Diaz Home Care ALF II Inc.	12211 SW 268th St	Homestead	786-601-7752	7	6	1	0
6	8.0	NNW	Blanca Azuzena Homecare	12414 SW 252nd Ter	Homestead	305-257-4741	8	7	1	0

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Cap-acity	Ambul-atory Patients	Wheel-chair Patients	Bed-ridden Patients
6	10.7	NNW	B&B Home Care, Inc.	20625 SW 114th Pl	Miami	305-235-9510	7	6	1	0
6	8.2	NNW	Del Real Home Care, Inc.	13071 SW 260th Ter	Homestead	305-257-0041	7	6	1	0
6	7.7	NNW	Duran Home Care Corp	26775 SW 129th Ave	Homestead	305-726-5782	7	6	1	0
6	8.3	NNW	God Is First ALF, Inc	11316 SW 246th Ter	Miami	305-508-8412	6	5	1	0
6	10.1	NNW	Ifa Lola ALF	12230 SW 220th St	Cutler Bay	786-308-9915	6	5	1	0
6	11.1	NNW	Ive Home	20020 SW 113th Pl	Miami	305-255-7934	8	7	1	0
6	9.9	NNW	Ive Home II ALF	22636 SW 125th Ave	Cutler Bay	305-804-3183	8	7	1	0
6	10.0	NNW	Rick and Dauvy ALF Inc.	23120 SW 124th Ave	Miami	305-345-6751	6	5	1	0
6	8.3	NNW	Living Well ALF, Co.	24151 SW 107th Ave	Homestead	305-431-2586	7	6	1	0
6	8.0	NNW	Meadow Wood Homes LLC	25799 SW 122nd Pl	Homestead	305-283-5034	7	6	1	0
6	8.0	NNW	Osmani M ALF LLC	26423 SW 122nd Pl	Miami	305-671-3308	7	6	1	0
6	10.9	NNW	My Sweet Home	11312 SW 203rd Ter	Miami	305-251-1119	8	7	1	0
6	9.9	NNW	Paula's Mansion ALF	13206 SW 218th Ter	Miami	786-306-4819	6	5	1	0
6	10.8	NNW	Rafaela's Home ALF II	20560 SW 113th Rd	Miami	305-259-3607	8	7	1	0
6	9.2	NNW	St. Mary Adult Care II	11271 SW 229th Ter	Miami	305-238-5594	7	6	1	0
6	10.9	NNW	Suany's Home	20411 SW 116th Rd	Miami	305-252-0734	8	7	1	0
6	8.8	NNW	Sunny Hills of Homestead ALF	25268 SW 134th Ave	Princeton	305-258-2222	105	89	11	5
6	10.0	NNW	Biscayne Villa Assisted Living	22181 Southwest 117th Avenue	Miami	305-218-4429	6	5	1	0
6	9.5	NNW	Sylvia's Senior Home	23025 SW 120th Ave	Miami	305-257-2880	10	9	1	0
6	7.6	NNW	Vicky's ALF	12438 SW 266th Ln	Homestead	305-257-3039	7	6	1	0
7	7.7	NW	Advance ALF	14335 SW 288 St	Homestead	305-242-6461	6	5	1	0
7	9.0	NW	Naranja Group Home	15190 SW 272 St	Naranja	305-248-7116	12	10	1	1
7	7.9	NW	Maria Home Care Corp.	14615 SW 288th St	Miami	786-385-5415	7	6	1	0
7	9.0	NW	Por Una Vida Mejor	27352 SW 154th Ave	Homestead	786-457-0806	8	7	1	0
7	7.8	NW	San Rafael Home Health Inc.	13373 SW 283rd St	Homestead	786-470-7927	7	6	1	0
7	9.0	NW	Serenity Adult Home Care Services	15401 SW 277th St	Homestead	786-853-8880	6	5	1	0
8	8.0	WNW	Alita and John Haran ALF	1532 Flamingo Ct	Homestead	305-242-5620	6	5	1	0

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Cap-acity	Ambul-atory Patients	Wheel-chair Patients	Bed-ridden Patients
8	7.8	NW	Angele's Assisted Living Facility	29921 SW 151st Ave	Homestead	305-247-7171	7	6	1	0
8	8.0	NW	Emanuel Adult ALF Inc.	14950 Leisure Dr	Homestead	305-815-7771	7	6	1	0
8	8.0	NW	Leisure City Homecare Inc.	14785 Coolidge Lane	Homestead	305-247-5949	6	5	1	0
8	8.0	NW	Heaven Assisted Living Facility	30136 SW 148th Pl	Homestead	305-245-2290	7	6	1	0
8	8.0	WNW	New Horizon Assisted Living	30110 SW 145th Ct	Homestead	305-245-6029	7	6	1	0
8	6.9	NW	El Viejo Sol ALF Corp	4163 NE 16th St	Homestead	305-986-8104	6	5	1	0
8	7.5	NW	Heaven Assisted Living Facility	30136 SW 148th Pl	Homestead	305-245-2290	7	6	1	0
8	7.1	WNW	Homestead Hospital	975 Baptist Way	Homestead	786-243-8000	120	102	12	6
8	10.0	WNW	Homestead Manor	1330 NW 1st Ave	Homestead	305-248-0271	82	70	8	4
8	8.4	WNW	Kayleen and Denis Care	15700 SW 296th St	Homestead	305-248-5046	10	9	1	0
8	10.0	WNW	Krome Apartments - Sunrise Community Inc	1102 N. Krome Ave	Homestead	305-242-0600	12	10	1	1
8	9.0	WNW	Kayleen and Denis Care	15700 SW 296th St	Homestead	305-242-5048	10	9	1	0
8	8.2	WNW	MD ALF	15735 SW 303rd Ter	Miami	305-247-0260	6	5	1	0
8	7.2	WNW	Mi Renacer ALF	1305 SE 7th St	Homestead	786-295-2913	8	7	1	0
8	7.4	NW	Mother Golden Years II	29332 SW 143rd Ct	Homestead	305-551-3160	6	5	1	0
8	9.9	WNW	Palace Gardens-North	1351 N Krome Ave	Homestead	305-247-0446	224	191	22	11
8	7.8	NW	Pina & Fuerte Adult Care	14935 SW 297th St	Homestead	305-242-0871	7	6	1	0
8	9.6	WNW	Sara Home Care	29100 SW 172nd Ave	Homestead	305-246-4034	16	14	2	0
8	7.7	WNW	Signature Healthcare of Brookwood Gardens	1990 S Canal Dr	Homestead	305-246-1200	120	102	12	6
8	10.0	WNW	Sol Radiante Inc.	221 NE 15th St	Homestead	305-246-4798	6	5	1	0
8	10.1	WNW	Swankridge Care Center	120 NW 17th St	Homestead	305-248-9662	12	10	1	1
8	9.8	WNW	Swankridge Holistic Research & Care Center	122 NW 7th St	Homestead	305-248-9662	12	10	1	1
8	9.4	WNW	Sweet Mansion ALF Inc	16925 SW 300th St	Homestead	786-486-4902	7	6	1	0

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Cap-acity	Ambul-atory Patients	Wheel-chair Patients	Bed-ridden Patients
8	8.0	NW	The Gil Family Home	15201 SW 297th St	Miami	305-248-0308	6	5	1	0
						Miami-Dade County Subtotal:	*1,360*	*1,160*	*153*	*47*
						EPZ TOTAL:	**1,360**	**1,160**	**153**	**47**

Table E-3. Major Employers within the EPZ

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Employees[a]	Employee Vehicles
MIAMI-DADE COUNTY, FL								
1	0.0	N	Turkey Point Nuclear Plant	SW 344th St	Homestead	N/A	1467	1346
5	11.5	N	Best Buy	19191 S Dixie Hwy/20505 S Dixie Hwy	Cutler Bay	305-256-9552	344	316
5	9.8	N	Doris Ison South Dade Community Health Center	10300 Southwest 216th St	Miami	305-253-5100	345	317
5	10.4	N	Health South Rehabilitation Hospital	20601 Old Cutler Rd	Miami	305-251-3800	263	241
5	11.3	N	Office Max	19650 South Dixie Hwy	Cutler Bay	305-254-8077	125	115
5	11.4	N	PRC	19500 S Dixie Hwy	Cutler Bay	786-293-4000	126	116
5	9.0	WNW	Prime Outlets of Florida City	250 East Palm Dr	Florida City	305-248-4736	195	179
5	10.5	N	Shopping Center - Lakes by the Bay	Old Cutler Rd	Cutler Bay	N/A	263	241
5	7.8	N	South District Wastewater Treatment Plant	SE 232nd St	Cutler Bay	786-552-8157	24	22
5	11.3	N	Toys R Us	19525 So. Dixie Hwy	Cutler Bay	305-233-6122	344	316
5	11.5	N	Winn Dixie	19167 South Dixie Hwy	Cutler Bay	N/A	345	317
6	9.4	NNW	Cemax	N/A	Princeton	N/A	734	673
6	5.2	WNW	Contender Boats	1820 SE 38th Ave	Homestead	305-230-1700	31	28
6	10.8	NNW	Kmart	20505 S Dixie Hwy	Cutler Bay	305-254-0455	345	317
6	10.3	NNW	Miami Dade Government Center	10710 SW 211th St	Miami	305-275-1155	345	317
6	7.1	NW	Publix Super Market	3060 NE 41st Ter	Homestead	305-242-5530	344	316
6	10.5	NNW	Sears	20701 SW 112th Ave	Cutler Bay	305-378-5195	345	317
6	12.0	N	Shopping Center – Cutler Bay	S Dixie Hwy	East Perrine	N/A	344	316
6	9.8	NNW	Shopping Center I – Goulds	S Dixie Hwy	Goulds	N/A	118	108
6	9.9	NNW	Shopping Center II – Goulds	S Dixie Hwy	Goulds	N/A	118	108
6	10.0	NNW	Shopping Center III – Goulds	S Dixie Hwy	Goulds	N/A	118	108

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Employees[a]	Employee Vehicles
6	10.2	NNW	Shopping Center IV- Goulds	S Dixie Hwy	Goulds	N/A	118	108
6	9.7	NNW	Shopping Center V- Goulds	S Dixie Hwy	Goulds	N/A	118	108
6	10.6	NNW	Southland Mall	20505 S Dixie Hwy	Cutler Bay	305-235-8880	345	317
6	10.8	NNW	Target	20500 SW 112th Ave	Cutler Bay	305-235-0839	125	115
7	8.8	NW	CVS	28740 South Dixie Hwy	Homestead	305-248-1761	181	166
7	8.7	NW	Winn Dixie	27359 S Dixie Hwy/240 Northeast 8th St/30346 Old Dixie Highway	Homestead	305-248-0660	515	472
8	9.2	WNW	Applebee's	33009 S Dixie Hwy	Homestead	305-246-1004	194	178
8	8.8	WNW	BJ's Wholesale & Vicinity [c]	650 NW 8th Ave	Homestead	305-248-7538	2,422	2,222
8	9.3	W	DiMare Homestead, Inc.	258 NW 1st Ave	Florida City	305-245-4211	194	178
8	9.1	WNW	Florida City Centre & Vicinity	33001 South Dixie Hwy	Florida City	786-243-9370	180	165
8	9.2	WNW	Florida City State Farmers' Market	300 North Krome Ave	Florida City	305-246-6334	194	178
8	7.2	NW	Home Depot	13895 SW 288th St	Homestead	305-247-1179	194	178
8	7.1	WNW	Homestead Hospital & Oasis Plaza Shopping Center [d]	975 Baptist Way	Homestead	786-243-8000	2,422	2,222
8	8.6	WNW	Lowe's Home Improvement Center & Vicinity [e]	1850 NE Campbell Dr	Homestead	305-508-3020	2,422	2,222
8	10.6	NNW	Publix Super Market	20711 S Dixie Hwy	Miami	305-256-3140	180	165
8	10.7	NNW	R C Comprehensive Medical Center	10700 Caribbean Blvd	Cutler Bay	305-252-1022	344	316
8	9.0	WNW	Shopping Center – Homestead & Vicinity [f]	S Dixie Hwy	Homestead	N/A	2,422	2,222
8	8.8	WNW	Walgreens	29601 S Dixie Hwy	Homestead	305-248-2451	181	166
8	9.0	WNW	Wal-Mart	33501 S Dixie Hwy	Homestead	305-242-4447	194	178
9	9.4	NNW	Florida Rock and Sand	15900 SW 408th St #B	Florida City	305-247-9611	50	46
10	9.2	WNW	Office Depot	32955 S Dixie Hwy	Florida City	786-243-1550	194	178

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Employees[a]	Employee Vehicles
						Miami-Dade County Subtotal:	*19,872*	*18,234*
MONROE COUNTY, FL								
10	8.2	SSE	Ocean Reef Club[b]	35 Ocean Reef Dr	Key Largo	305-396-3006	600	550
						Monroe County Subtotal:	*600*	*550*
						EPZ TOTAL:	**20,472**	**18,784**

(a) The employment for each municipality in Table 3-5 was evenly distributed among major employers listed for that municipality in the table above. There are many large shopping centers with multiple stores along S Dixie Hwy; the employee estimates above are for the entire shopping center which has been identified by the major store in that shopping center.
(b) Based on information provided by the director of public safety for the Ocean Reef Community (ORC), there are 3000 employees at ORC at peak times, 80% of which are EPZ residents. Therefore 20% of employees (3000 x 20% = 600) commute into the EPZ to work at ORC.
(c) There are several additional employees in this area including Homestead Water & Sewer, NAPA Auto Parts, AT&T, and 3 shopping centers.
(d) Oasis Plaza Shopping Center includes Publix Supermarket, Walgreen’s, H&R Block, several restaurants and small retail establishments.
(e) There are several additional employers in this area including Campbell East Shopping Center, The Flagship Cinemas Shopping Center, and Homestead Pavilion Shopping Center (including Kohl’s, Sports Authority, Ross, Dress for Less, Petco, Michael’s, Staples, specialty shops and restaurants).
(f) There are several employers in this area including Publix Supermarket, Sedano’s Supermarket, Office Max, Walgreen’s, Pet Supermarket, Chase Bank, Bank of America, and several restaurants.

Table E-4. Parks/Recreational Attractions within the EPZ

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Transients	Vehicles
MIAMI-DADE COUNTY, FL								
4	2.7	N	Biscayne National Park (Convoy Point)	9700 SW 328 St	Homestead	305-230-7275	400	70
4	2.3	N	Homestead Bayfront Marina/Herbert Hoover Marina and Park	9698 SW 328th St	Homestead	305-230-3033	2,000	500
6	7.9	N	Black Point Marina	24775 SW 87 Ave	Cutler Bay	305-258-4092	2,613	871
6	7.8	N	Black Point Park	24775 SW 87th Ave	Cutler Bay	305-258-4092	4,000	1,333
6	12.7	NNW	Larry & Penny Thompson Memorial Park[(a)]	12451 SW 184th St	Miami	305-232-1049	1,360	920
6	9.6	NNW	South Miami-Dade Cultural Arts Center	10950 SW 211 St	Cutler Bay	786-573-5317	1,250	313
6	10.7	NNW	Southland Mall	20505 South Dixie Hwy	Miami	305-235-8880	3,825	1,275
7	10.7	NW	Camp Owaissa Bauer[(a)]	17001 SW 264 St	Miami	305-247-6016	150	6
7	8.7	NW	Coral Castle Museum	28655 S Dixie Hwy	Homestead	305-248-6344	50	20
8	8.9	WNW	Harris Field	1034 NE 8th St	Homestead	305-248-5189	591	197
8	5.8	WNW	Homestead Sports Complex	1601 SE 28th Ave	Homestead	305-773-7987	1,000	333
8	7.2	WNW	Keys Gate Golf Club	2300 Palm Dr	Homestead	305-230-0362	100	40
8	8.9	W	Prime Outlets of Florida City	250 East Palm Dr	Florida City	305-248-4736	3,715	1,229
						Miami-Dade County Subtotal:	*21,054*	*7,107*
MONROE COUNTY, FL								
10	8.4	SSE	Ocean Reef Club Marina	35 Ocean Reef Dr	Key Largo	305-367-2611	See note (b)	
						Monroe County Subtotal:	See note (b)	
						EPZ TOTAL:	**21,054**	**7,107**

(a) Based on discussions with Miami-Dade County emergency management officials, Camp Owaissa Bauer and Larry & Penny Thompson Memorial Park will be evacuated in the event of an incident at Turkey Point because they are close to the EPZ boundary. Larry & Penny Thompson Park and Camp Owaissa Bauer were included in areas 6 and 7, respectively, for the ETE analysis.
(b) As discussed in Section 3.3, the transients at this facility have been included with the Ocean Reef Community transient population provided in Table E-5.

Table E-5. Lodging Facilities within the EPZ

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Transients	Vehicles
MIAMI-DADE COUNTY, FL								
6	10.8	N	Best Western Floridian Hotel	10775 Caribbean Blvd	Miami	305-253-9960	600	150
6	10.8	N	Howard Johnson Plaza (Floridian Hotel Cutler Ridge)	10779 Caribbean Blvd	Cutler Bay	305-253-9960	370	128
6	9.9	NNW	Kent Motel	22345 S Dixie Hwy	Miami	305-258-2114	48	12
6	10.9	NNW	La Quinta Inn	10821 Caribbean Blvd	Cutler Bay	305-278-0001	412	103
7	8.8	NW	America's Best Inn & Suites (Royal Tern Motel)	26476 S Dixie Hwy	Homestead	305-258-3034	57	20
7	8.7	NW	Budget Express	27707 S Dixie Hwy	Naranja	305-245-4330	217	108
7	8.7	NW	Deluxe Inn Motel	28475 S Dixie Hwy	Homestead	305-248-5622	44	15
8	9.0	WNW	A-1 Budget Motel	30600 S Dixie Hwy	Homestead	305-247-7032	49	17
8	9.5	WNW	Anhinga Motel	250 S Krome Ave	Homestead	305-247-3590	99	34
8	9.1	W	Best Western Gateway to the Keys	411 S Krome Ave	Florida City	305-246-5100	281	97
8	9.3	WNW	Budget Host (Roadway Inn)	815 N Krome Ave	Florida City	305-248-2741	90	45
8	9.7	WNW	Caribe Motel	841 N Krome Ave	Homestead	305-247-2442	103	34
8	8.9	W	Comfort Inn Florida City Hotel	333 SE First Ave	Florida City	305-248-4009	372	124
8	9.3	WNW	Coral Roc Motel	1100 N Krome Ave	Florida City	305-246-2888	30	10
8	9.7	WNW	Country Lodge	651 N Krome Ave	Florida City	305-245-2376	89	31
8	9.2	WNW	Days Inn	51 S Homestead Blvd	Homestead	305-245-1260	187	94
8	9.1	WNW	Econo Lodge	553 NE First Ave	Florida City	305-248-9300	104	36
8	9.4	WNW	Everglades Motel	605 S Krome Ave	Homestead	305-247-4117	25	8
8	9.0	W	Fairway Inn	100 SE 1st Ave	Florida City	305-248-4202	394	136
8	9.0	WNW	Floridian Hotel of Homestead	990 N Homestead Blvd	Homestead	305-247-7020	345	119
8	9.6	WNW	Green Stone Motel	304 N Krome Ave	Homestead	305-247-8334	62	21
8	8.9	W	Holiday Inn Express	35200 S Dixie Hwy	Florida City	305-247-3414	200	100
8	9.3	WNW	Holiday Motel	1405 N Krome Ave	Florida City	305-248-8681	30	15
8	9.1	WNW	Inn at Homestead (Villager Lodge)	1020 N Homestead Blvd	Homestead	305-248-2121	123	43
8	9.2	WNW	Knights Inn Florida City–Hotel (Sea Glades Hotel)	1223 NE First Ave	Florida City	305-247-6633	70	35
8	9.4	WNW	Park Motel	600 S Krome Ave	Homestead	305-247-6731	52	18
8	9.0	W	Ramada Inn Florida City (Hampton Inn)	124 East Palm Dr	Florida City	305-247-8833	394	98
8	9.4	WNW	Redland Hotel	5 S Flagler Ave	Homestead	305-246-1904	22	11

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Transients	Vehicles
8	9.3	WNW	Super 8-Florida City (Bel Air Motel)	1202 N Krome Ave	Florida City	305-245-0311	104	26
8	9.8	WNW	Tradewinds Motel	846 N Krome Ave	Homestead	305-247-5050	21	11
8	8.9	W	Travelodge–Florida City	409 SE 1st Ave	Florida City	305-248-9777	264	88
						Miami-Dade County Subtotal:	*5,258*	*1,787*
MONROE COUNTY, FL								
10	8.2	SSE	Ocean Reef Club[(a)]	35 Ocean Reef Dr	Key Largo	305-396-3006	6,763	4,540
						Monroe County Subtotal:	*6,763*	*4,540*
						EPZ TOTAL:	**12,021**	**6,327**

Note: People and vehicles per room varied by hotel. Peak occupancy rates were obtained through direct phone calls to the facilities. An average occupancy rate was used for hotels that did not provide data.

(a) Based on information provided by the director of public safety for the ORC, there are 5,000 residents and 2,800 transients staying at rental homes and lodging facilities at ORC at peak times. There are 1,037 year-round residents at ORC (see Section 3.3). Therefore, there are 6,763 (5,000 + 2,800 – 1,037) non-EPZ residents at ORC at peak times. Vehicle estimates were also provided by the director of public safety.

Table E-6. Correctional Facilities within the EPZ

Area	Distance (miles)	Dire-ction	Facility Name	Street Address	Municipality	Phone	Cap-acity	Census
MIAMI-DADE COUNTY, FL								
9	9.8	WSW	Dade Juvenile Residential Facility	18500 SW 424th St	Florida City	305-247-6492	56	55
						Miami-Dade County Subtotal:	*56*	*55*
						EPZ TOTAL:	**56**	**55**

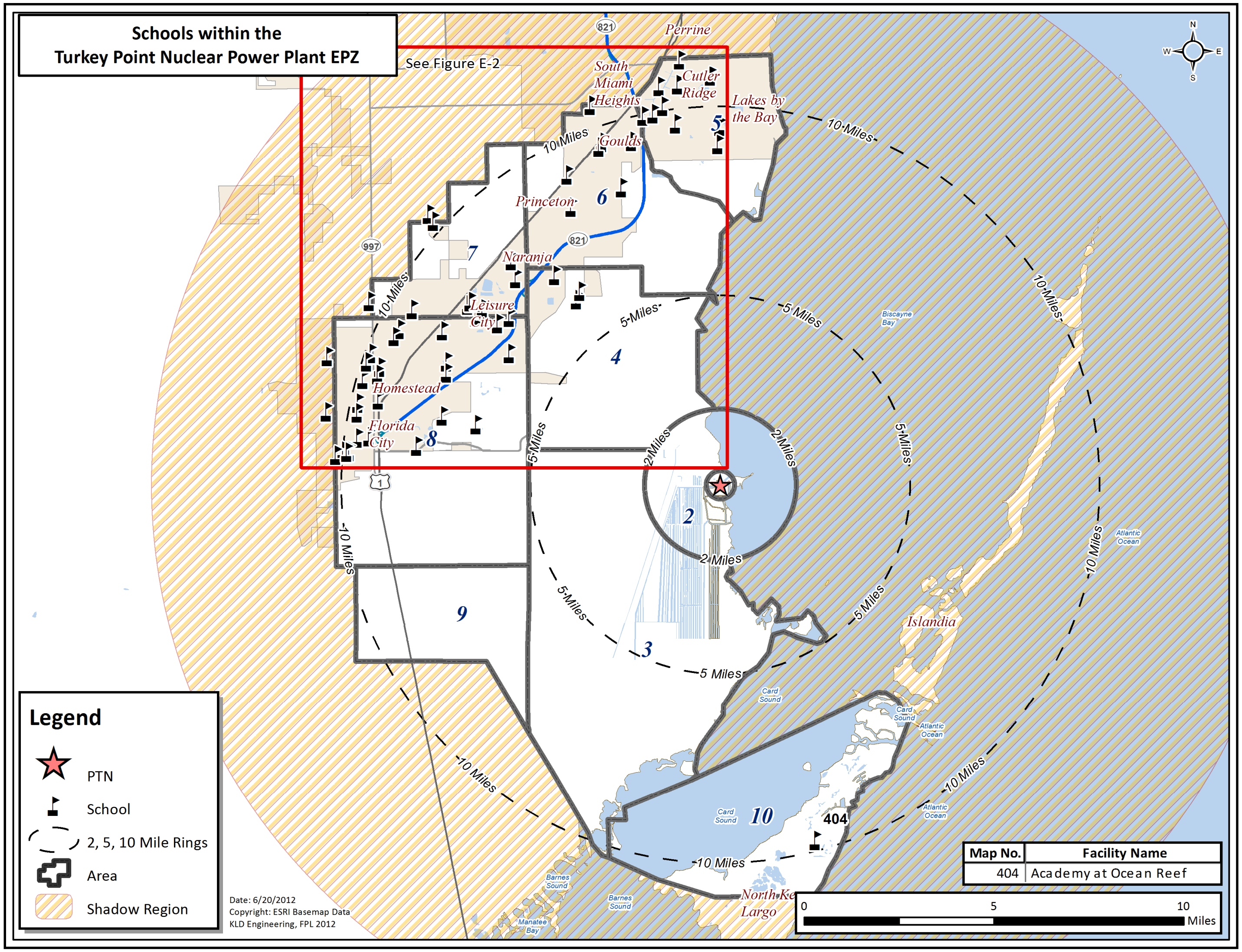
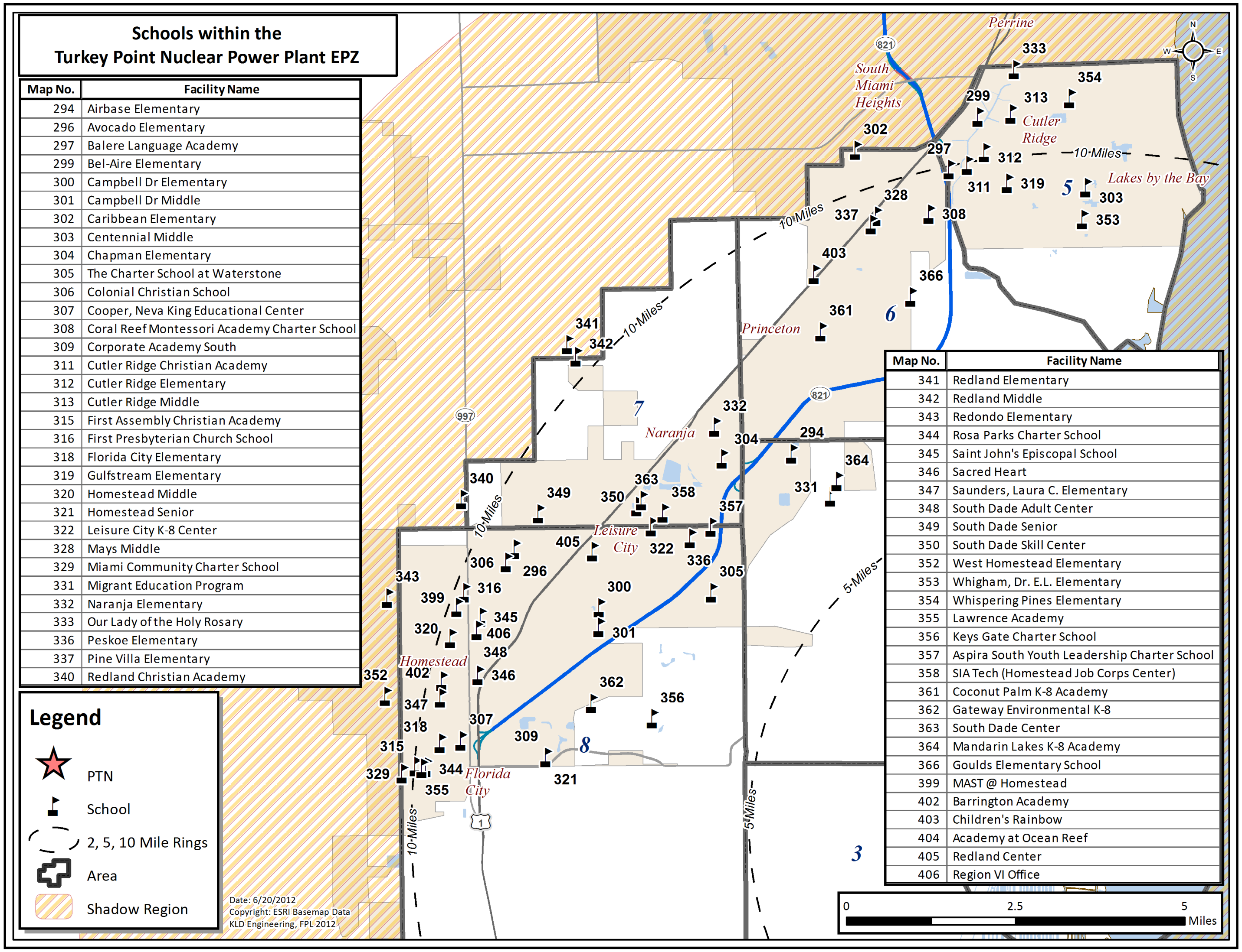


Figure E-1. Schools within the Turkey Point Nuclear Power Plant EPZ



Map No.	Facility Name
294	Airbase Elementary
296	Avocado Elementary
297	Balere Language Academy
299	Bel-Aire Elementary
300	Campbell Dr Elementary
301	Campbell Dr Middle
302	Caribbean Elementary
303	Centennial Middle
304	Chapman Elementary
305	The Charter School at Waterstone
306	Colonial Christian School
307	Cooper, Neva King Educational Center
308	Coral Reef Montessori Academy Charter School
309	Corporate Academy South
311	Cutler Ridge Christian Academy
312	Cutler Ridge Elementary
313	Cutler Ridge Middle
315	First Assembly Christian Academy
316	First Presbyterian Church School
318	Florida City Elementary
319	Gulfstream Elementary
320	Homestead Middle
321	Homestead Senior
322	Leisure City K-8 Center
328	Mays Middle
329	Miami Community Charter School
331	Migrant Education Program
332	Naranja Elementary
333	Our Lady of the Holy Rosary
336	Peskoe Elementary
337	Pine Villa Elementary
340	Redland Christian Academy

Map No.	Facility Name
341	Redland Elementary
342	Redland Middle
343	Redondo Elementary
344	Rosa Parks Charter School
345	Saint John's Episcopal School
346	Sacred Heart
347	Saunders, Laura C. Elementary
348	South Dade Adult Center
349	South Dade Senior
350	South Dade Skill Center
352	West Homestead Elementary
353	Whigham, Dr. E.L. Elementary
354	Whispering Pines Elementary
355	Lawrence Academy
356	Keys Gate Charter School
357	Aspira South Youth Leadership Charter School
358	SIA Tech (Homestead Job Corps Center)
361	Coconut Palm K-8 Academy
362	Gateway Environmental K-8
363	South Dade Center
364	Mandarin Lakes K-8 Academy
366	Goulds Elementary School
399	MAST @ Homestead
402	Barrington Academy
403	Children's Rainbow
404	Academy at Ocean Reef
405	Redland Center
406	Region VI Office

Figure E-2. Schools within the Turkey Point Nuclear Power Plant EPZ

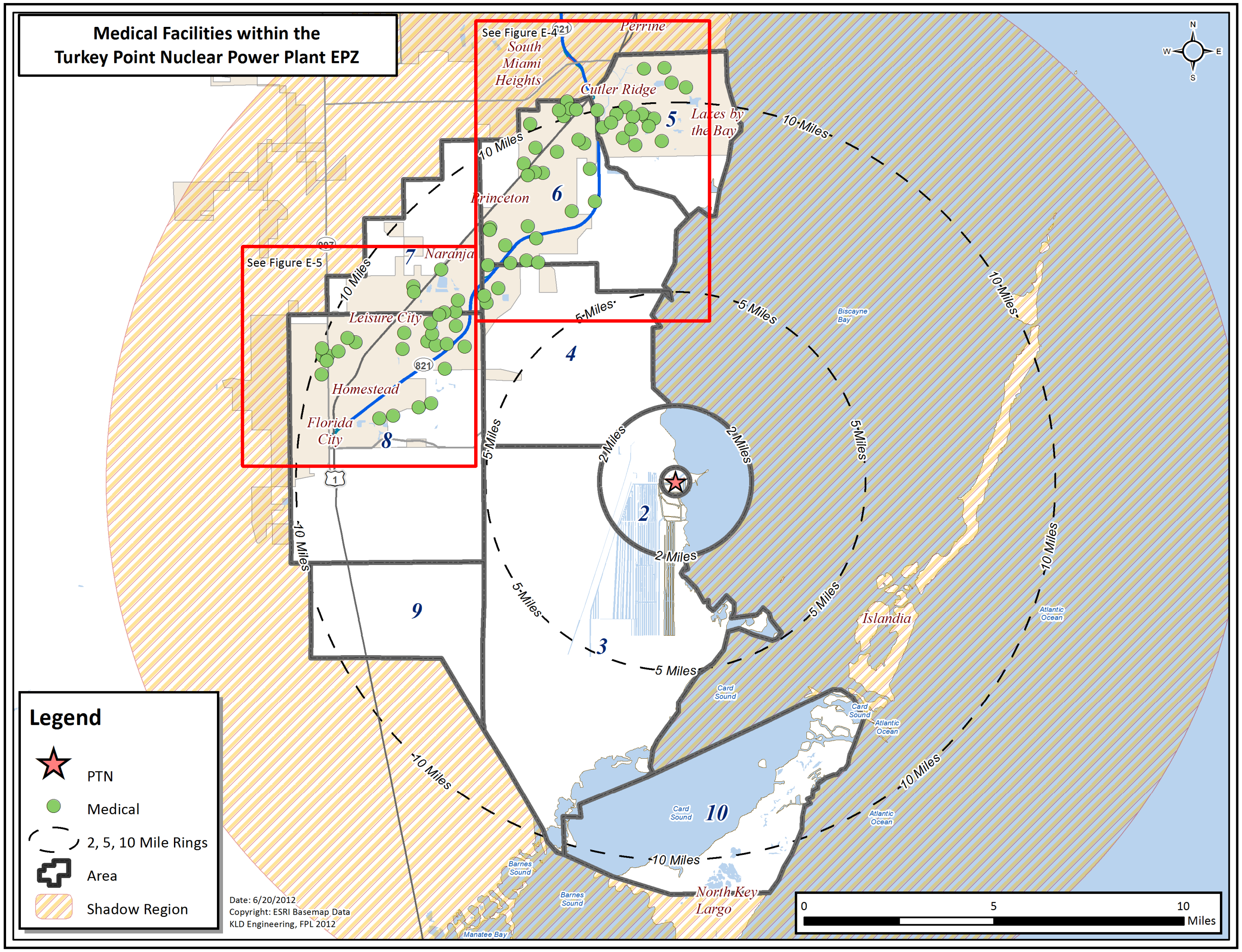
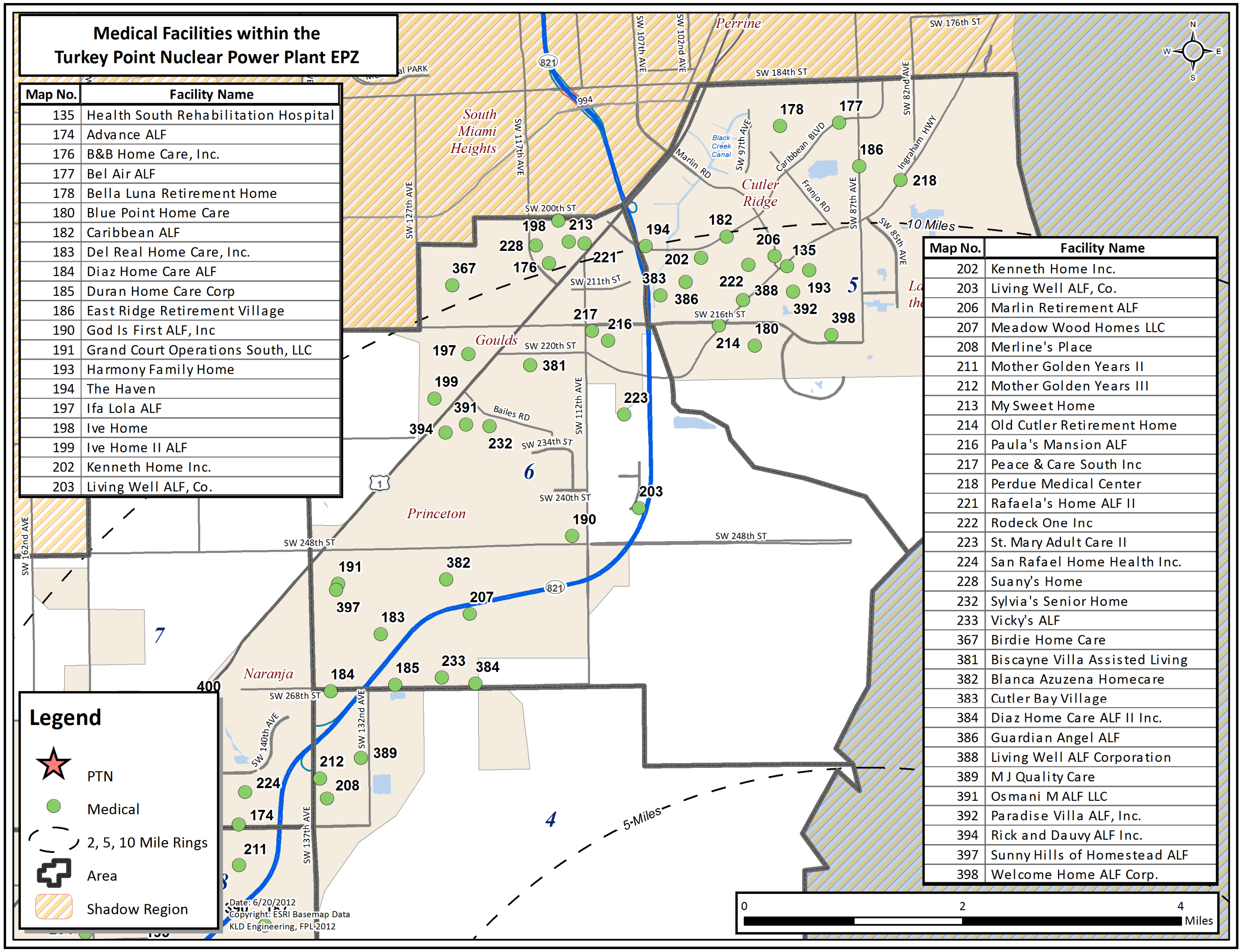


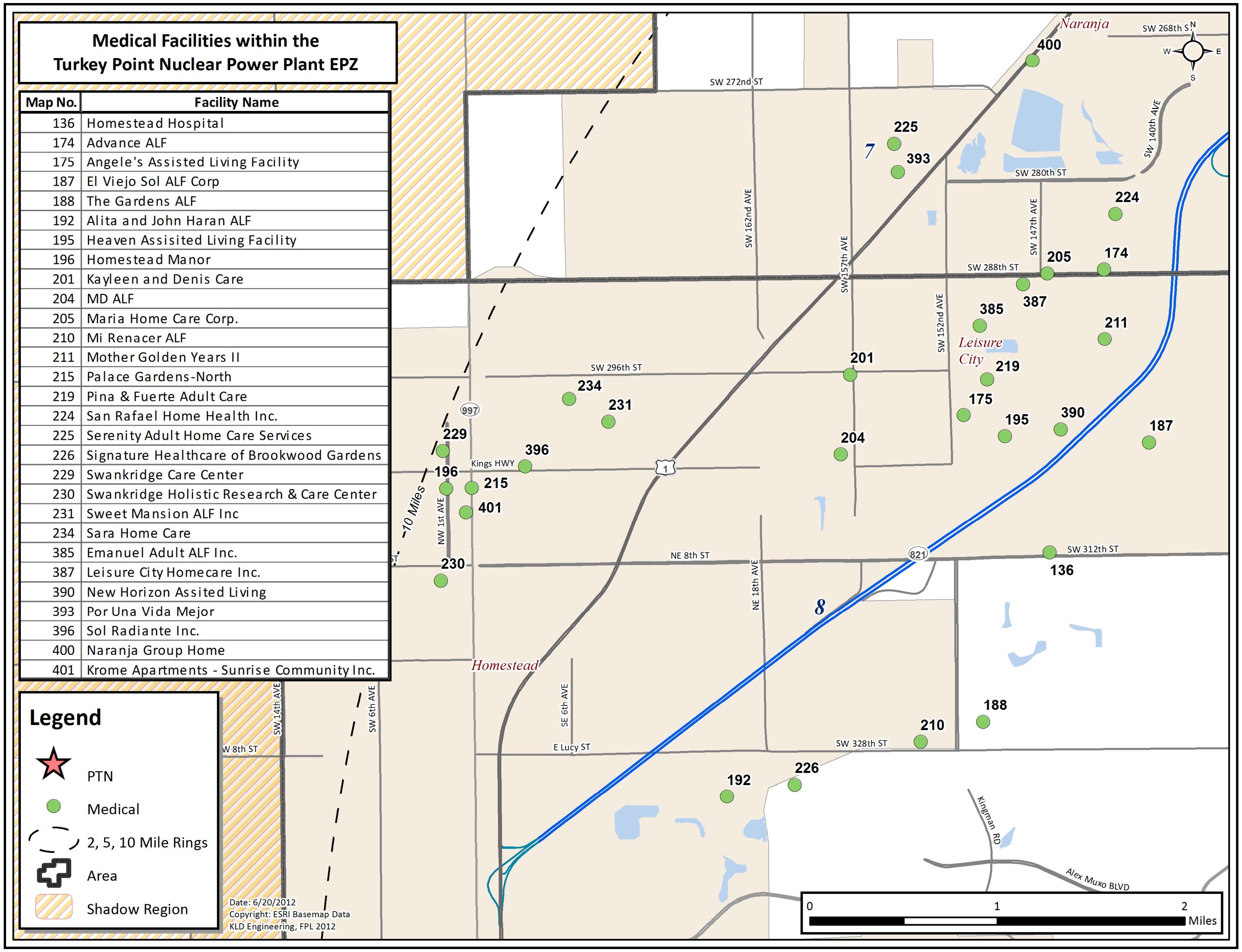
Figure E-3. Medical Facilities within the Turkey Point Nuclear Power Plant EPZ



Map No.	Facility Name
135	Health South Rehabilitation Hospital
174	Advance ALF
176	B&B Home Care, Inc.
177	Bel Air ALF
178	Bella Luna Retirement Home
180	Blue Point Home Care
182	Caribbean ALF
183	Del Real Home Care, Inc.
184	Diaz Home Care ALF
185	Duran Home Care Corp
186	East Ridge Retirement Village
190	God Is First ALF, Inc
191	Grand Court Operations South, LLC
193	Harmony Family Home
194	The Haven
197	Ifa Lola ALF
198	Ive Home
199	Ive Home II ALF
202	Kenneth Home Inc.
203	Living Well ALF, Co.

Map No.	Facility Name
202	Kenneth Home Inc.
203	Living Well ALF, Co.
206	Marlin Retirement ALF
207	Meadow Wood Homes LLC
208	Merline's Place
211	Mother Golden Years II
212	Mother Golden Years III
213	My Sweet Home
214	Old Cutler Retirement Home
216	Paula's Mansion ALF
217	Peace & Care South Inc
218	Perdue Medical Center
221	Rafaela's Home ALF II
222	Rodeck One Inc
223	St. Mary Adult Care II
224	San Rafael Home Health Inc.
228	Suany's Home
232	Sylvia's Senior Home
233	Vicky's ALF
367	Birdie Home Care
381	Biscayne Villa Assisted Living
382	Blanca Azuzena Homecare
383	Cutler Bay Village
384	Diaz Home Care ALF II Inc.
386	Guardian Angel ALF
388	Living Well ALF Corporation
389	M J Quality Care
391	Osmani M ALF LLC
392	Paradise Villa ALF, Inc.
394	Rick and Dauvy ALF Inc.
397	Sunny Hills of Homestead ALF
398	Welcome Home ALF Corp.

Figure E-4. Medical Facilities within the Turkey Point Nuclear Power Plant EPZ



Map No.	Facility Name
136	Homestead Hospital
174	Advance ALF
175	Angele's Assisted Living Facility
187	El Viejo Sol ALF Corp
188	The Gardens ALF
192	Alita and John Haran ALF
195	Heaven Assisited Living Facility
196	Homestead Manor
201	Kayleen and Denis Care
204	MD ALF
205	Maria Home Care Corp.
210	Mi Renacer ALF
211	Mother Golden Years II
215	Palace Gardens-North
219	Pina & Fuerte Adult Care
224	San Rafael Home Health Inc.
225	Serenity Adult Home Care Services
226	Signature Healthcare of Brookwood Gardens
229	Swankridge Care Center
230	Swankridge Holistic Research & Care Center
231	Sweet Mansion ALF Inc
234	Sara Home Care
385	Emanuel Adult ALF Inc.
387	Leisure City Homecare Inc.
390	New Horizon Assited Living
393	Por Una Vida Mejor
396	Sol Radiante Inc.
400	Naranja Group Home
401	Krome Apartments - Sunrise Community Inc.

Figure E-5. Medical Facilities within the Turkey Point Nuclear Power Plant EPZ

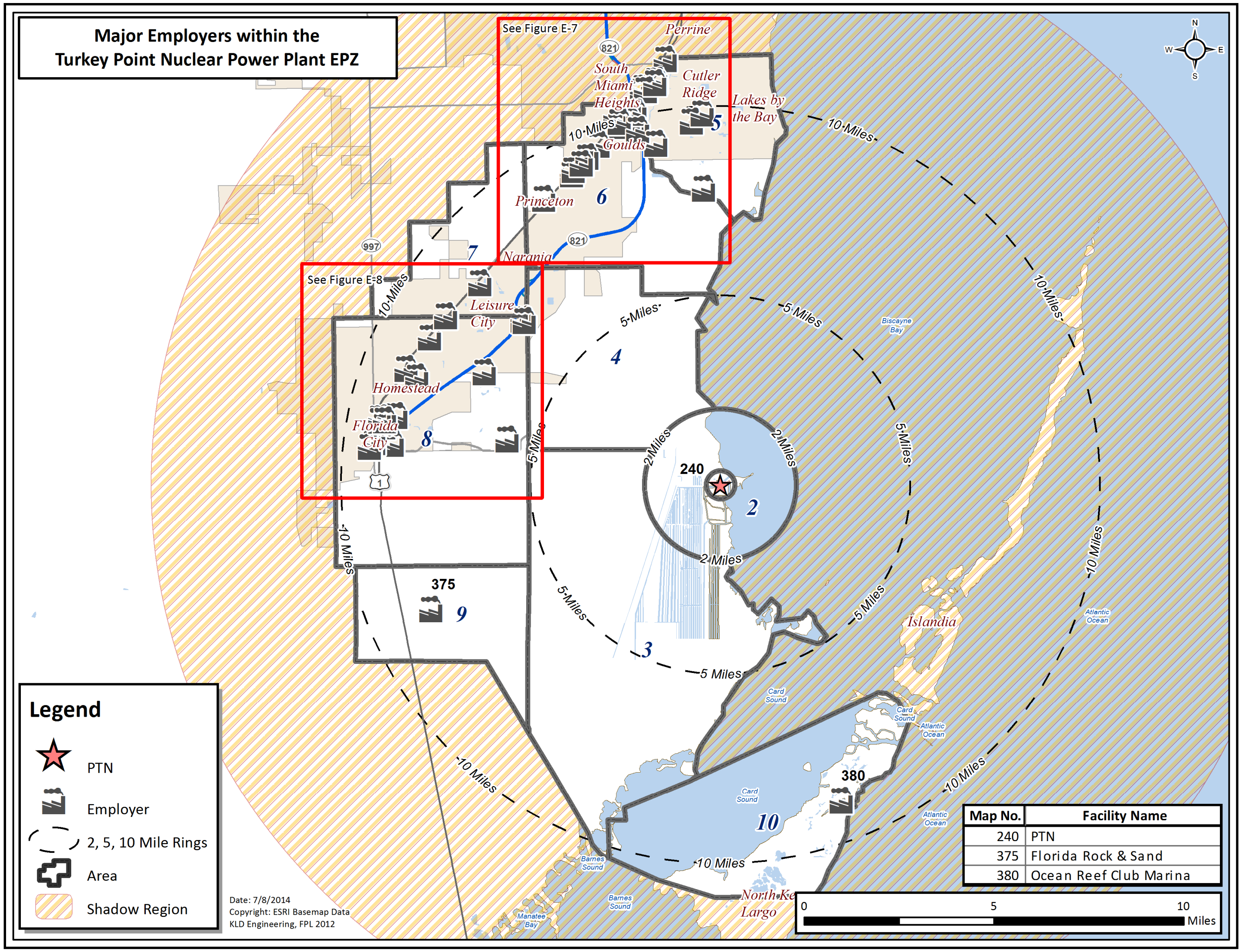


Figure E-6. Major Employers within the Turkey Point Nuclear Power Plant EPZ

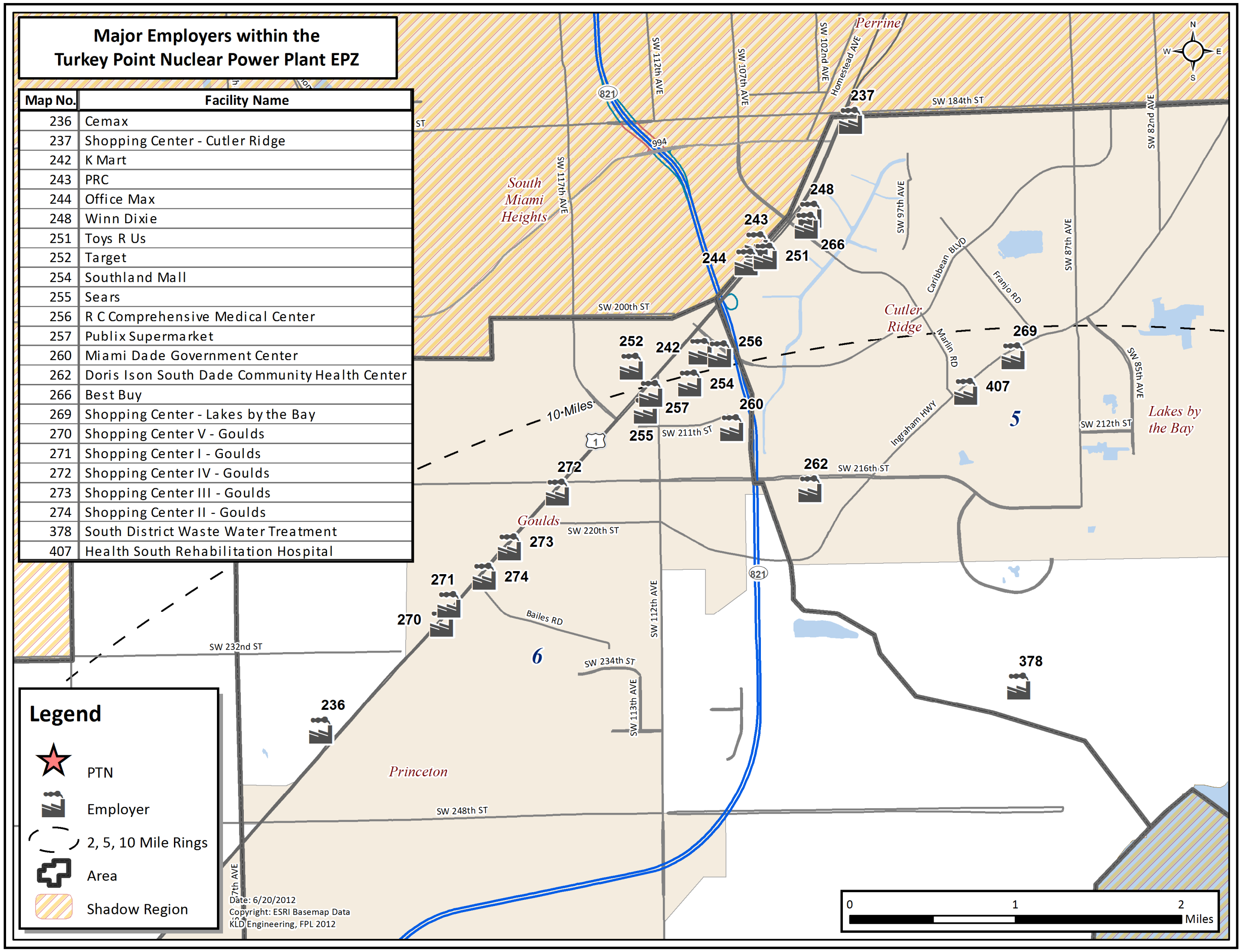
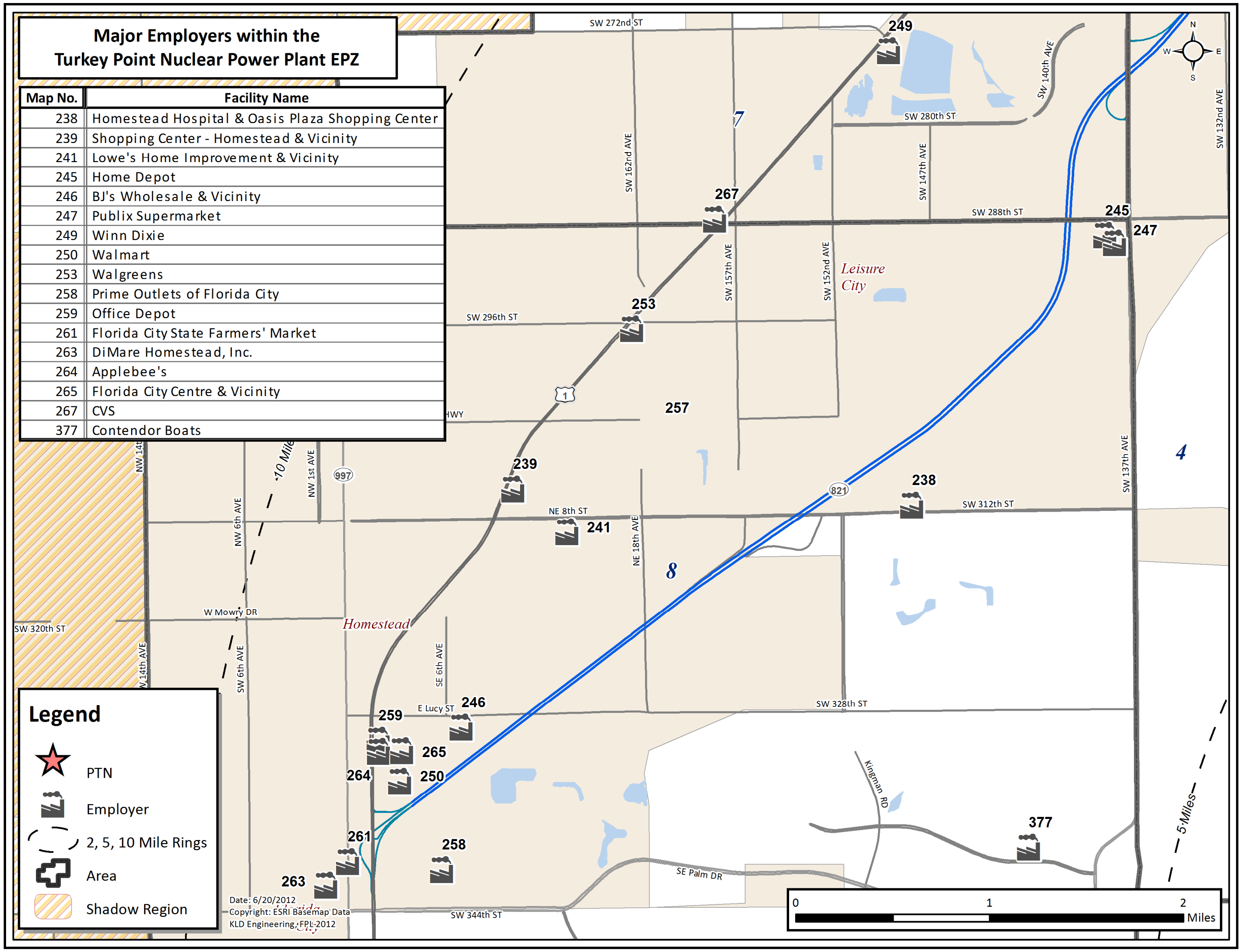


Figure E-7. Major Employers within the Turkey Point Nuclear Power Plant EPZ



Map No.	Facility Name
238	Homestead Hospital & Oasis Plaza Shopping Center
239	Shopping Center - Homestead & Vicinity
241	Lowe's Home Improvement & Vicinity
245	Home Depot
246	BJ's Wholesale & Vicinity
247	Publix Supermarket
249	Winn Dixie
250	Walmart
253	Walgreens
258	Prime Outlets of Florida City
259	Office Depot
261	Florida City State Farmers' Market
263	DiMare Homestead, Inc.
264	Applebee's
265	Florida City Centre & Vicinity
267	CVS
377	Contendor Boats

Figure E-8. Major Employers within the Turkey Point Nuclear Power Plant EPZ

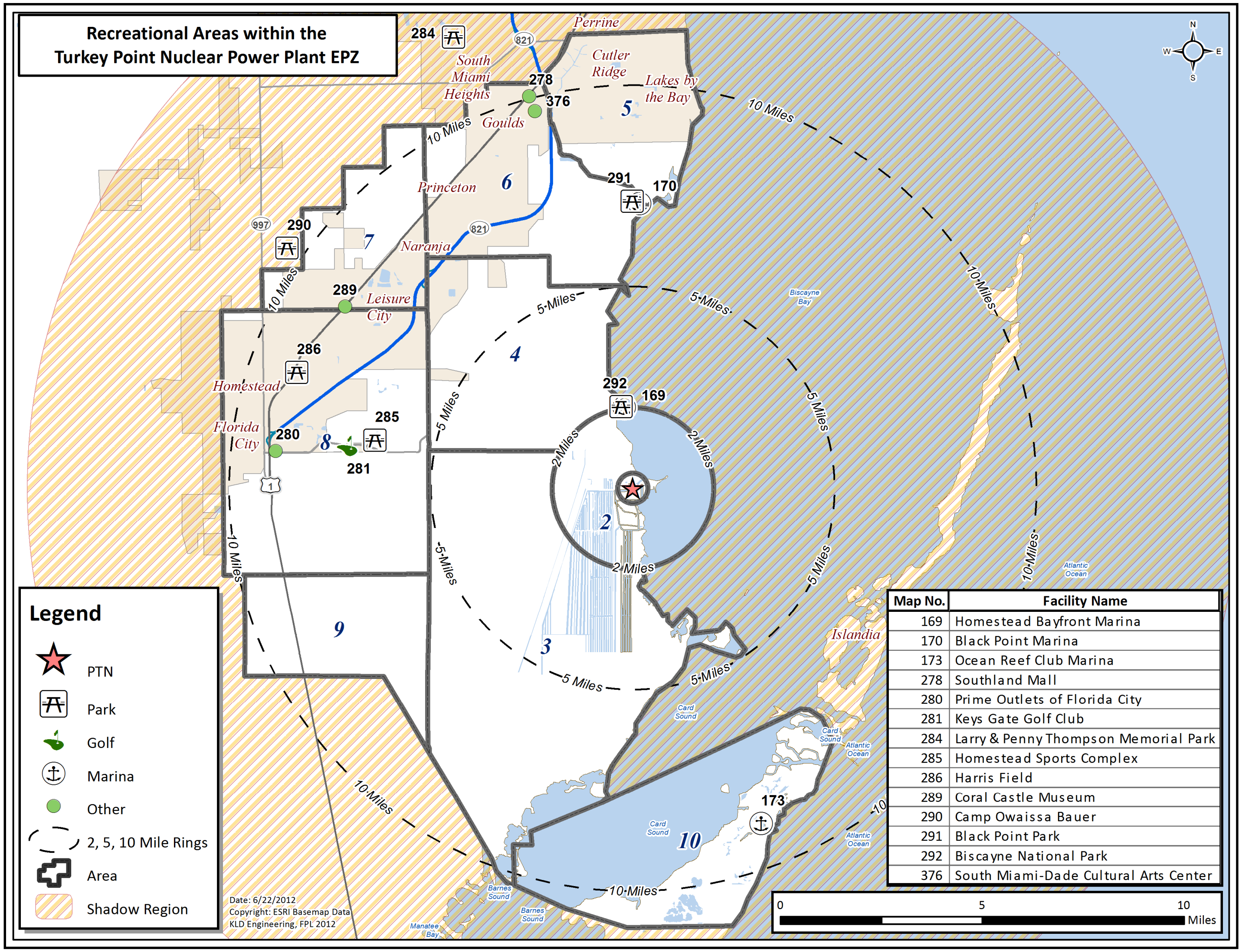
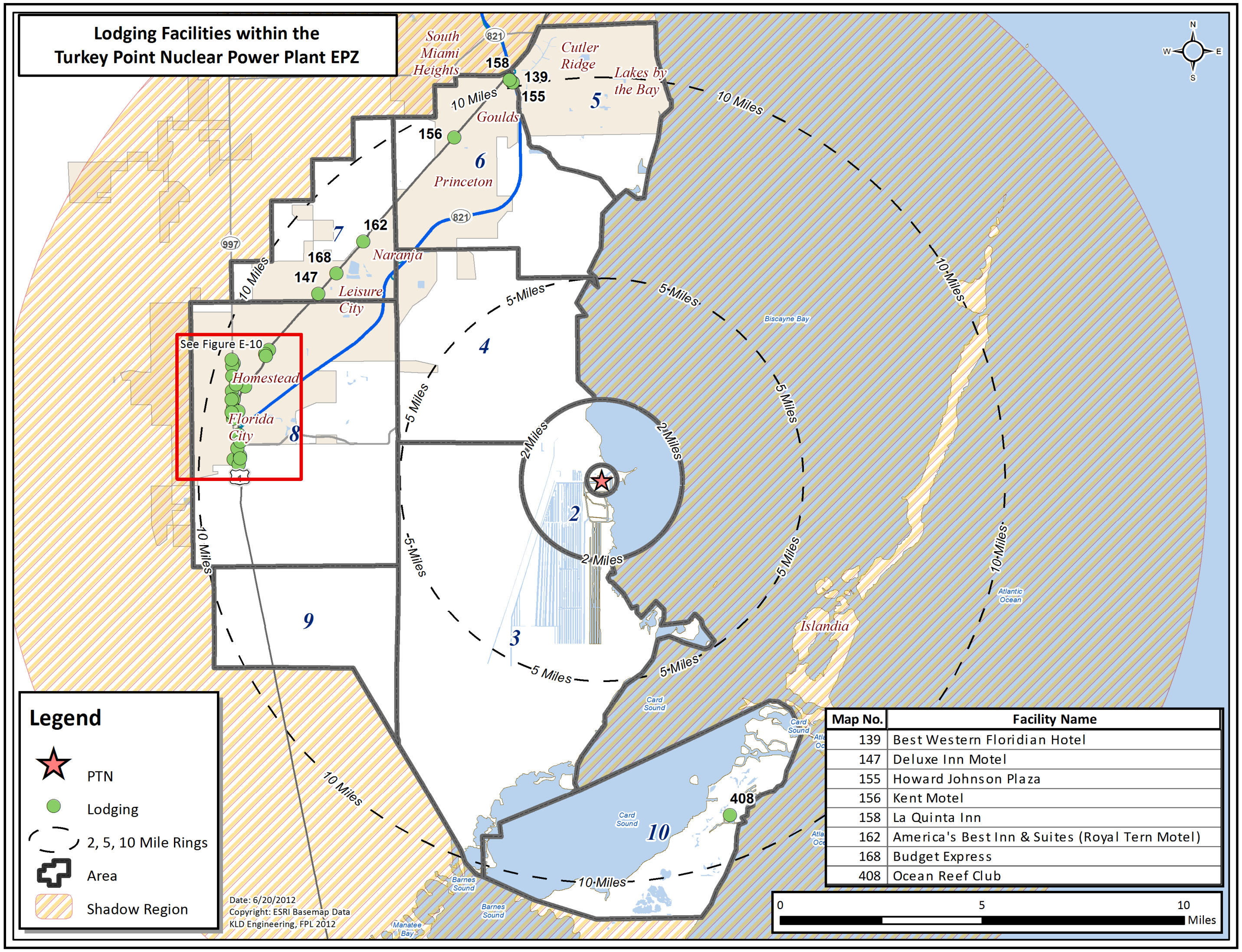
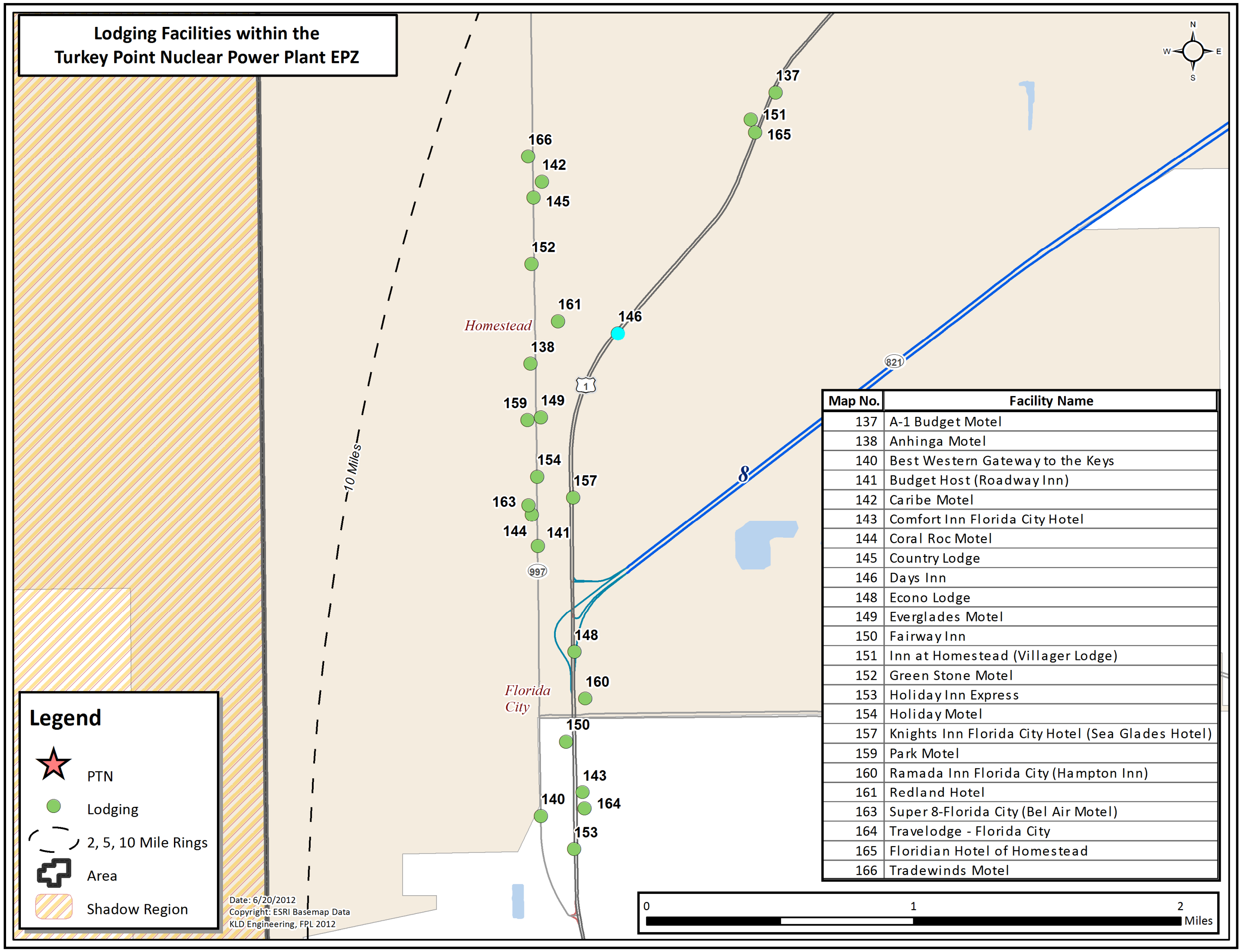


Figure E-9. Recreational Areas within the Turkey Point Nuclear Power Plant EPZ



Map No.	Facility Name
139	Best Western Floridian Hotel
147	Deluxe Inn Motel
155	Howard Johnson Plaza
156	Kent Motel
158	La Quinta Inn
162	America's Best Inn & Suites (Royal Tern Motel)
168	Budget Express
408	Ocean Reef Club

Figure E-10. Lodging Facilities within the Turkey Point Nuclear Power Plant EPZ



Map No.	Facility Name
137	A-1 Budget Motel
138	Anhinga Motel
140	Best Western Gateway to the Keys
141	Budget Host (Roadway Inn)
142	Caribe Motel
143	Comfort Inn Florida City Hotel
144	Coral Roc Motel
145	Country Lodge
146	Days Inn
148	Econo Lodge
149	Everglades Motel
150	Fairway Inn
151	Inn at Homestead (Villager Lodge)
152	Green Stone Motel
153	Holiday Inn Express
154	Holiday Motel
157	Knights Inn Florida City Hotel (Sea Glades Hotel)
159	Park Motel
160	Ramada Inn Florida City (Hampton Inn)
161	Redland Hotel
163	Super 8-Florida City (Bel Air Motel)
164	Travelodge - Florida City
165	Floridian Hotel of Homestead
166	Tradewinds Motel

Figure E-11. Lodging Facilities within the Turkey Point Nuclear Power Plant EPZ

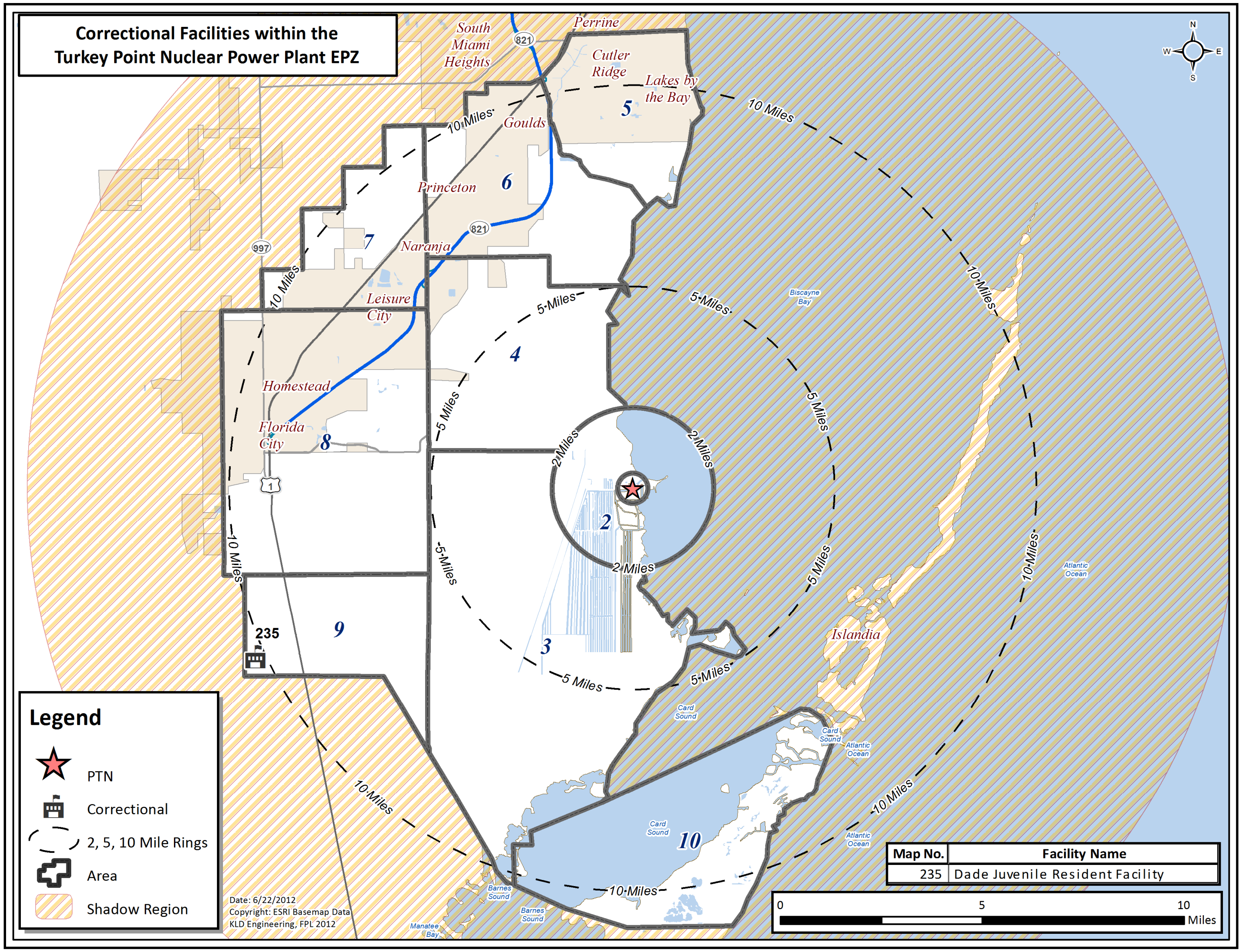


Figure E-12. Correctional Facilities with the Turkey Point Nuclear Power Plant EPZ

APPENDIX F

Telephone Survey

F. TELEPHONE SURVEY

F.1 Introduction

The development of ETE for the Turkey Point Nuclear Power Plant requires the identification of travel patterns, car ownership and household size of the population within the EPZ. Demographic information can be obtained from census data. The use of this data has several limitations when applied to emergency planning. First, the census data do not encompass the range of information needed to identify the time required for preliminary activities (mobilization) that must be undertaken prior to evacuating the area. Secondly, Census data do not contain attitudinal responses needed from the population of the EPZ and consequently may not accurately represent the anticipated behavioral characteristics of the evacuating populace.

These concerns are addressed by conducting a telephone survey of a representative sample of the EPZ population. The survey is designed to elicit information from the public concerning family demographics and estimates of response times to well defined events. The design of the survey includes a limited number of questions of the form “What would you do if …?” and other questions regarding activities with which the respondent is familiar (“How long does it take you to …?”)

F.2 Survey Instrument and Sampling Plan

Attachment A presents the final survey instrument used in this study. A draft of the instrument was submitted to stakeholders for comment. Comments were received and the survey instrument was modified accordingly, prior to conducting the survey.

Following the completion of the instrument, a sampling plan was developed. A sample size of approximately 550 **completed** survey forms yields results with a sampling error of ±4.15% at the 95% confidence level. The sample must be drawn from the EPZ population. Consequently, a list of zip codes in the EPZ was developed using GIS software. This list is shown in Table F-1. Along with each zip code, an estimate of the population and number of households in each area was determined by overlaying Census data and the EPZ boundary, again using GIS software. The proportional number of desired completed survey interviews for each area was identified, as shown in Table F-1.

The completed survey adhered to the sampling plan.

The survey discussed herein was performed in 2009 for the preparation of the Turkey Point Nuclear Power Plant Units 6 & 7 combined license application effort. The EPZ population has increased by about 4 percent (an estimated 7,841 people) between 2009, when the survey was conducted, and the 2010 Census. During this timeframe, the nature of the EPZ and the population demographics have not significantly changed. It consists primarily of farmland to the west and suburban housing in the remainder of the EPZ. Consequently, the use of 2009 telephone survey results can be justified on this basis.

F.3 Survey Results

The results of the survey fall into two categories. First, the household demographics of the area can be identified. Demographic information includes such factors as household size, automobile ownership, and automobile availability. The distributions of the time to perform certain pre-evacuation activities are the second category of survey results. These data are processed to develop the trip generation distributions used in the evacuation modeling effort, as discussed in Section 5.

A review of the survey instrument reveals that several questions have a “don’t know” (DK) or “refused” entry for a response. It is accepted practice in conducting surveys of this type to accept the answers of a respondent who offers a DK response for a few questions or who refuses to answer a few questions. To address the issue of occasional DK/refused responses from a large sample, the practice is to assume that the distribution of these responses is the same as the underlying distribution of the positive responses. In effect, the DK/refused responses are ignored and the distributions are based upon the positive data that is acquired.

F.3.1 Household Demographic Results

Household Size

Figure F-1 presents the distribution of household size within the EPZ. The average household contains 3.13 people. The estimated household size (3.25 persons) used to determine the survey sample (Table F-1) was drawn from Census data. The agreement (within the sampling error range) between the average household size obtained from the survey and from the Census is an indication of the reliability of the survey.

Automobile Ownership

The average number of automobiles available per household in the EPZ is 1.89. It should be noted that approximately 7 percent of households do not own or have access to an automobile. The distribution of automobile ownership is presented in Figure F-2. Figure F-3 and Figure F-4 present the automobile availability by household size. Note that the majority of households without access to a car are single person households.

Commuters

Figure F-5 presents the distribution of the number of commuters in each household. Commuters are defined as household members who travel to work or college on a daily basis. The data shows an average of 1.19 commuters in each household in the EPZ, and 68% of households have at least one commuter.

Commuter Travel Modes

Figure F-6 presents the mode of travel that commuters use on a daily basis. The vast majority of commuters use their private automobiles to travel to work. The data shows an average of 1.09 employees per vehicle, assuming 2 people per vehicle – on average – for carpools.

F.3.2 Evacuation Response

Several questions were asked to gauge the population's response to an emergency. These are now discussed:

"How many of the vehicles would your household use during an evacuation?" The response is shown in Figure F-7. On average, evacuating households would use 1.37 vehicles.

"Would your family await the return of other family members prior to evacuating the area?" Of the survey participants who responded, 71 percent said they would await the return of other family members before evacuating and 29 percent indicated that they would not await the return of other family members.

"If you had a household pet, would you take your pet with you if you were asked to evacuate the area?" Based on responses from the survey, 65 percent of households do have a family pet.

Of the households with pets, 75 percent of them indicated that they would take their pets, as shown in Figure F-8.

F.3.3 Time Distribution Results

The survey asked several questions about the amount of time it takes to perform certain pre-evacuation activities. These activities involve actions taken by residents during the course of their day-to-day lives. Thus, the answers fall within the realm of the responder's experience.

The mobilization distributions provided below are the result of having applied the analysis described in Section 5.4.1 on the component activities of the mobilization.

"How long does it take the commuter to complete preparation for leaving work?" Figure F-9 presents the cumulative distribution; in all cases, the activity is completed by 105 minutes. About eighty percent can leave within 35 minutes.

"How long would it take the commuter to travel home?" Figure F-10 presents the work to home travel time for the EPZ. About 80 percent of commuters can arrive home within 45 minutes of leaving work; all within 120 minutes.

"How long would it take the family to pack clothing, secure the house, and load the car?" Figure F-11 presents the time required to prepare for leaving on an evacuation trip. In many ways this activity mimics a family's preparation for a short holiday or weekend away from home. Hence, the responses represent the experience of the responder in performing similar activities.

The distribution shown in Figure F-11 has a long "tail." About 90 percent of households can be ready to leave home within 180 minutes; the remaining households require up to an additional three hours.

F.4 Conclusions

The telephone survey provides valuable, relevant data associated with the EPZ population, which have been used to quantify demographics specific to the EPZ, and "mobilization time" which can influence evacuation time estimates.

Table F-1. Turkey Point Telephone Survey Sampling Plan

Zip Code	Population within EPZ (2000)	Households	Required Sample
33030	21,955	6,518	83
33031	1,574	519	7
33032	19,520	5,488	70
33033	32,224	9,485	120
33034	9,900	3,001	38
33035	2,763	1,091	14
33037	932	511	6
33039	446	13	1
33157	13,378	4,679	59
33170	5,667	1,607	20
33177	6,265	1,643	21
33189	22,051	7,392	94
33190	3,993	1,356	17
Total	140,668	43,303	550
		Average Household Size:	3.25
		Total Sample Required:	550

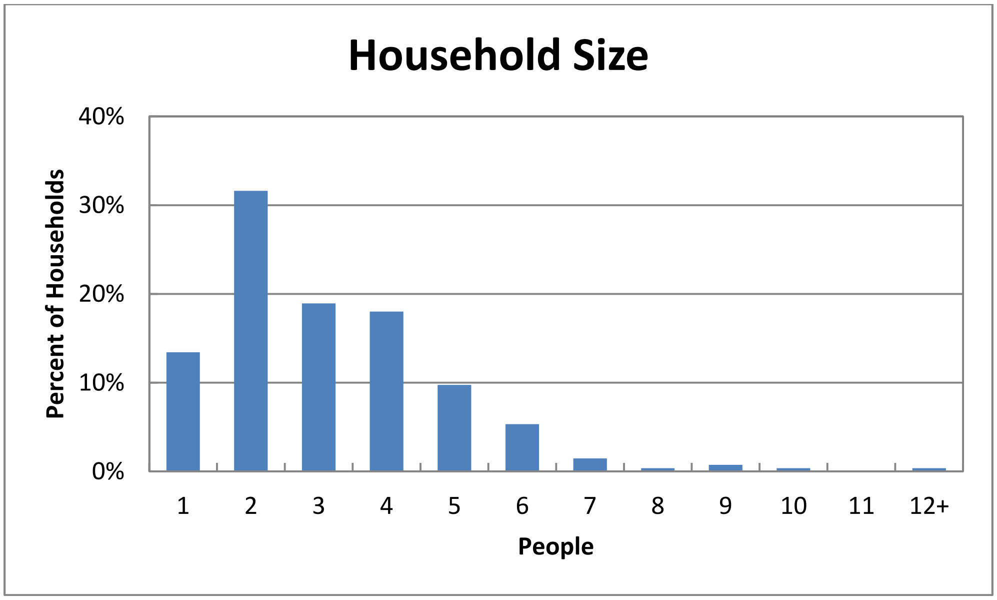


Figure F-1. Household Size in the EPZ

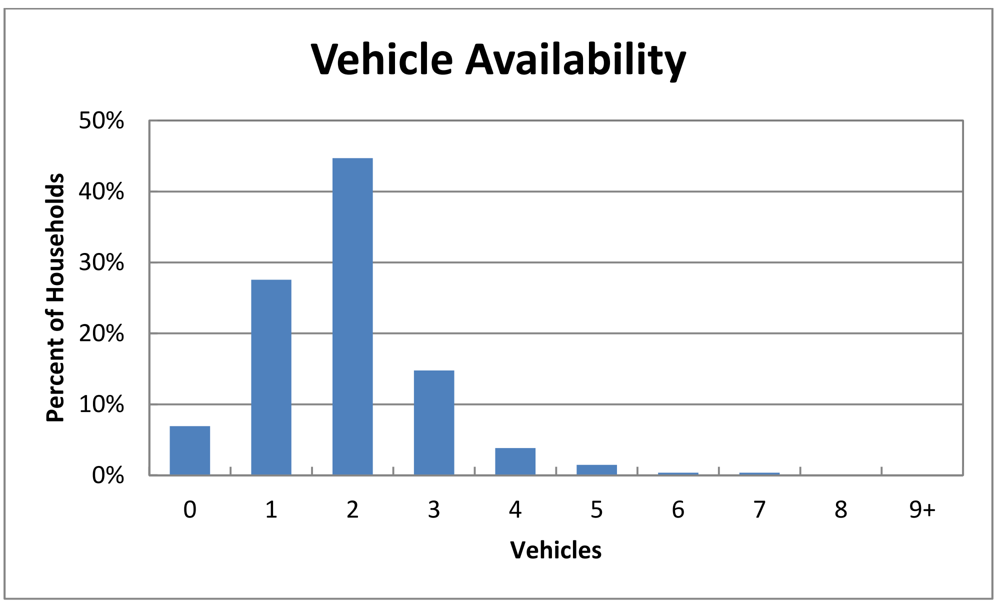


Figure F-2. Household Vehicle Availability

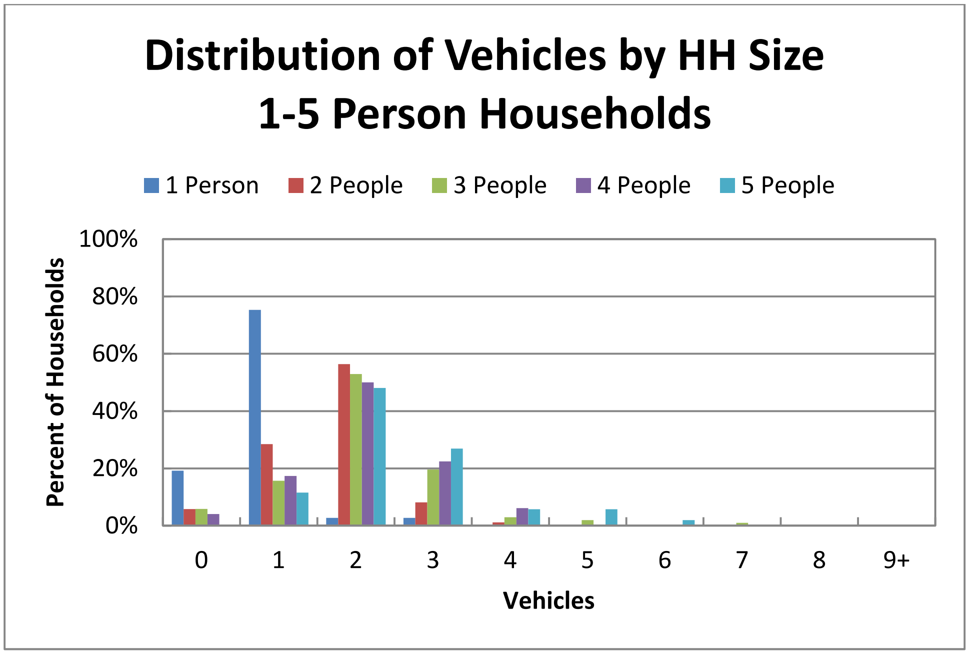


Figure F-3. Vehicle Availability - 1 to 5 Person Household

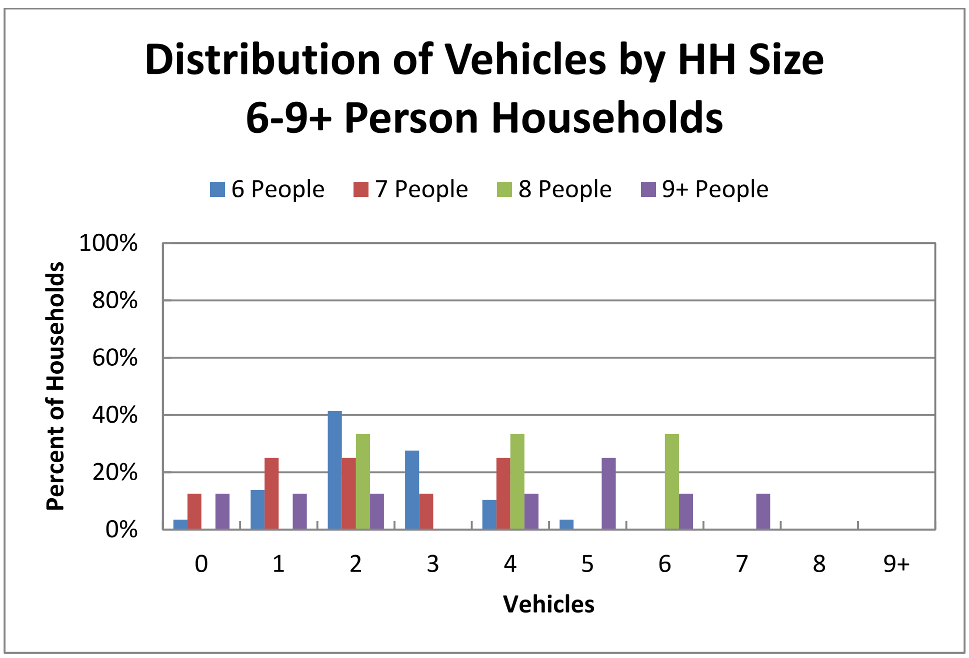


Figure F-4. Vehicle Availability - 6 to 9+ Person Household

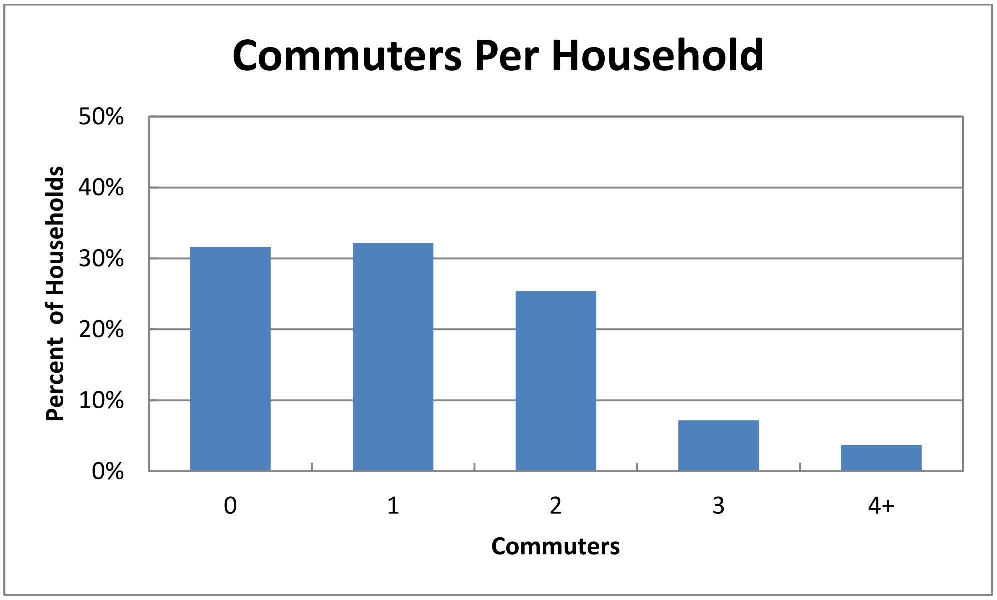


Figure F-5. Commuters in Households in the EPZ

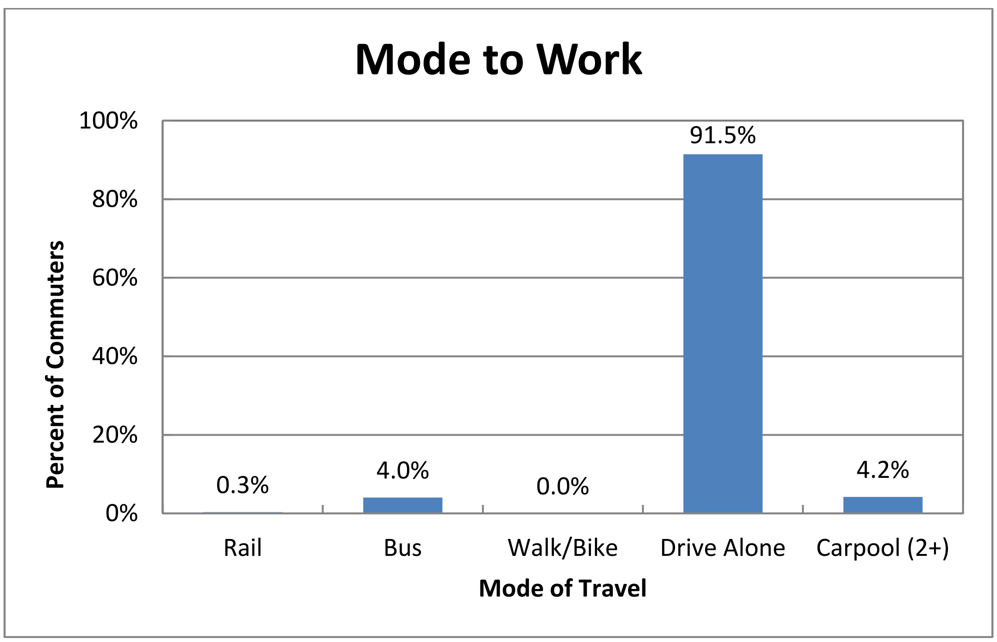


Figure F-6. Modes of Travel in the EPZ

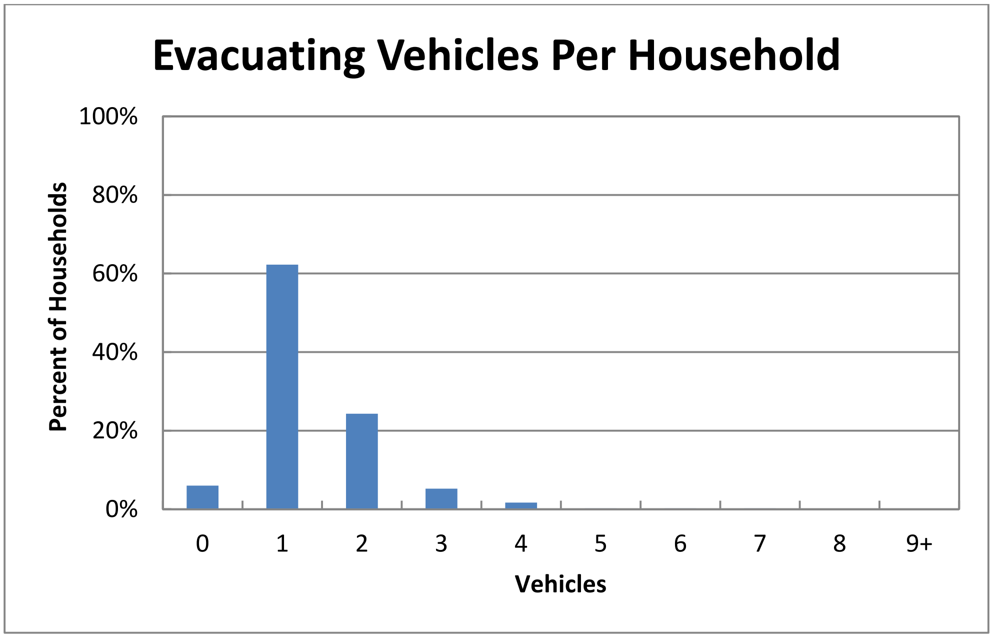


Figure F-7. Number of Vehicles Used for Evacuation

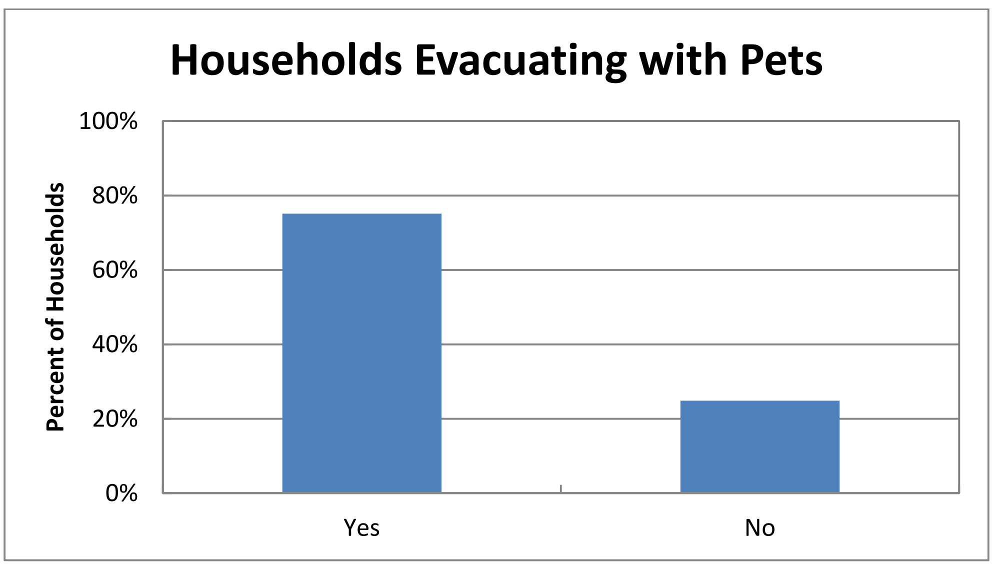


Figure F-8. Households Evacuating with Pets

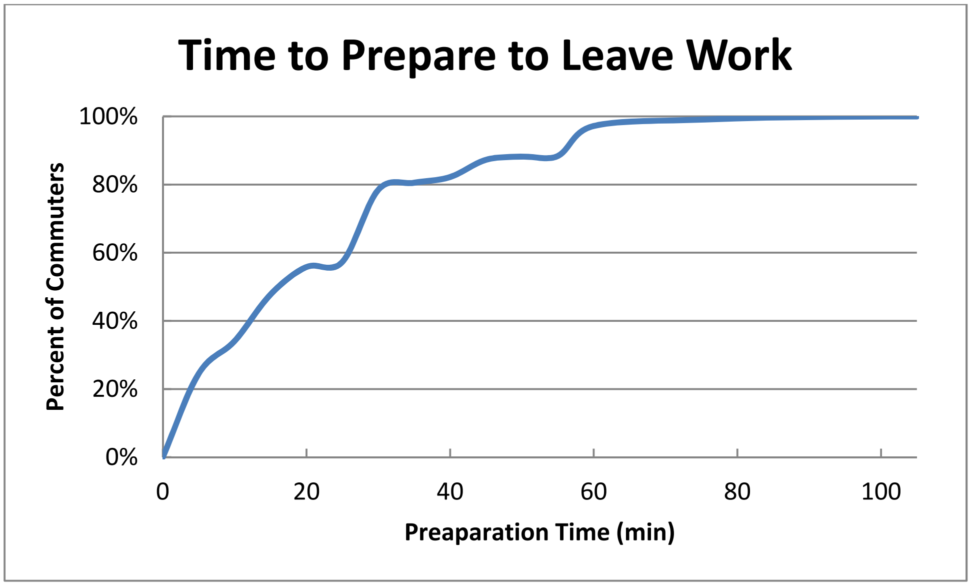


Figure F-9. Time Required to Prepare to Leave Work/School

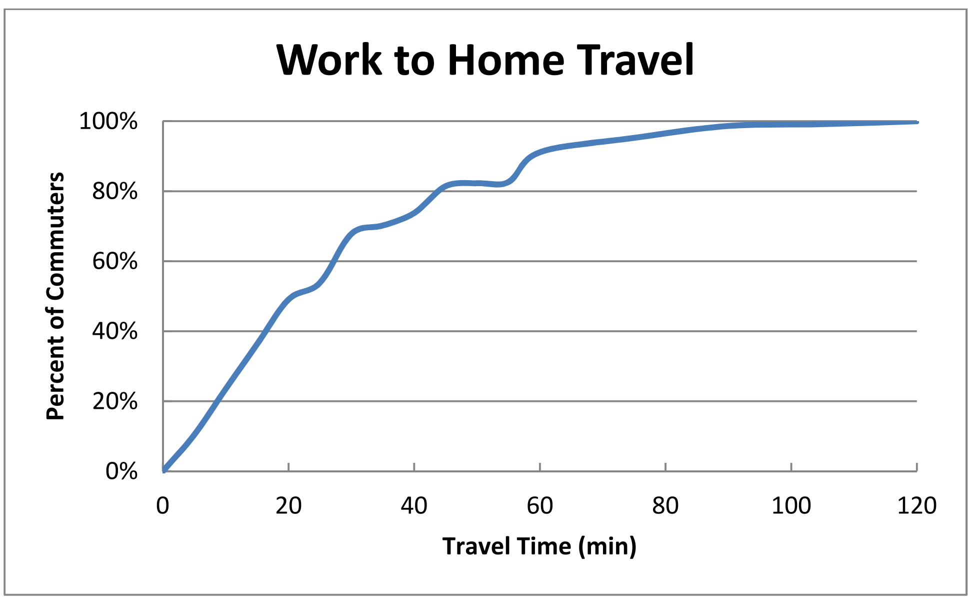


Figure F-10. Work to Home Travel Time

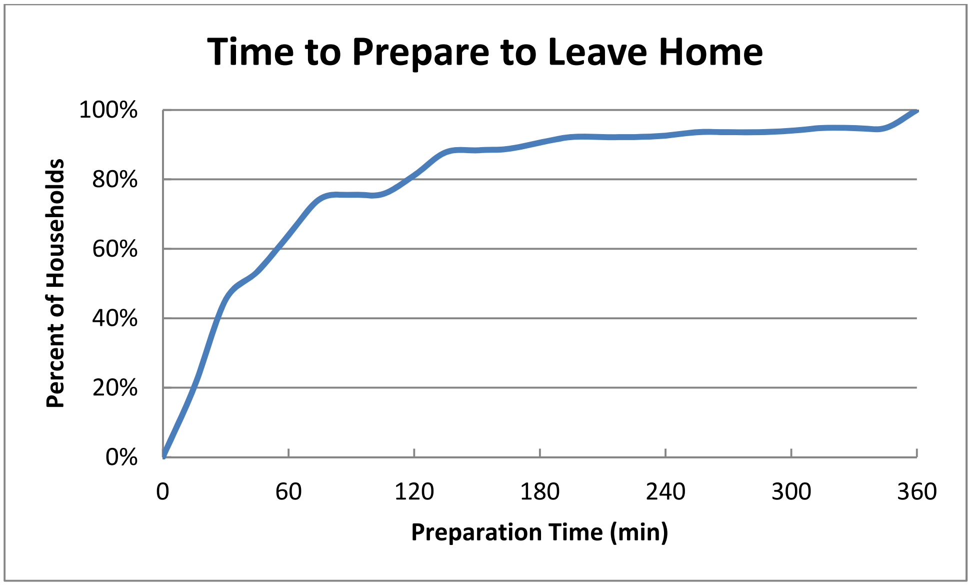


Figure F-11. Time to Prepare Home for Evacuation

ATTACHMENT A

Telephone Survey Instrument

Survey Instrument

Hello, my name is _______________ and I'm doing	**COL.1**	Unused
a survey to be used for emergency plans in response	**COL.2**	Unused
to hazards that **are not weather-related**.	COL.3	Unused
I am working for [INSERT MARKETING FIRM NAME]. Your answers will help identify local travel patterns.	**COL.4**	Unused
The information obtained will be used in a traffic engineering study and in connection with an update of the county's emergency response plans. Your participation in this survey will greatly enhance the county's emergency preparedness program.	**COL.5**	Unused

Sex **COL. 8**

1 Male

2 Female

INTERVIEWER: ASK TO SPEAK TO THE HEAD OF HOUSEHOLD OR THE SPOUSE OF THE HEAD OF HOUSEHOLD. (Terminate call if not a residence)

DO NOT ASK:

1A. Record area code. To Be Determined

COL. 9-11

1B. Record exchange number. To Be Determined

COL. 12-14

---

2. What is your home Zip Code **Col. 15-19**

3. In total, how many cars, or other vehicles are usually available to the household? (DO NOT READ ANSWERS.)

COL.20

1 ONE

2 TWO

3 THREE

4 FOUR

5 FIVE
6 SIX
7 SEVEN
8 EIGHT
9 NINE OR MORE
0 ZERO (NONE)
X REFUSED

---

4. How many people usually live in this household? (DO NOT READ ANSWERS.)

COL.21	**COL.22**
1 ONE	0 TEN
2 TWO	1 ELEVEN
3 THREE	2 TWELVE
4 FOUR	3 THIRTEEN
5 FIVE	4 FOURTEEN
6 SIX	5 FIFTEEN
7 SEVEN	6 SIXTEEN
8 EIGHT	7 SEVENTEEN
9 NINE	8 EIGHTEEN
	9 NINETEEN OR MORE
	X REFUSED

5. How many children living in this household go to local public, private, or parochial schools? (DO NOT READ ANSWERS.)

COL.23
0 ZERO
1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE
6 SIX
7 SEVEN
8 EIGHT
9 NINE OR MORE
X REFUSED

---

6. How many people in the household commute to a job, or to college, at least 4 times a week?

COL.24	SKIP TO
0 ZERO	Q. 12
1 ONE	Q. 7
2 TWO	Q. 7
3 THREE	Q. 7

4 FOUR OR MORE Q. 7

5 DON'T KNOW/REFUSED Q. 12

INTERVIEWER: For each person identified in Question 6, ask Questions 7, 8, 9, and 10.

7. Thinking about commuter #1, how does that person usually travel to work or college? (REPEAT QUESTION FOR EACH COMMUTER.)

	Commuter #1 **COL.25**	Commuter #2 **COL.26**	Commuter #3 **COL.27**	Commuter #4 **COL.28**
Rail	1	1	1	1
Bus	2	2	2	2
Walk/Bicycle	3	3	3	3
Driver Car/Van	4	4	4	4
Park & Ride (Car/Rail, Xpress_bus)	5	5	5	5
Driver Carpool-2 or more people	6	6	6	6
Passenger Carpool-2 or more people	7	7	7	7
Taxi	8	8	8	8
Refused	9	9	9	9

---

8. What is the name of the city, town or community in which Commuter #1 works or attends school? (REPEAT QUESTION FOR EACH COMMUTER.) (FILL IN ANSWER.)

COMMUTER #1			COMMUTER #2			COMMUTER #3			COMMUTER #4		
_________ City/Town		_____ State	_________ City/Town		_____ State	_________ City/Town		_____ State	_________ City/Town		_____ State
COL.29	**COL.30**	**COL.31**	**COL.32**	**COL.33**	**COL.34**	**COL.35**	**COL.36**	**COL.37**	**COL.38**	**COL.39**	**COL.40**
0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9

9. How long would it take Commuter #1 to travel home from work or college?
(REPEAT QUESTION FOR EACH COMMUTER.) (DO NOT READ ANSWERS.)

COMMUTER #1

COL.41

1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.42

1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

COMMUTER #2

COL.43

1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.44

1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

COMMUTER #3

COL.45

1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.46

1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR

COMMUTER #4

COL.47

1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.48

1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR

46 MINUTES AND 2 HOURS	46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)	8 OVER 2 HOURS (SPECIFY _____)
9	9
0	0
X DON'T KNOW/REFUSED	X DON'T KNOW/REFUSED

10. Approximately how long does it take Commuter #1 to complete preparation for leaving work or college prior to starting the trip home? (REPEAT QUESTION FOR EACH COMMUTER.)

(DO NOT READ ANSWERS.)

COMMUTER #1		COMMUTER #2	
COL. 49	**COL.50**	**COL.51**	**COL. 52**
1 5 MINUTES OR LESS	1 46-50 MINUTES	1 5 MINUTES OR LESS	1 46-50 MINUTES
2 6-10 MINUTES	2 51-55 MINUTES	2 6-10 MINUTES	2 51-55 MINUTES
3 11-15 MINUTES	3 56 - 1 HOUR	3 11-15 MINUTES	3 56 - 1 HOUR
4 16-20 MINUTES	4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES	4 16-20 MINUTES	4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 21-25 MINUTES	5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES	5 21-25 MINUTES	5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 26-30 MINUTES	6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES	6 26-30 MINUTES	6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 31-35 MINUTES	7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS	7 31-35 MINUTES	7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 36-40 MINUTES	8 OVER 2 HOURS (SPECIFY _____)	8 36-40 MINUTES	8 OVER 2 HOURS (SPECIFY _____)
9 41-45 MINUTES	9	9 41-45 MINUTES	9
	0		0
	X DON'T KNOW/REFUSED		X DON'T KNOW/REFUSED

COMMUTER #3		COMMUTER #4	
COL. 53	**COL. 54**	**COL. 55**	**COL. 56**
1 5 MINUTES OR LESS	1 46-50 MINUTES	1 5 MINUTES OR LESS	1 46-50 MINUTES
2 6-10 MINUTES	2 51-55 MINUTES	2 6-10 MINUTES	2 51-55 MINUTES
3 11-15 MINUTES	3 56 - 1 HOUR	3 11-15 MINUTES	3 56 - 1 HOUR
4 16-20 MINUTES	4 OVER 1 HOUR, BUT	4 16-20 MINUTES	4 OVER 1 HOUR, BUT

5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

LESS THAN 1 HOUR 15 MINUTES –
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

---

11. When the commuters are away from home, is there a vehicle at home that is available for evacuation during any emergency?

Col. 57

1 Yes
2 No
3 Don't Know/Refused

---

12. Would you await the return of family members prior to evacuating the area?

Col. 58

1 Yes
2 No
3 Don't Know/Refused

13. How many of the vehicles that are usually available to the household would your family use during an evacuation?

(DO NOT READ ANSWERS.)

COL.59

1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE
6 SIX
7 SEVEN
8 EIGHT
9 NINE OR MORE
0 ZERO (NONE)
X REFUSED

14. If time permits, how long would it take the family to pack clothing, secure the house, load the car, and complete preparations prior to evacuating the area? (DO NOT READ ANSWERS.)

COL.60

1 LESS THAN 15 MINUTES
2 15-30 MINUTES
3 31-45 MINUTES
4 46 MINUTES - 1 HOUR
5 1 HOUR TO 1 HOUR 15 MINUTES
6 1 HOUR 16 MINUTES TO 1 HOUR 30 MINUTES
7 1 HOUR 31 MINUTES TO 1 HOUR 45 MINUTES
8 1 HOUR 46 MINUTES TO 2 HOURS
9 2 HOURS TO 2 HOURS 15 MINUTES
0 2 HOURS 16 MINUTES TO 2 HOURS 30 MINUTES
X 2 HOURS 31 MINUTES TO 2 HOURS 45 MINUTES
Y 2 HOURS 46 MINUTES TO 3 HOURS

COL.61

1 3 HOURS TO 3 HOURS 15 MINUTES
2 3 HOURS 16 MINUTES TO 3 HOURS 30 MINUTES
3 3 HOURS 31 MINUTES TO 3 HOURS 45 MINUTES
4 3 HOURS 46 MINUTES TO 4 HOURS
5 4 HOURS TO 4 HOURS 15 MINUTES
6 4 HOURS 16 MINUTES TO 4 HOURS 30 MINUTES
7 4 HOURS 31 MINUTES TO 4 HOURS 45 MINUTES
8 4 HOURS 46 MINUTES TO 5 HOURS
9 5 HOURS TO 5 HOURS 15 MINUTES
0 5 HOURS 16 MINUTES TO 5 HOURS 30 MINUTES
X 5 HOURS 31 MINUTES TO 5 HOURS 45 MINUTES
Y 5 HOURS 46 MINUTES TO 6 HOURS

COL.62

1 DON'T KNOW

15. Would you take household pets with you if you were asked to evacuate the area?

Col. 58

1 Yes

2 No

3 Don't Know/Refused

Thank you very much. ______________________________________
(TELEPHONE NUMBER CALLED)

If requested:

For Additional information

Contact your County Emergency Management Office

County	Phone Number
Miami-Dade County	(305) 468-5415
Monroe County	(305) 289-6018

APPENDIX G

Traffic Management Plan

G. TRAFFIC MANAGEMENT PLAN

NUREG/CR-7002 indicates that the existing TCPs and ACPs identified by the offsite agencies should be used in the evacuation simulation modeling. The traffic and access control plans for the EPZ were provided by each county.

These plans were reviewed and the TCPs were modeled accordingly.

G.1 Traffic Control Points

As discussed in Section 9, traffic control points at intersections (which are controlled) are modeled as actuated signals. If an intersection has a pre-timed signal, stop, or yield control, and the intersection is identified as a traffic control point, the control type was changed to an actuated signal in the DYNEV II system. One exception to this is the all-way stop sign at the intersection of CR-905 and CR-905A (Card Sound Rd) in Monroe County. Based on discussions with county emergency planning personnel, this intersection would be manned by a police officer who would allow the continuous flow of traffic on CR-905 (there will be little to no traffic flowing southbound on CR-905A) to facilitate the evacuation of the ORC. As such, the intersection was modeled as a TCP and uncontrolled.

Table K-2 provides the control type and node number for those nodes which are controlled. If the existing control was changed due to the point being a TCP, the control type is indicated as "TCP".

As shown in Figures 7-3 through 7-7, there is significant traffic congestion in competing directions (east-west and north-south) at intersections in the northwest quadrant of the EPZ. Assigning police officers to perform traffic control at these intersections will have no benefit due to the heavy congestion along all approaches. TCPs in this area would be ineffective. TCPs on the Florida Turnpike ramps would have the most benefit for evacuation. These TCPs would facilitate traffic movement onto the turnpike and discourage traffic from exiting the turnpike. Available manpower and equipment should be assigned to these interchanges as the top priority.

Figure G-1 maps the TCPs identified in the county emergency plans. These TCPS are concentrated along the Turnpike ramps in Miami-Dade County and along CR-905 in Monroe County. This is the most effective allocation of manpower and equipment as these are the primary evacuation routes in each county. These TCPs would be manned during evacuation by traffic guides who would direct evacuees in the proper direction and facilitate the flow of traffic through the intersections.

Note that there are additional TCPs in Miami-Dade County along the EPZ boundary and the boundary of those areas comprising the 5-mile region. These TCPs are designed to limit the number of vehicles entering areas at risk from outside the EPZ.

G.2 Access Control Points

It is assumed that ACPs will be established within 2 hours of the advisory to evacuate to discourage through travelers from using major through routes which traverse the EPZ. As discussed in Section 3.6, external traffic was only considered on three routes which traverse the EPZ – Don Shula Expressway, Florida Turnpike, and US 1 – in this analysis. The generation of these external trips ceased at 2 hours after the advisory to evacuate in the simulation.

According to the counties' emergency plans, access control points will be established through the use of road blocks and barricades. Residents and transients will be directed away from the restricted areas. They will be enacted in conjunction with evacuation.

As discussed in Section 9, no additional TCPs or ACPs are deemed necessary as a result of this study.

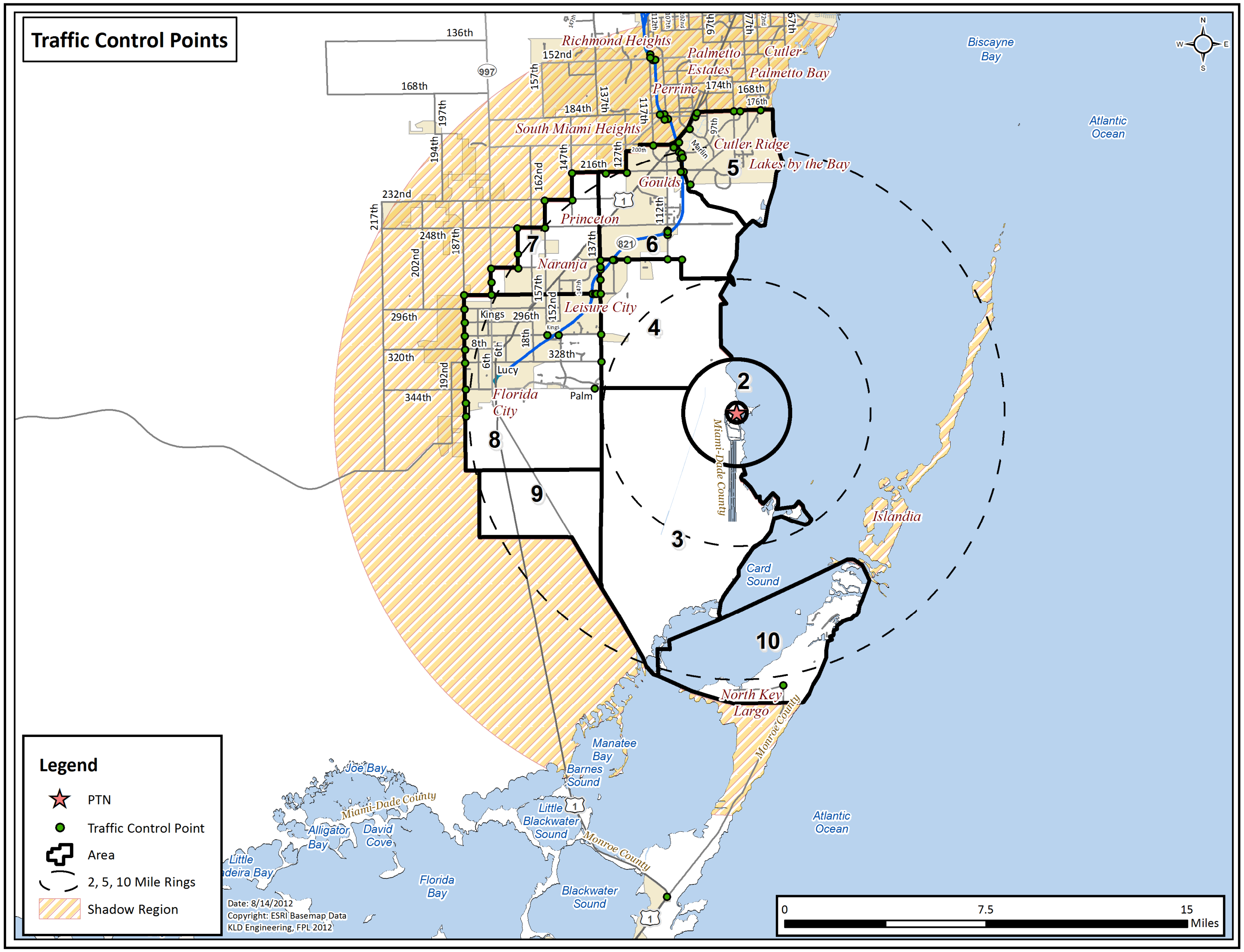


Figure G-1. Traffic Control Points for the PTN Site

APPENDIX H

Evacuation Regions

H. EVACUATION REGIONS

This appendix presents the evacuation percentages for each evacuation region (Table H-1) and maps of all evacuation regions. The percentages presented in Table H-1 are based on the methodology discussed in assumption 5 of Section 2.2 and shown in Figure 2-1.

Note the baseline ETE study assumes 20 percent of households will not comply with the shelter advisory, as per Section 2.5.2 of NUREG/CR-7002.

Note that area 1 is not labeled in Figures H-1 through H-23. Area 1 is the Turkey Point site and is indicated with a star in these figures.

Table H-1. Percent of Area Population Evacuating for Each Region

Region	Description	Area 1	2	3	4	5	6	7	8	9	10	EAS Message
R01	2-Mile Ring	100%	100%	20%	20%	20%	20%	20%	20%	20%	20%	E14/E15
R02	5-Mile Ring	100%	100%	100%	100%	20%	20%	20%	20%	20%	20%	E16/E17
R03	Full EPZ	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	E29
Evacuate 5-Mile Radius and Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R04	N	100%	100%	100%	100%	100%	100%	100%	20%	20%	20%	E23/E27
R05	NNE	100%	100%	100%	100%	100%	100%	20%	20%	20%	20%	E24/E28
N/A	NE, ENE, E, ESE, SE, SSE, S	Refer to Region R02										5 & 9
R06	SSW	100%	100%	100%	100%	20%	20%	20%	20%	100%	20%	E25
R07	SW, WSW	100%	100%	100%	100%	20%	20%	20%	100%	100%	20%	E20
R08	W	100%	100%	100%	100%	20%	20%	100%	100%	100%	20%	N/A
R09	WNW, NW	100%	100%	100%	100%	20%	100%	100%	100%	20%	20%	E22/E26
R10	NNW	100%	100%	100%	100%	100%	100%	100%	100%	20%	20%	N/A
Site Specific Region												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R11	-	100%	100%	100%	100%	20%	100%	100%	100%	100%	20%	N/A
Staged Evacuation - 5-Mile Radius Evacuates, then Evacuate Downwind to EPZ Boundary												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R12	Full EPZ	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	N/A
R13	N	100%	100%	100%	100%	100%	100%	100%	20%	20%	20%	N/A
R14	NNE	100%	100%	100%	100%	100%	100%	20%	20%	20%	20%	N/A
N/A	NE, ENE, E, ESE, SE, SSE, S	Refer to Region R02										N/A
R15	SSW	100%	100%	100%	100%	20%	20%	20%	20%	100%	20%	N/A
R16	SW, WSW	100%	100%	100%	100%	20%	20%	20%	100%	100%	20%	N/A
R17	W	100%	100%	100%	100%	20%	20%	100%	100%	100%	20%	N/A
R18	WNW, NW	100%	100%	100%	100%	20%	100%	100%	100%	20%	20%	N/A
R19	NNW	100%	100%	100%	100%	100%	100%	100%	100%	20%	20%	N/A
R20	-	100%	100%	100%	100%	20%	100%	100%	100%	100%	20%	N/A
Additional Miami-Dade County Requested Regions												
Region	**Wind Direction Towards:**	**Area 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**EAS Message**
R21	-	100%	100%	100%	20%	20%	20%	20%	20%	100%	20%	E18
R22	-	100%	100%	100%	20%	20%	20%	20%	100%	100%	20%	E19
R23	-	100%	100%	100%	100%	20%	20%	100%	100%	20%	20%	E21

Legend: Shelter-in-Place until 90% ETE for R02, then Evacuate (yellow) | Area(s) Shelter-in-Place (white) | Area(s) Evacuate (red)

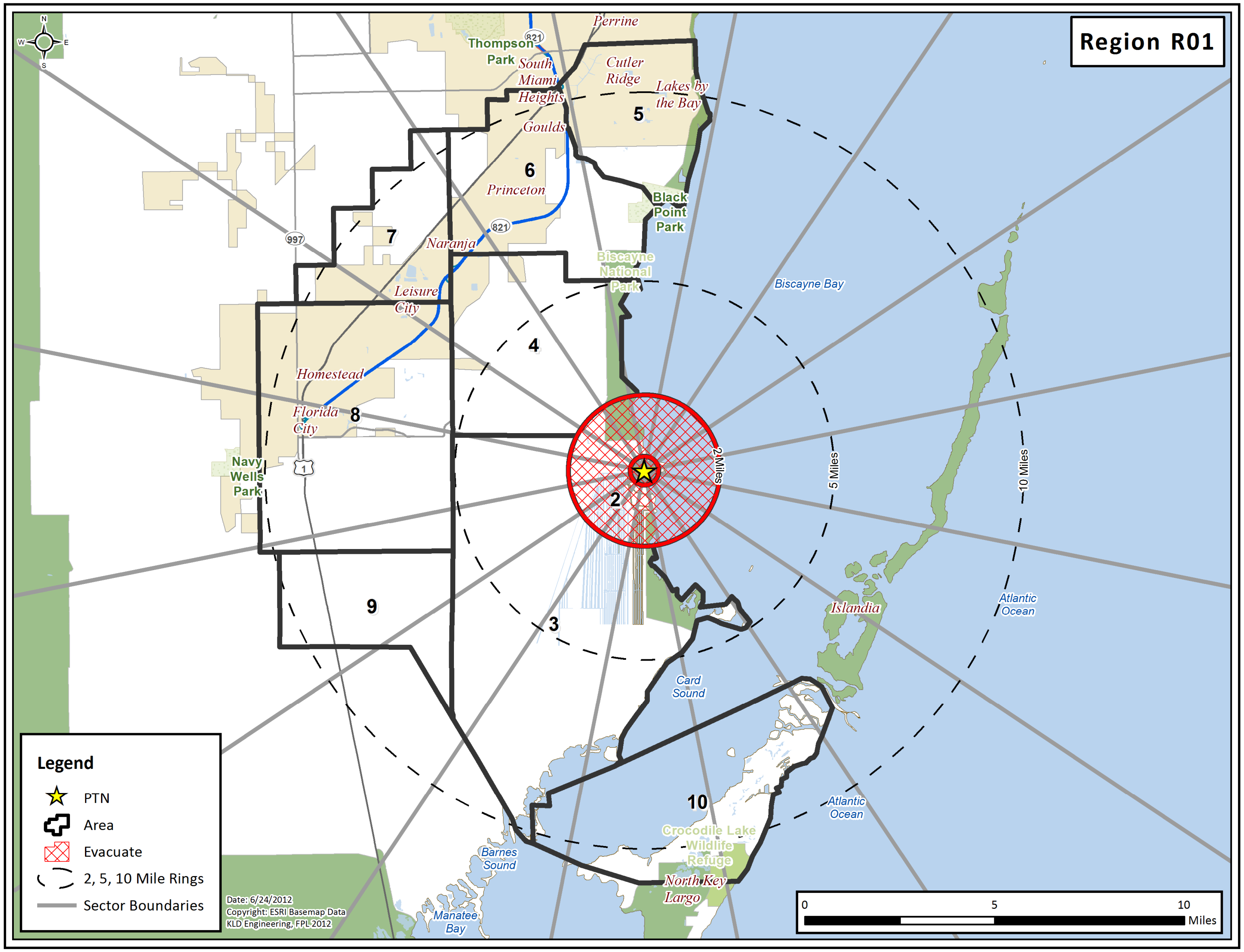


Figure H-1. Region R01

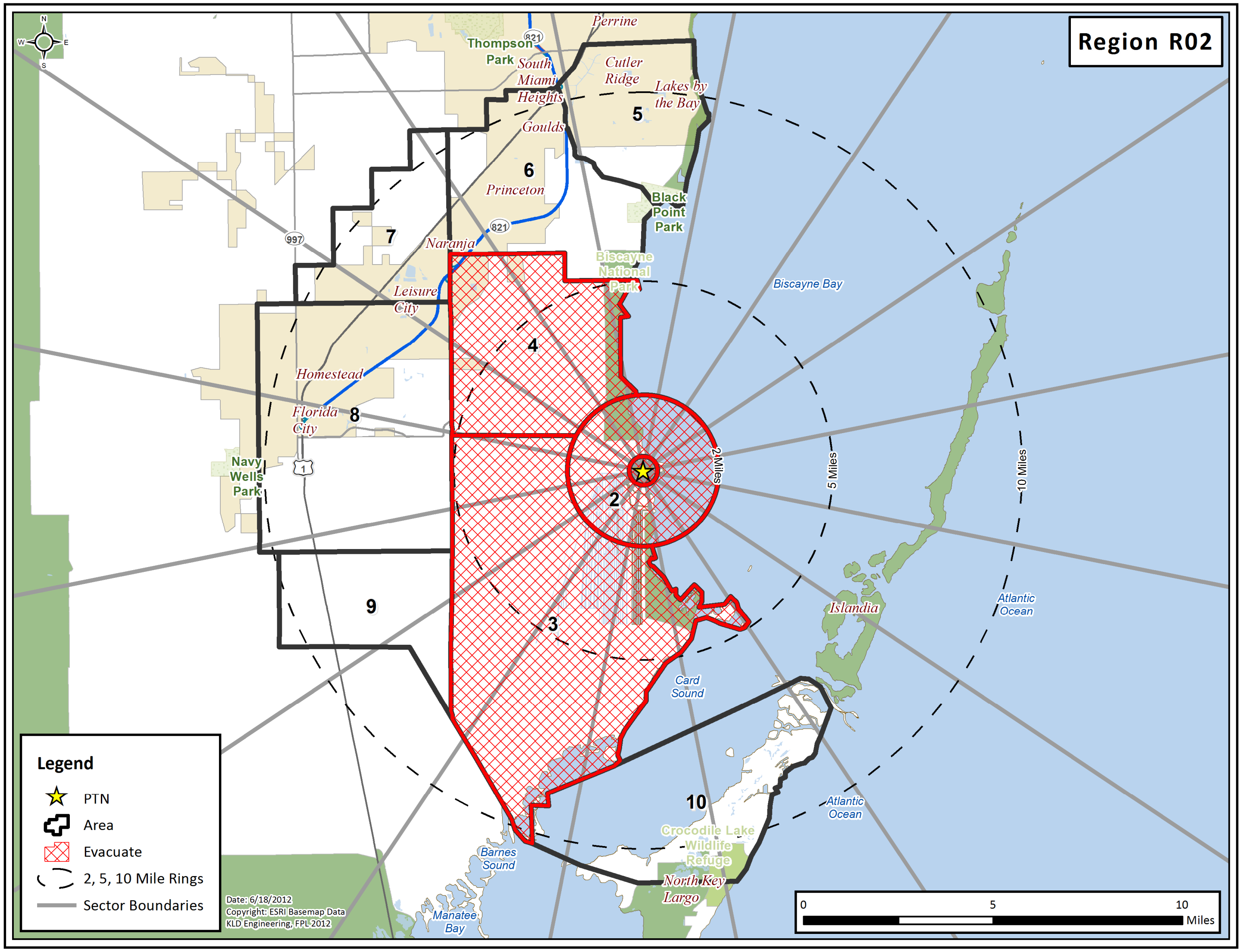


Figure H-2. Region R02

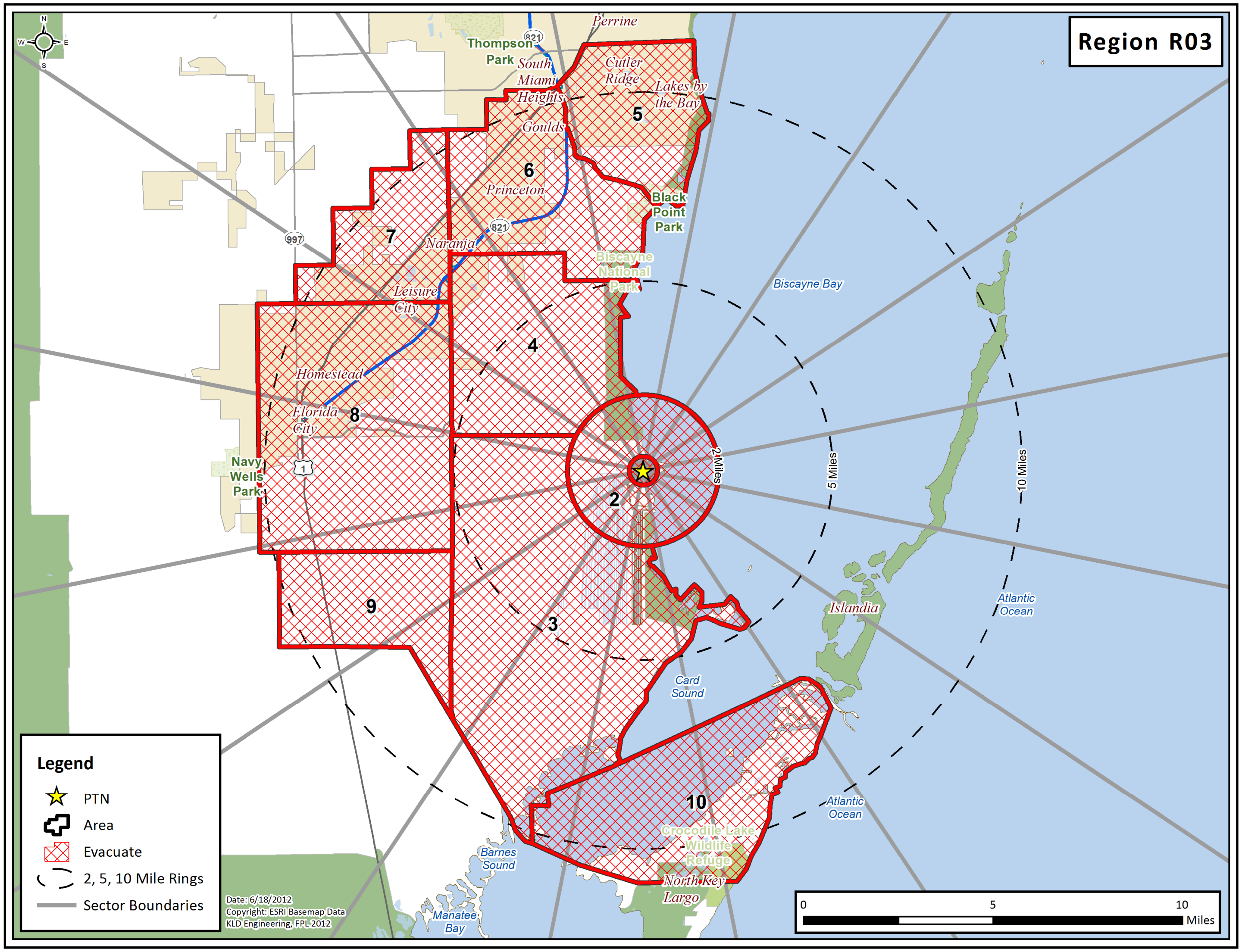


Figure H-3. Region R03

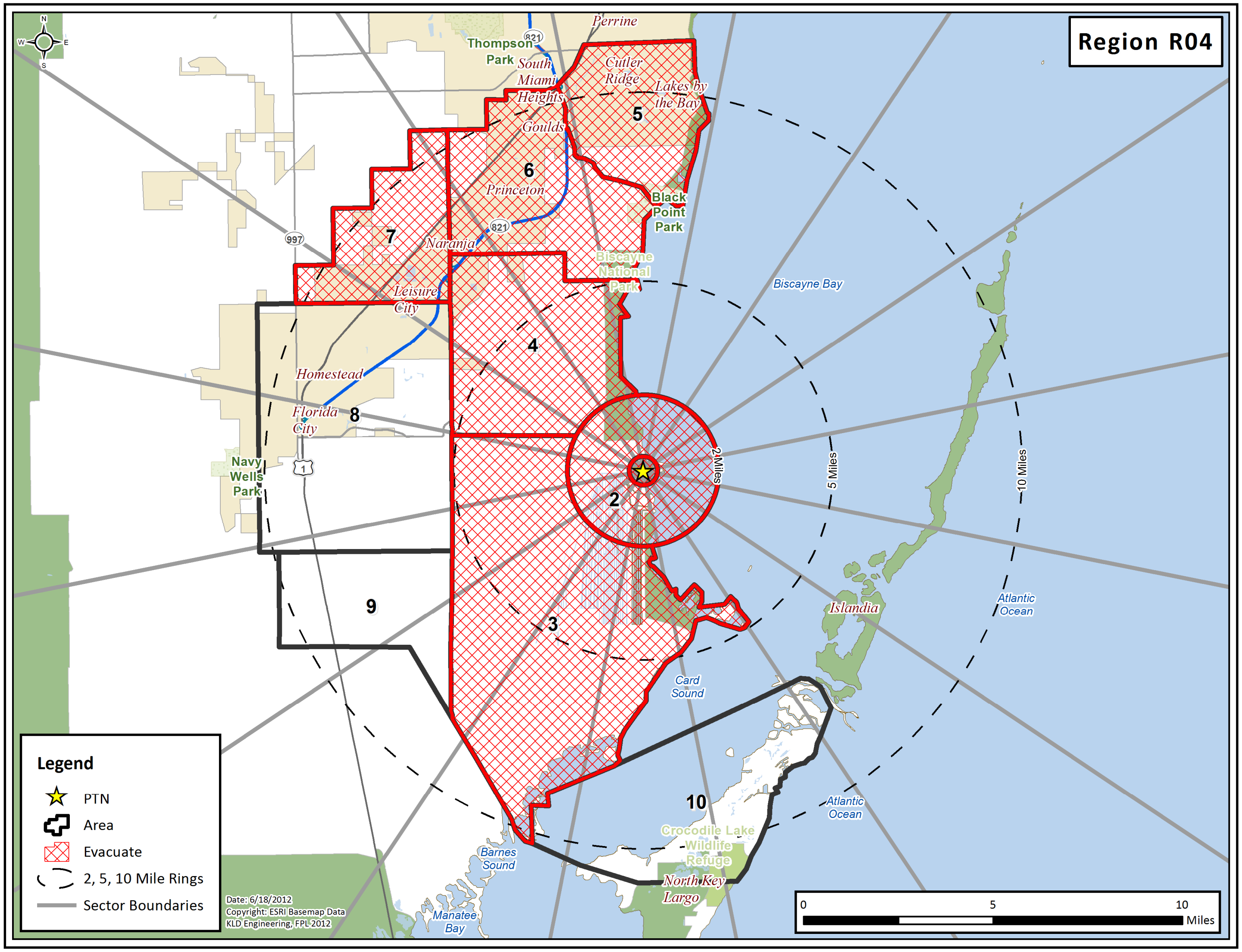


Figure H-4. Region R04

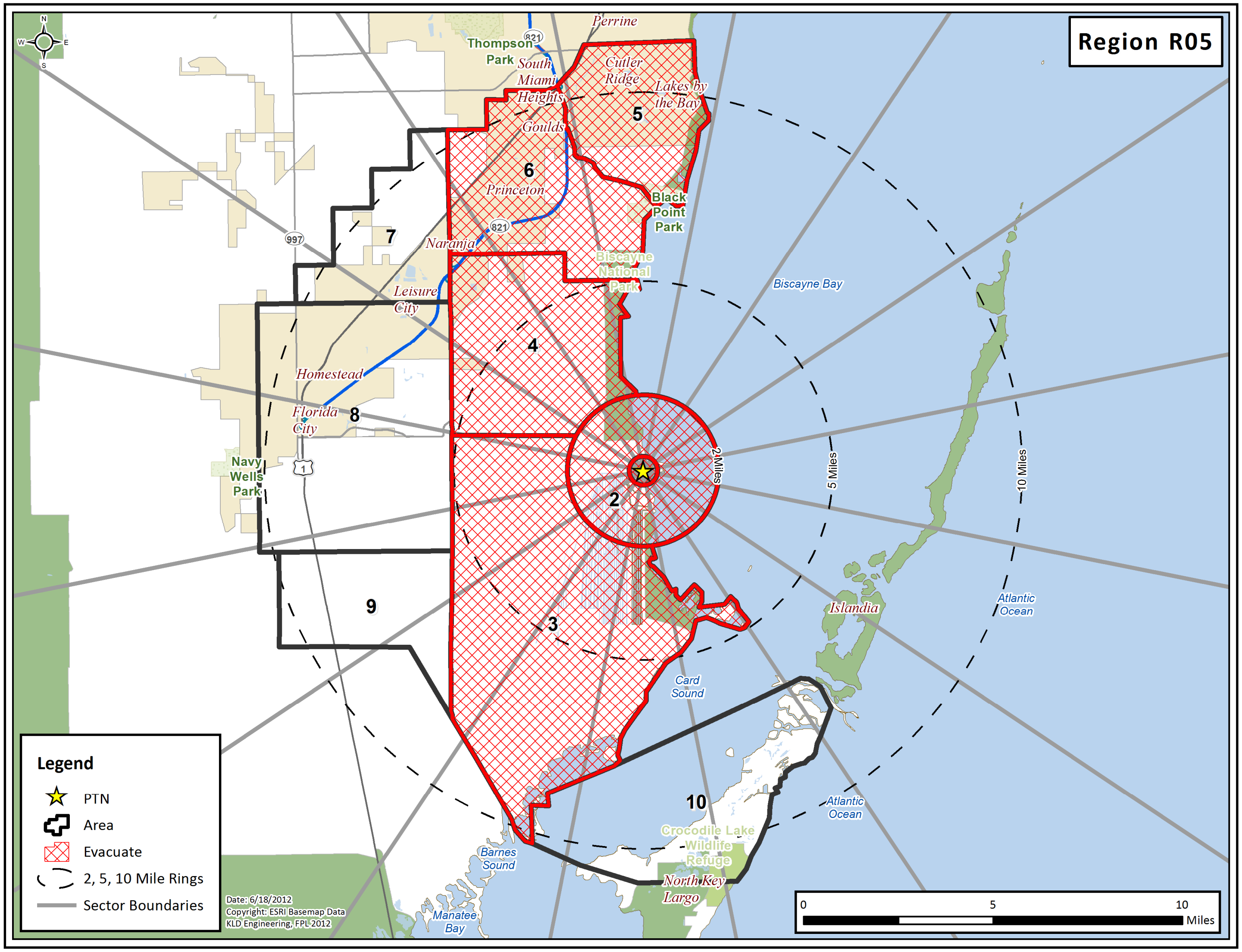


Figure H-5. Region R05

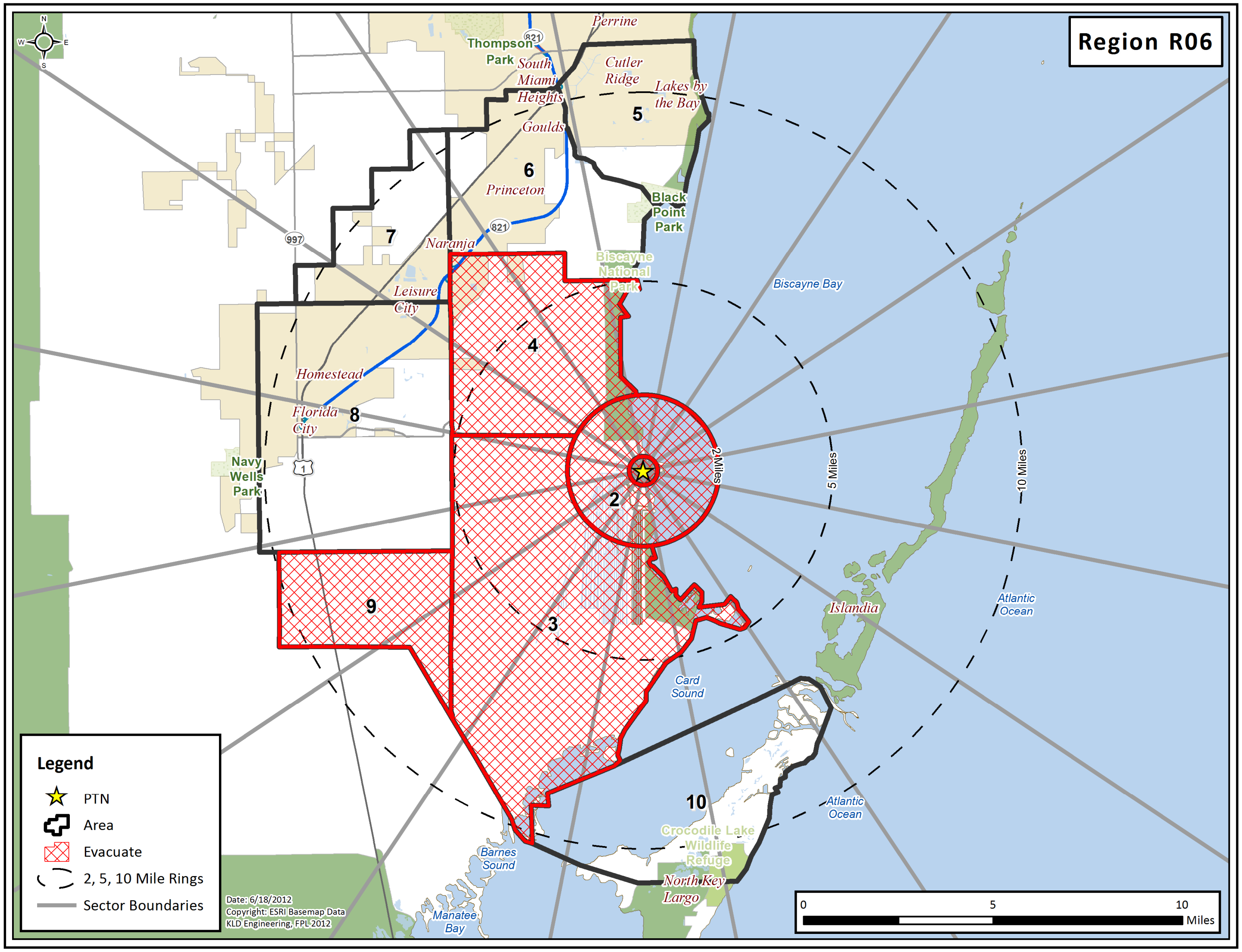


Figure H-6. Region R06

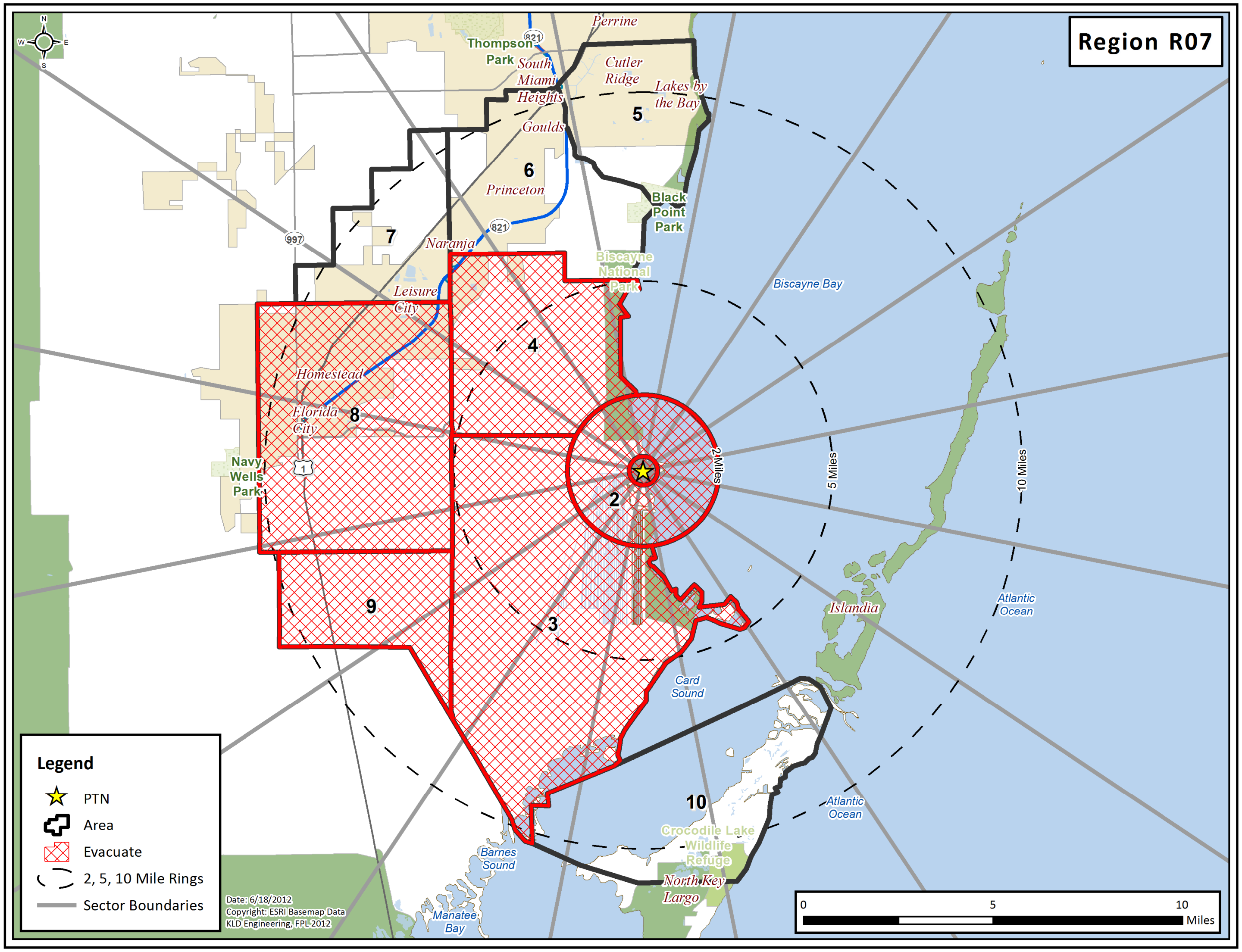


Figure H-7. Region R07

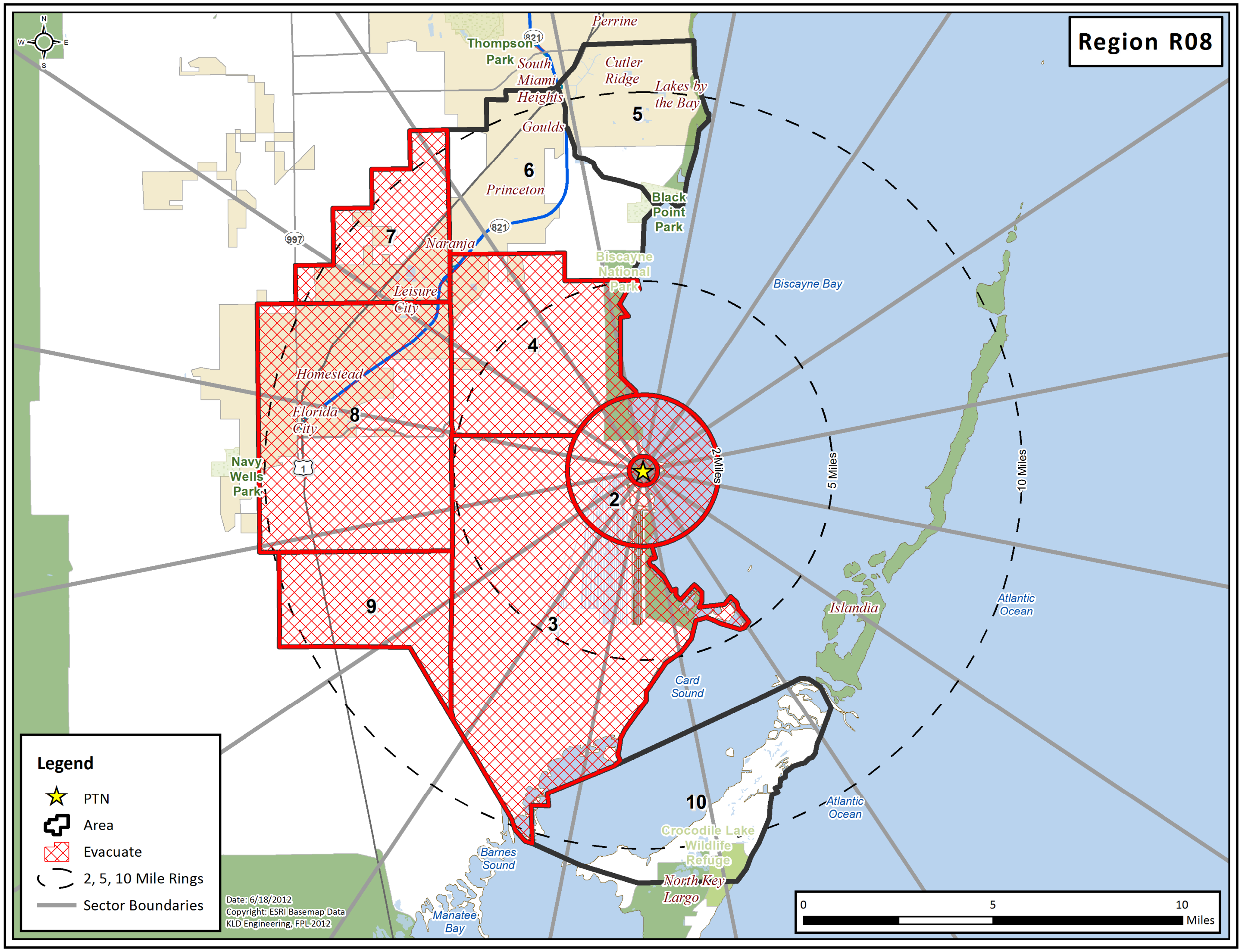


Figure H-8. Region R08

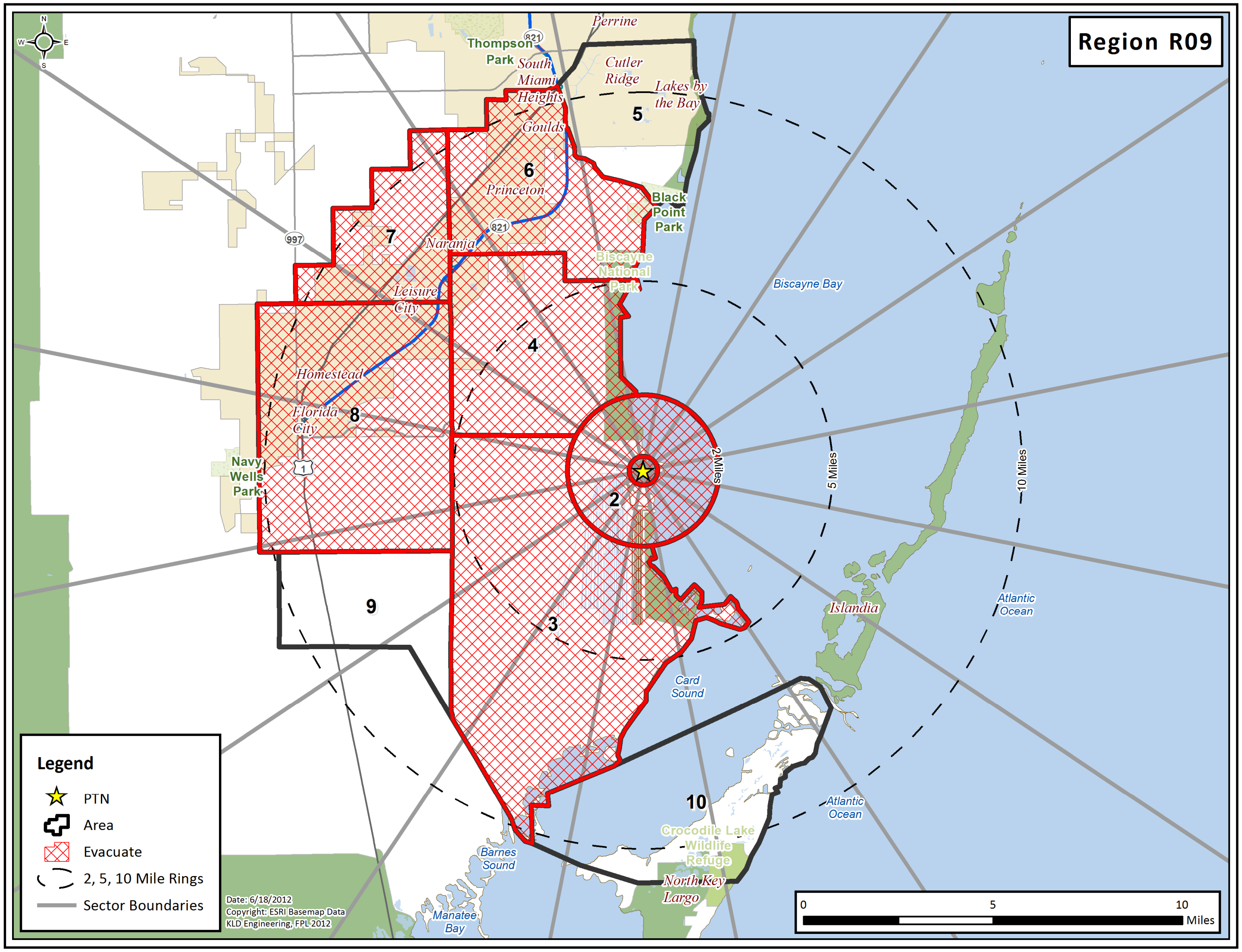


Figure H-9. Region R09

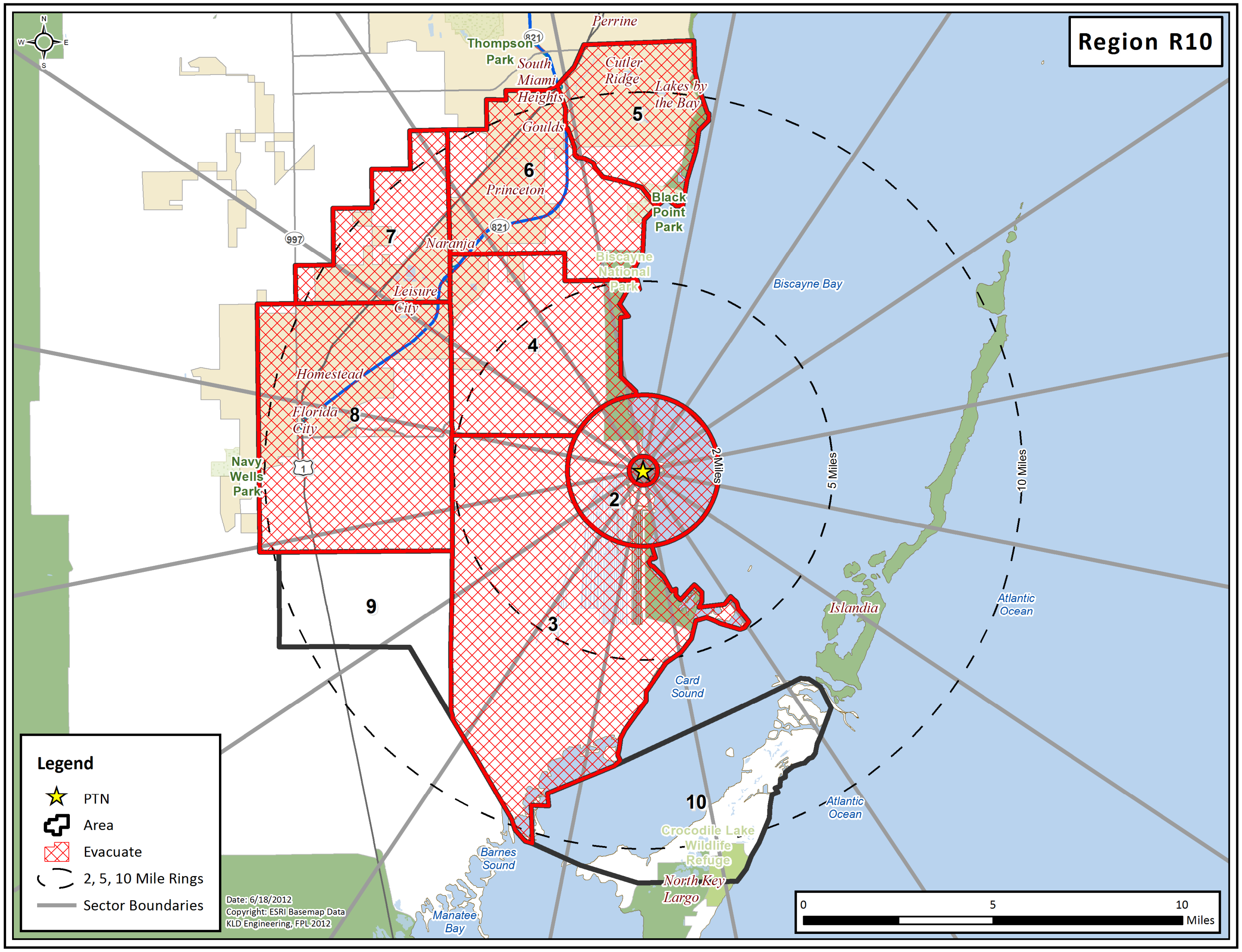


Figure H-10. Region R10

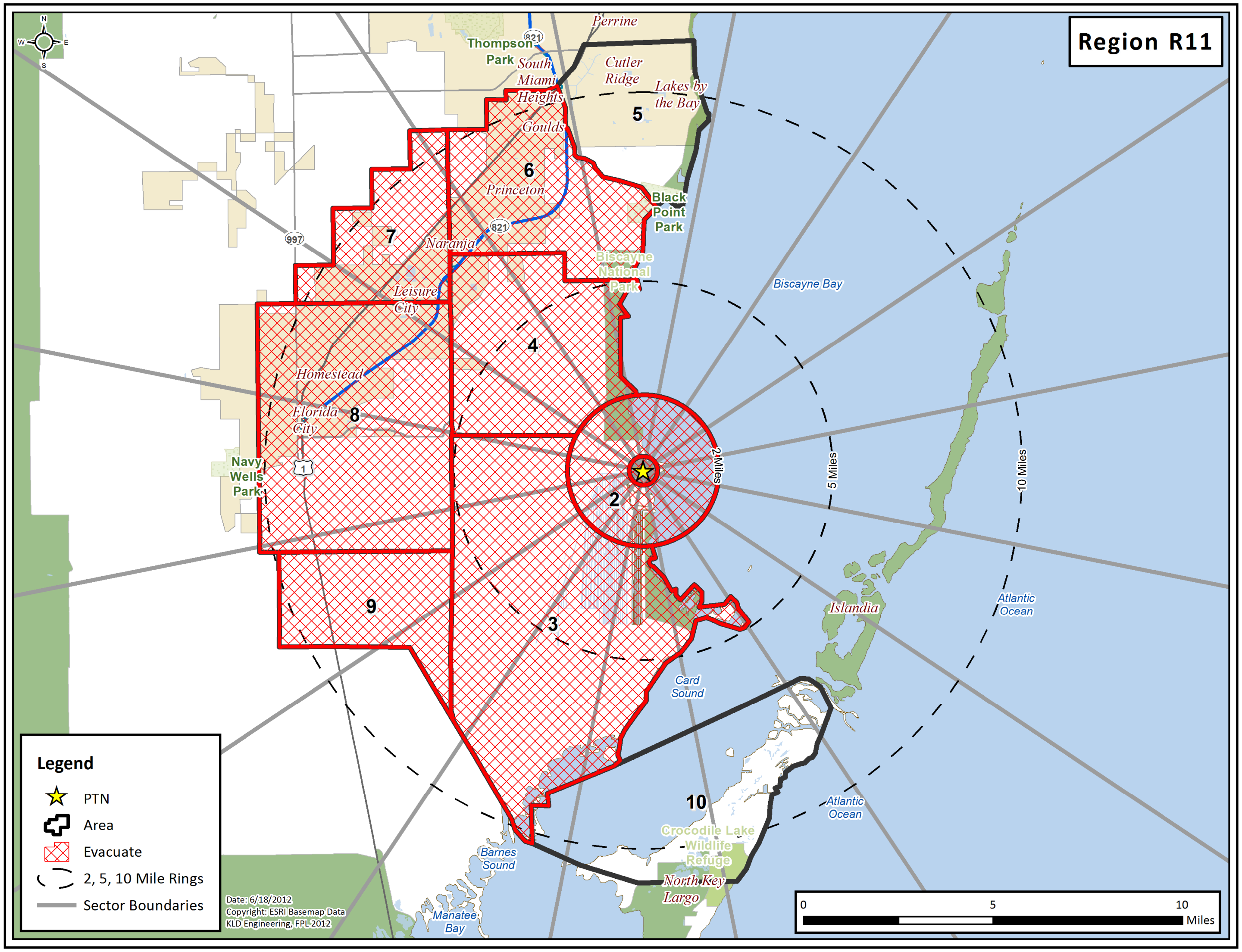


Figure H-11. Region R11

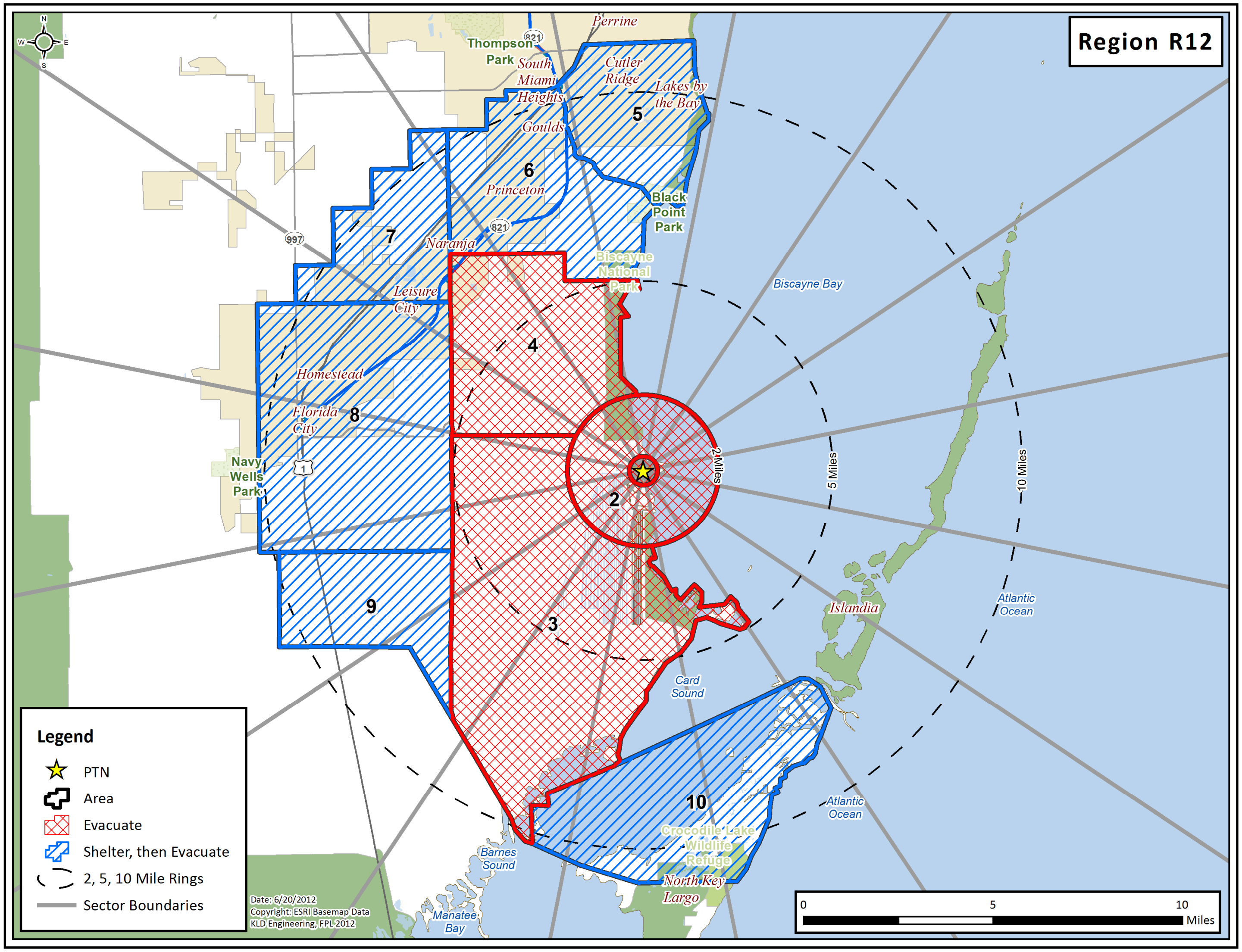


Figure H-12. Region R12

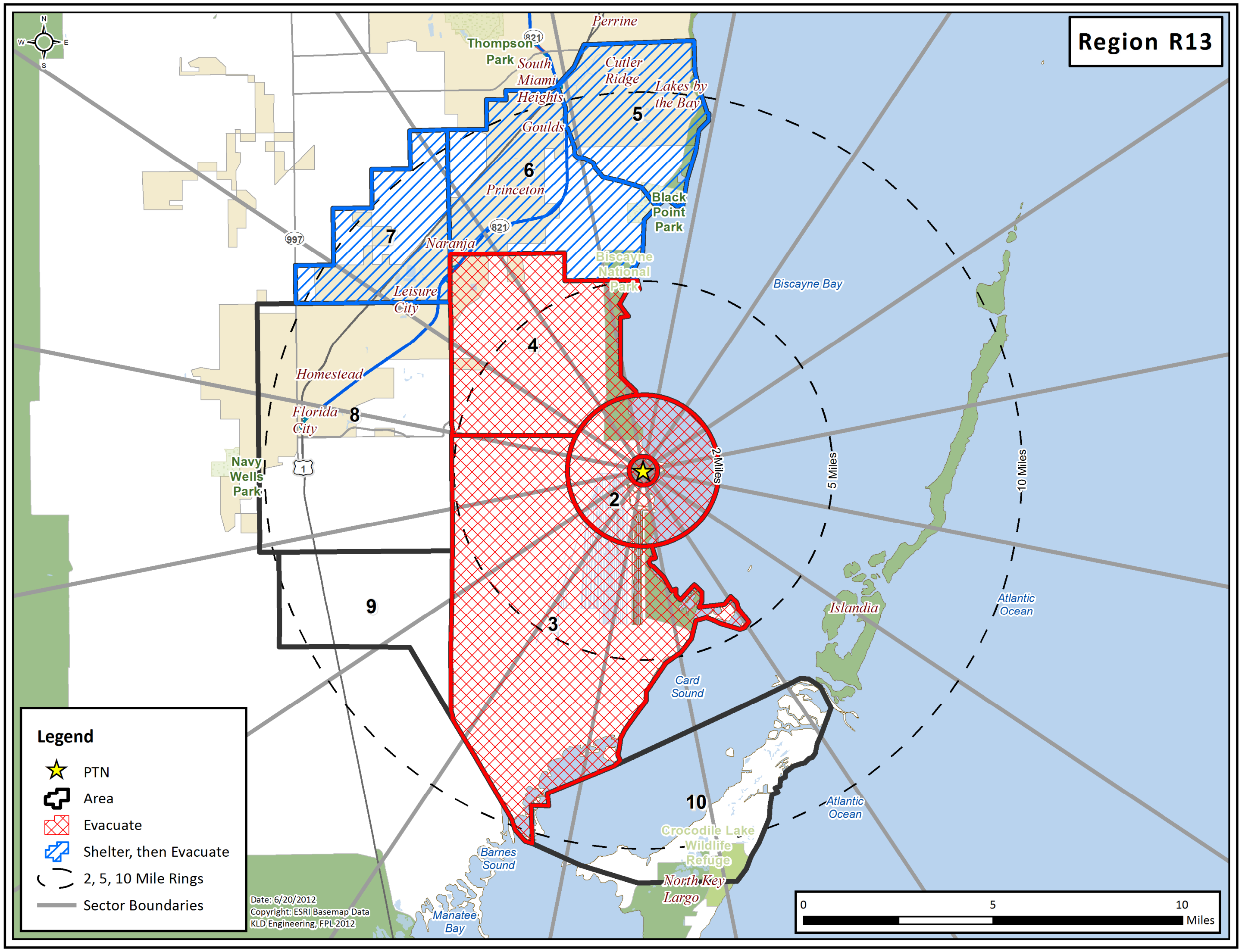


Figure H-13. Region R13

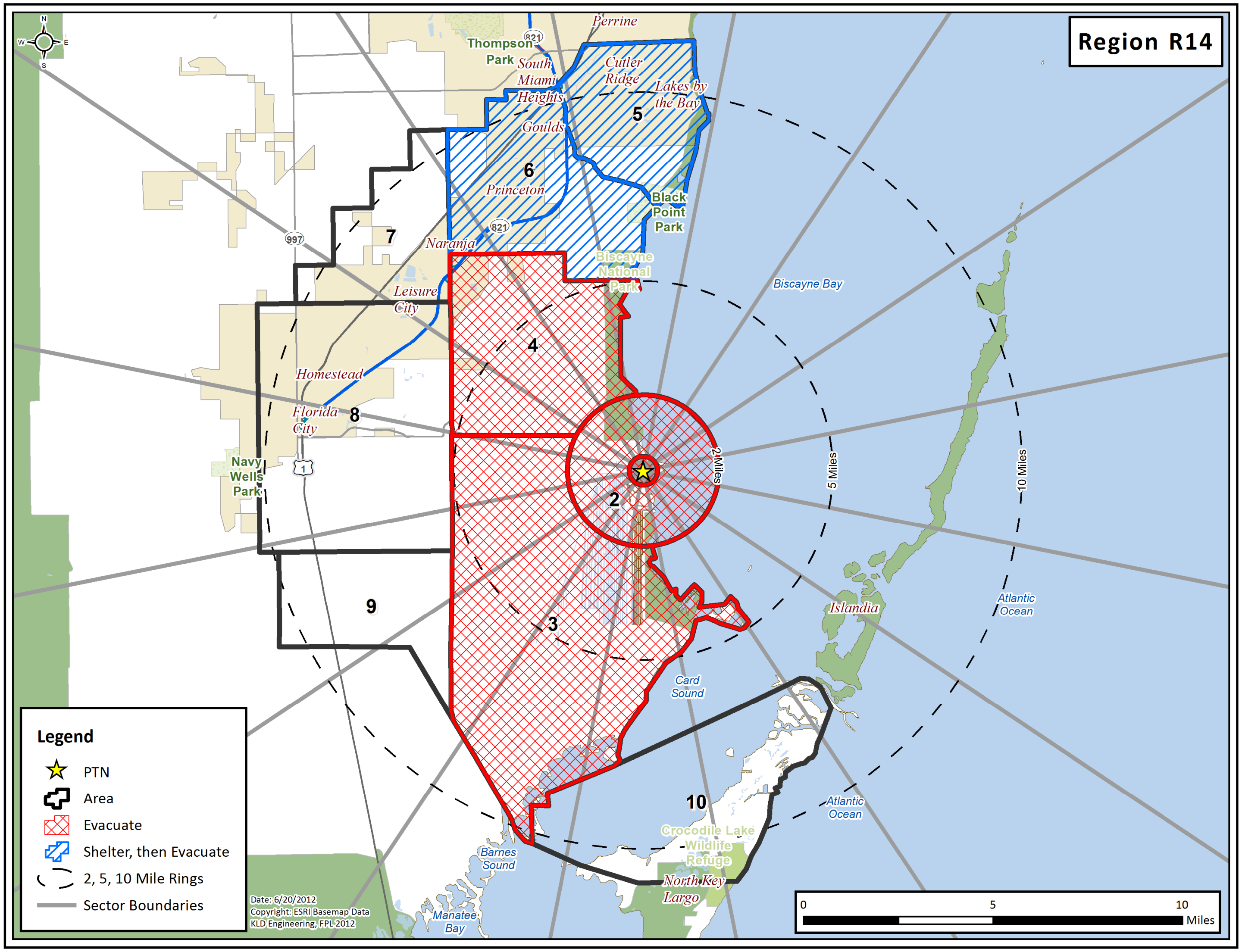


Figure H-14. Region R14

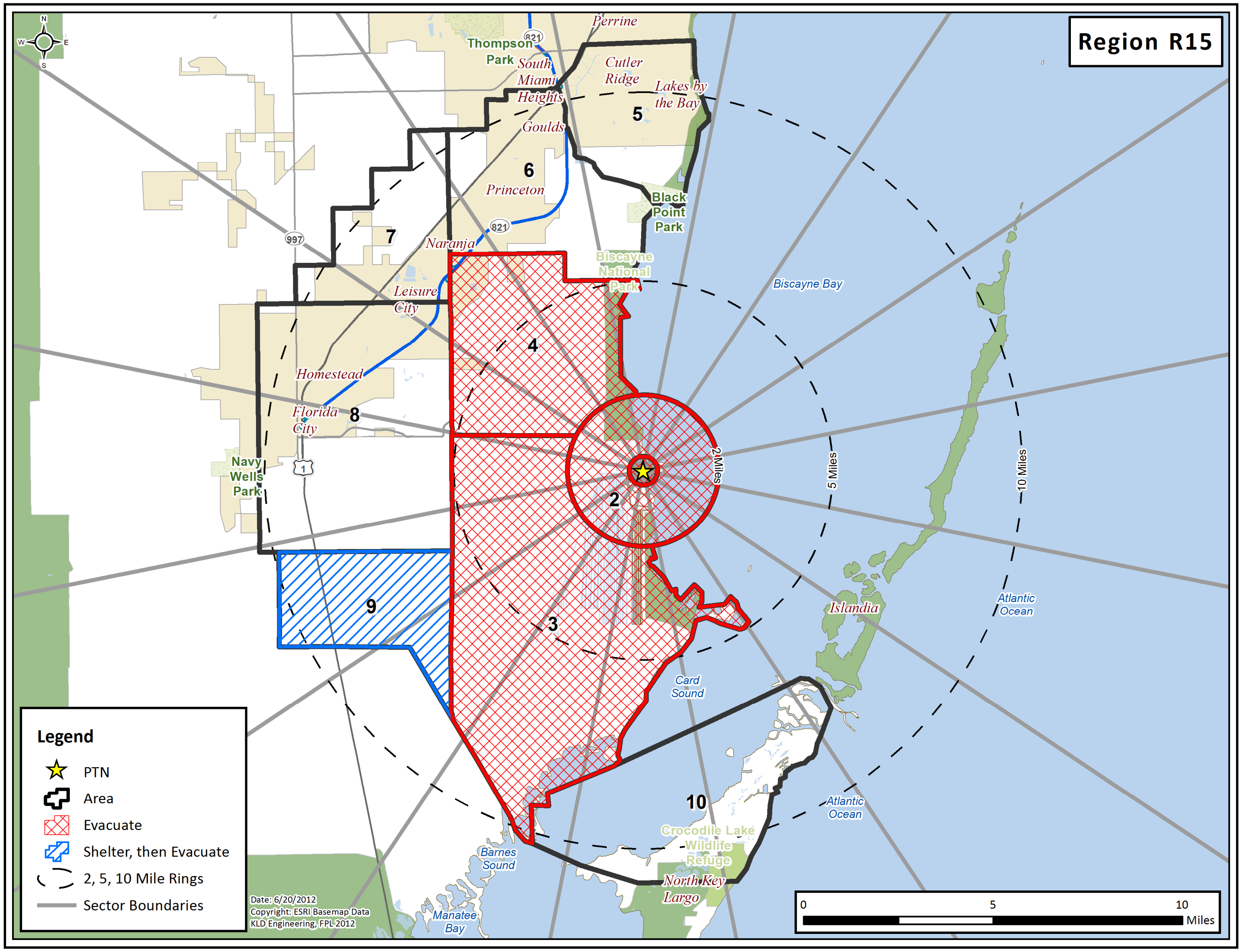


Figure H-15. Region R15

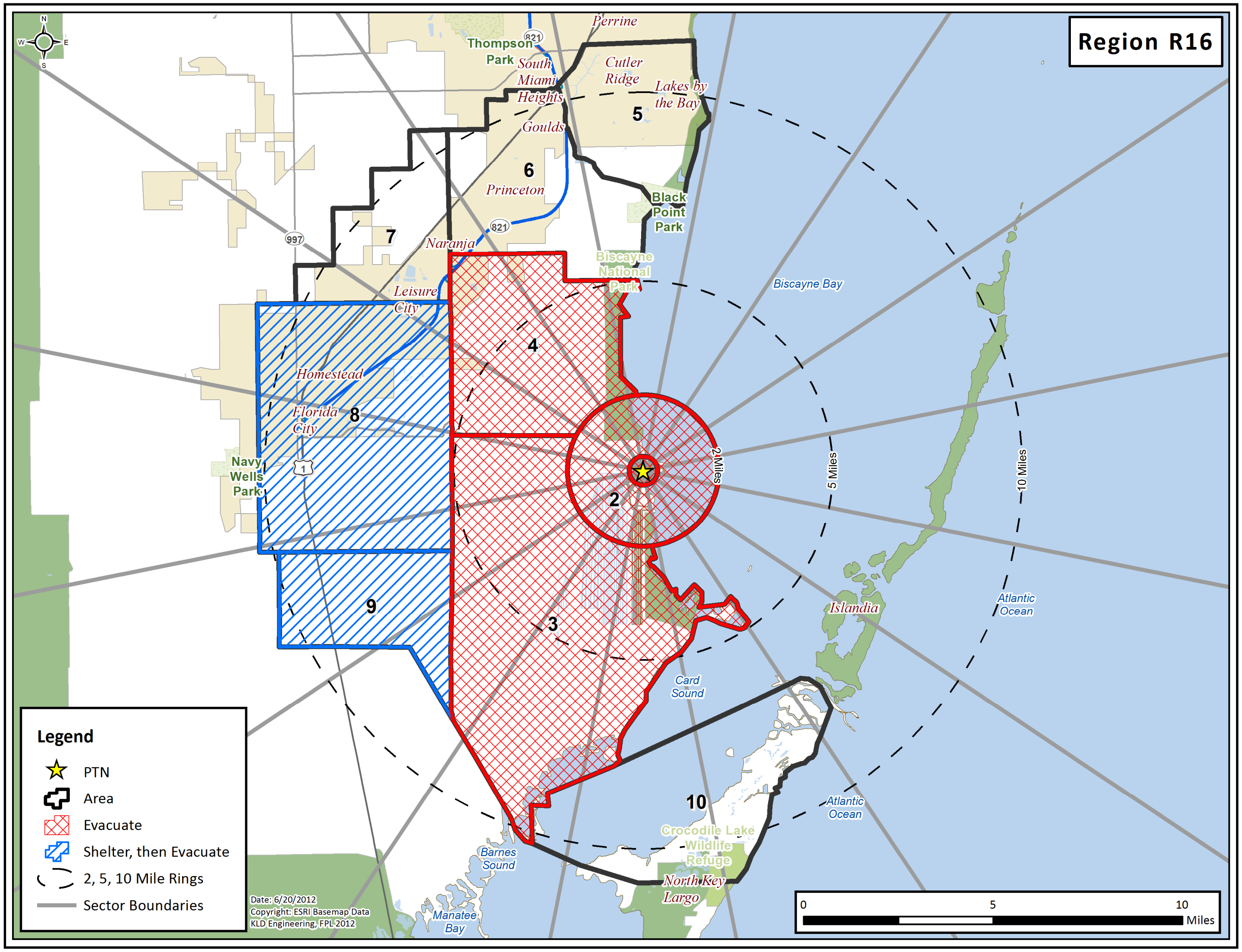


Figure H-16. Region R16

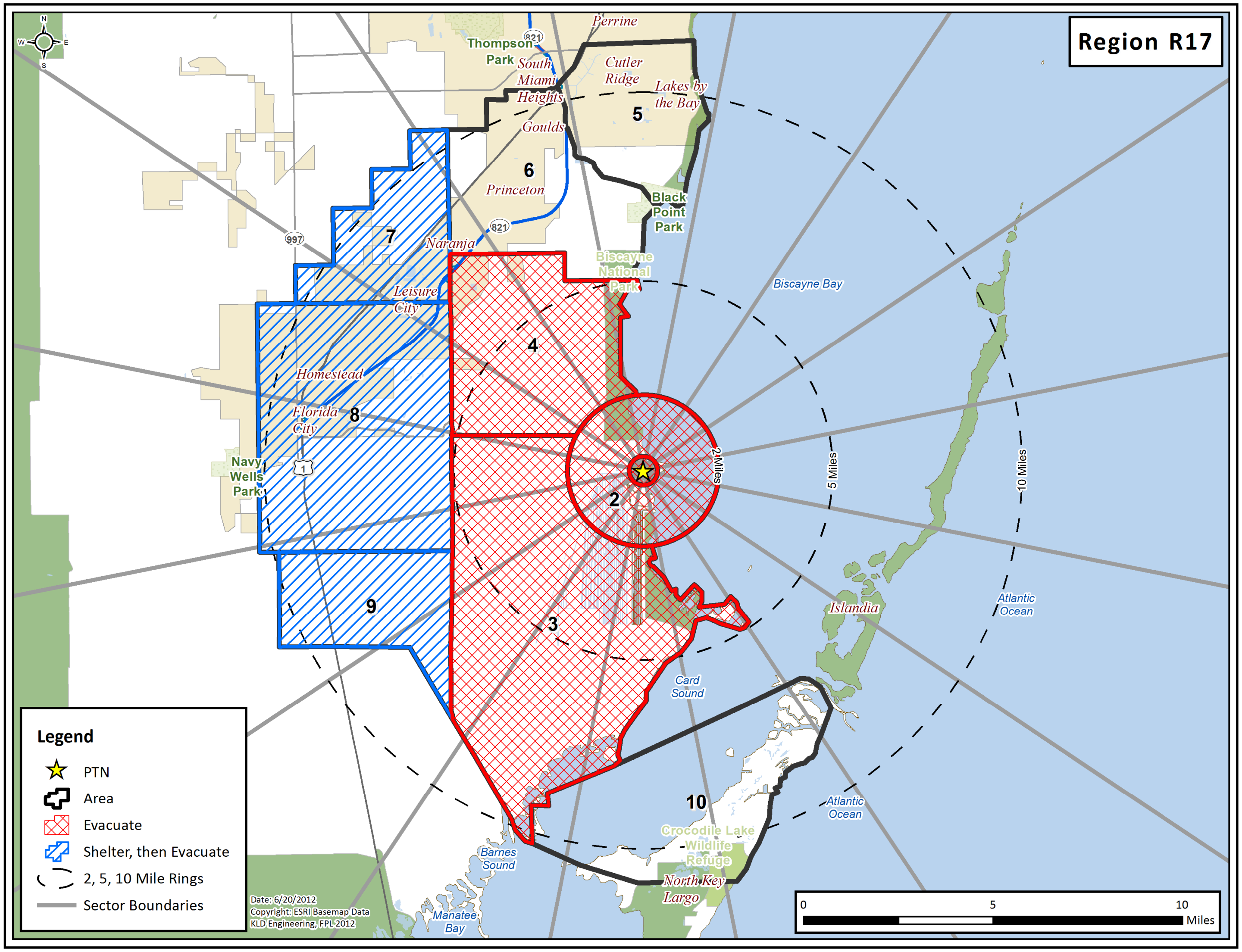


Figure H-17. Region R17

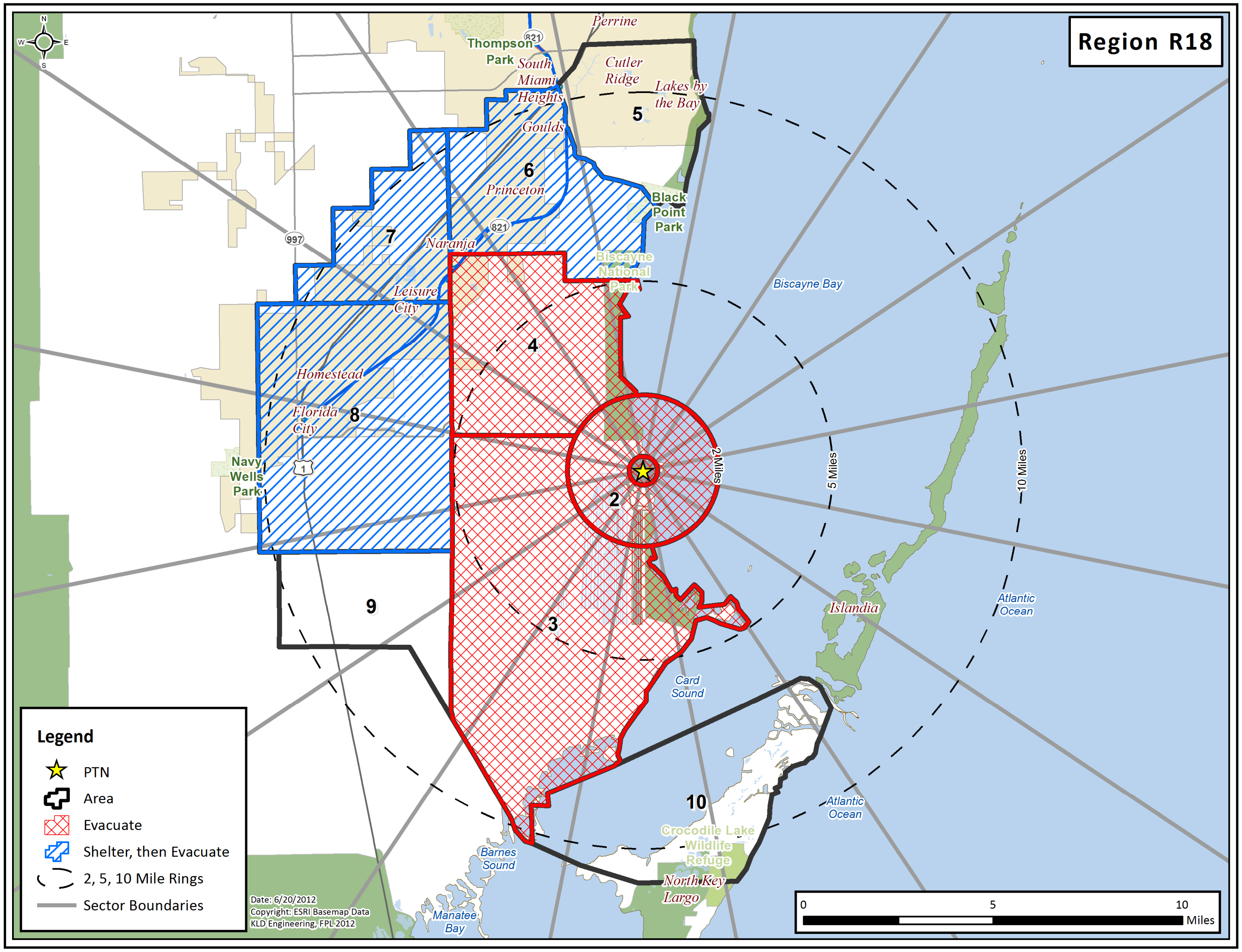


Figure H-18. Region R18

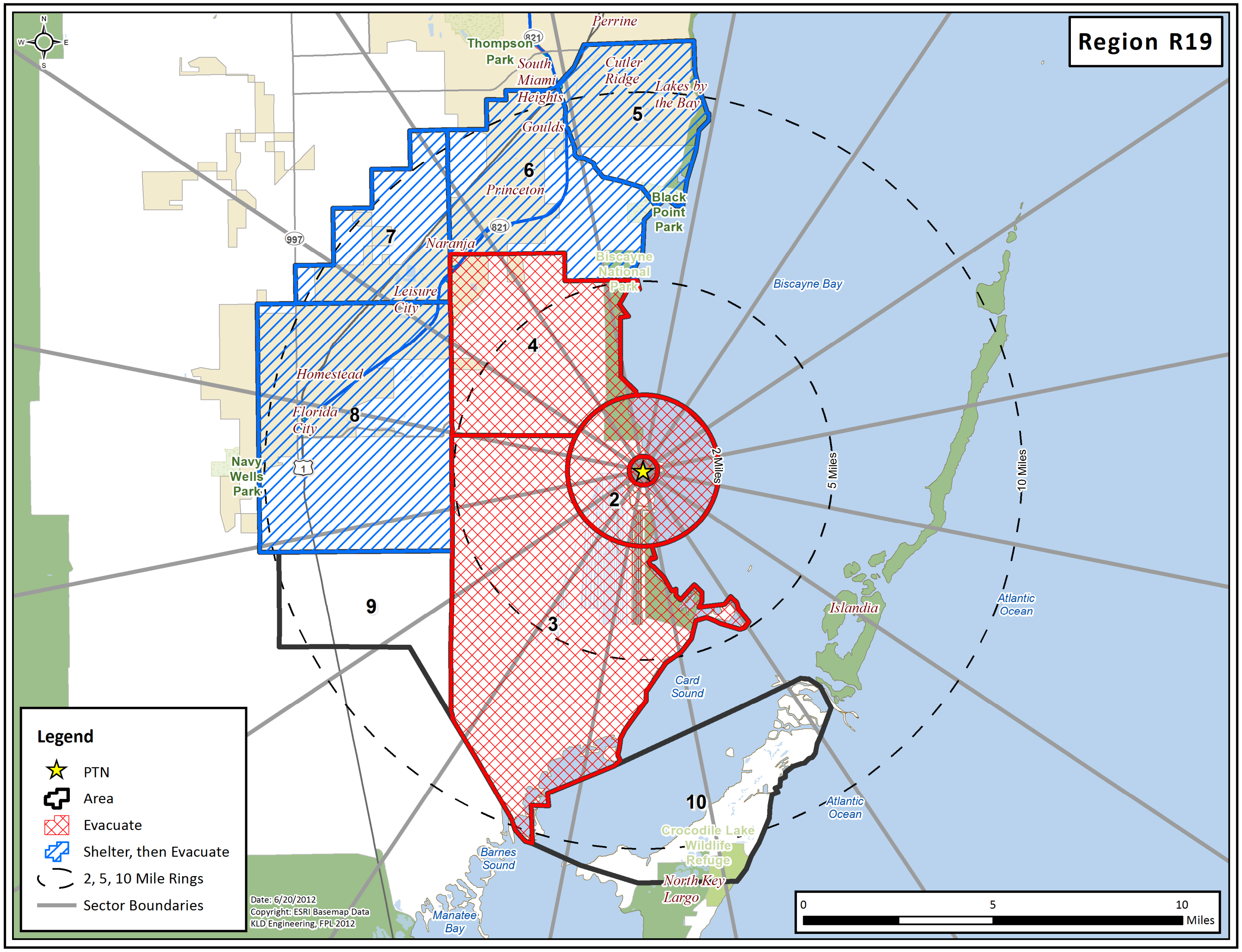


Figure H-19. Region R19

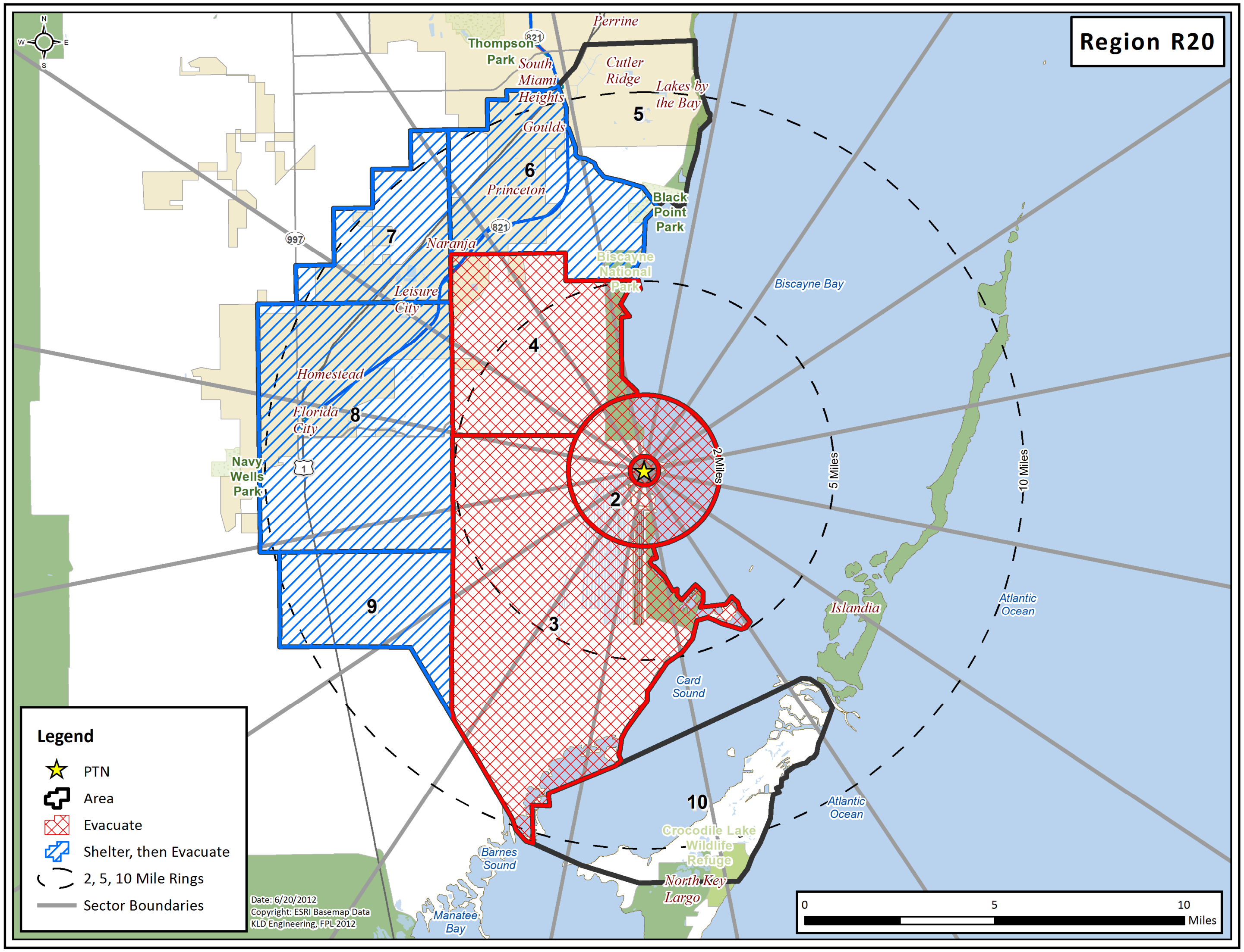


Figure H-20. Region R20

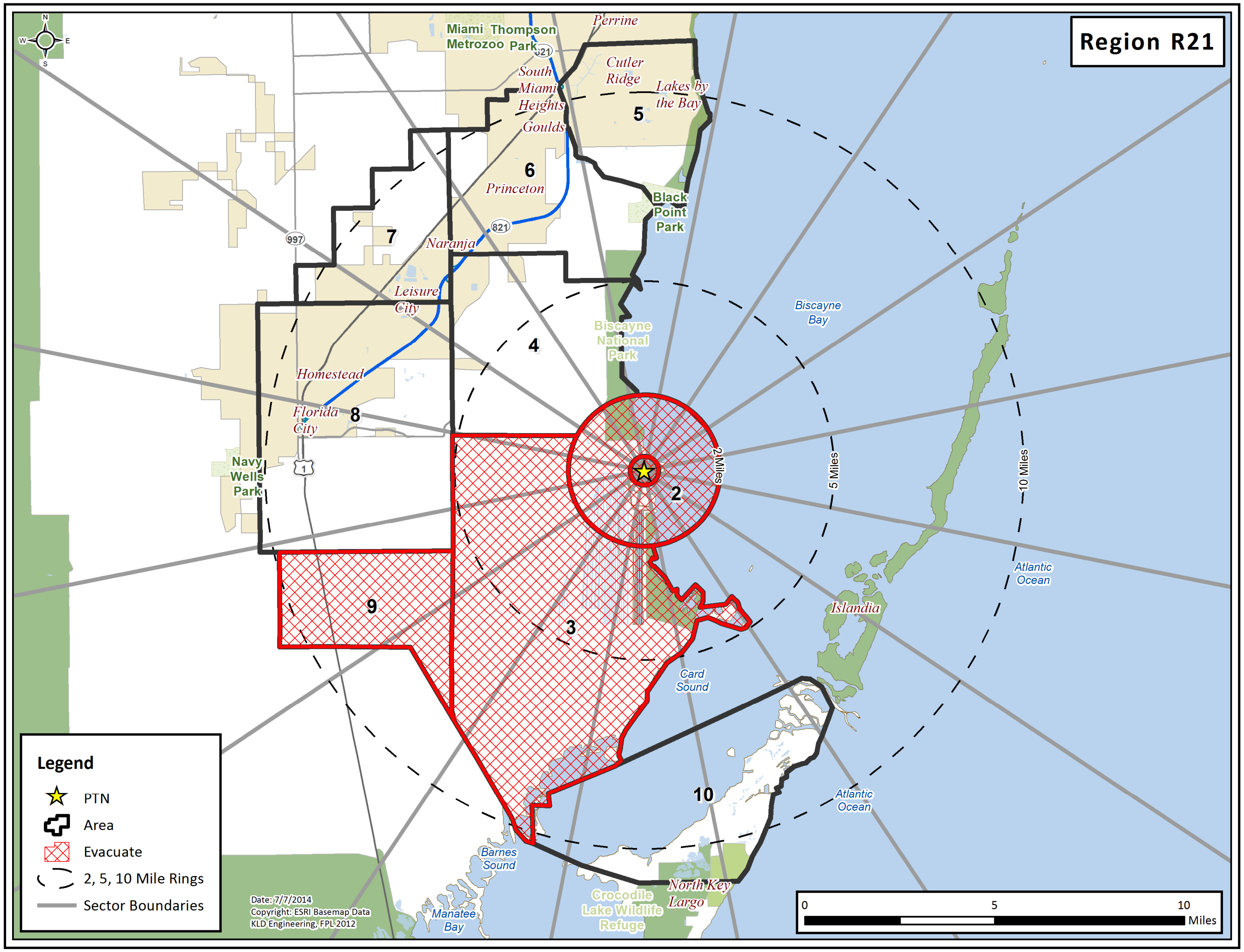


Figure H-21. Region R21

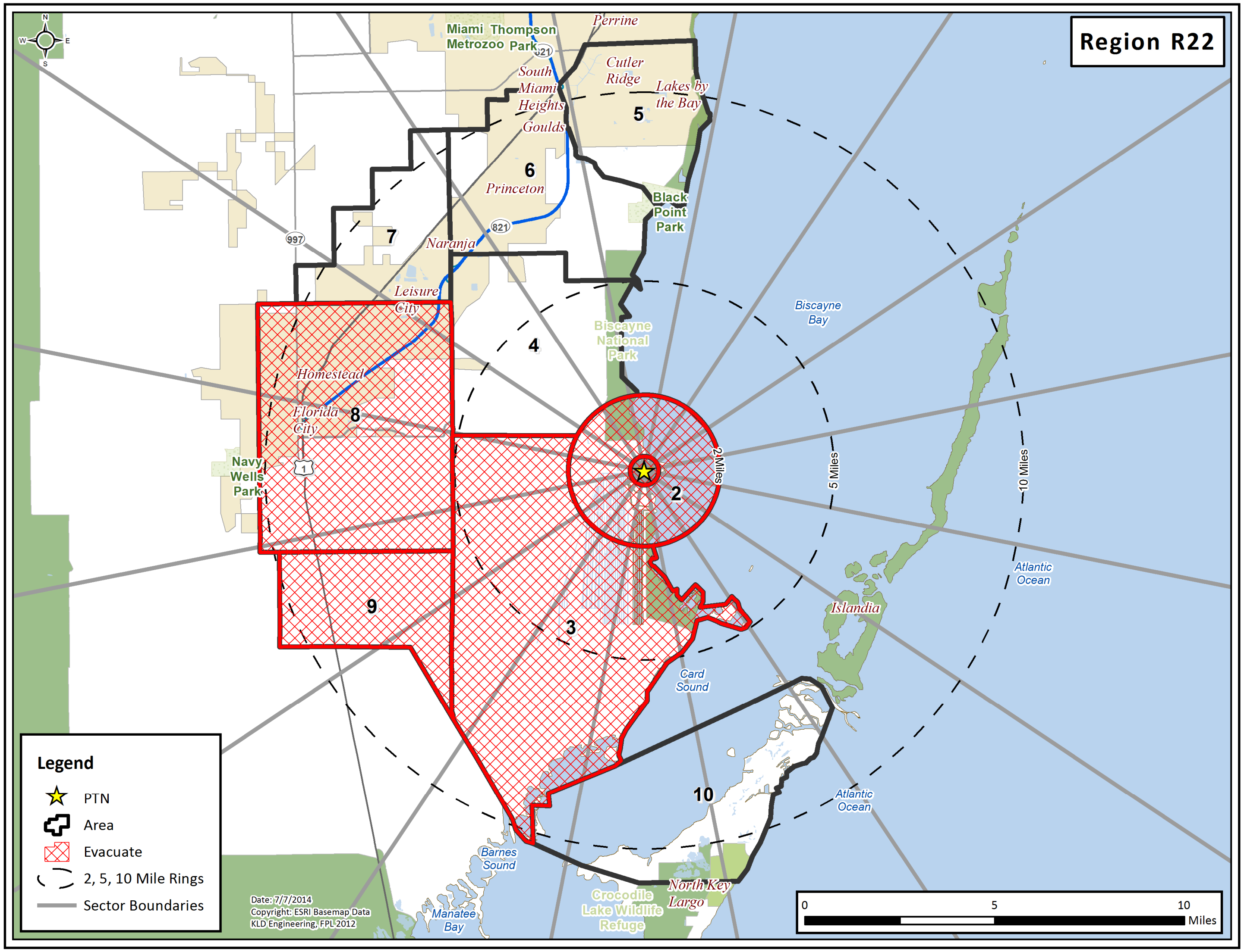


Figure H-22. Region R22

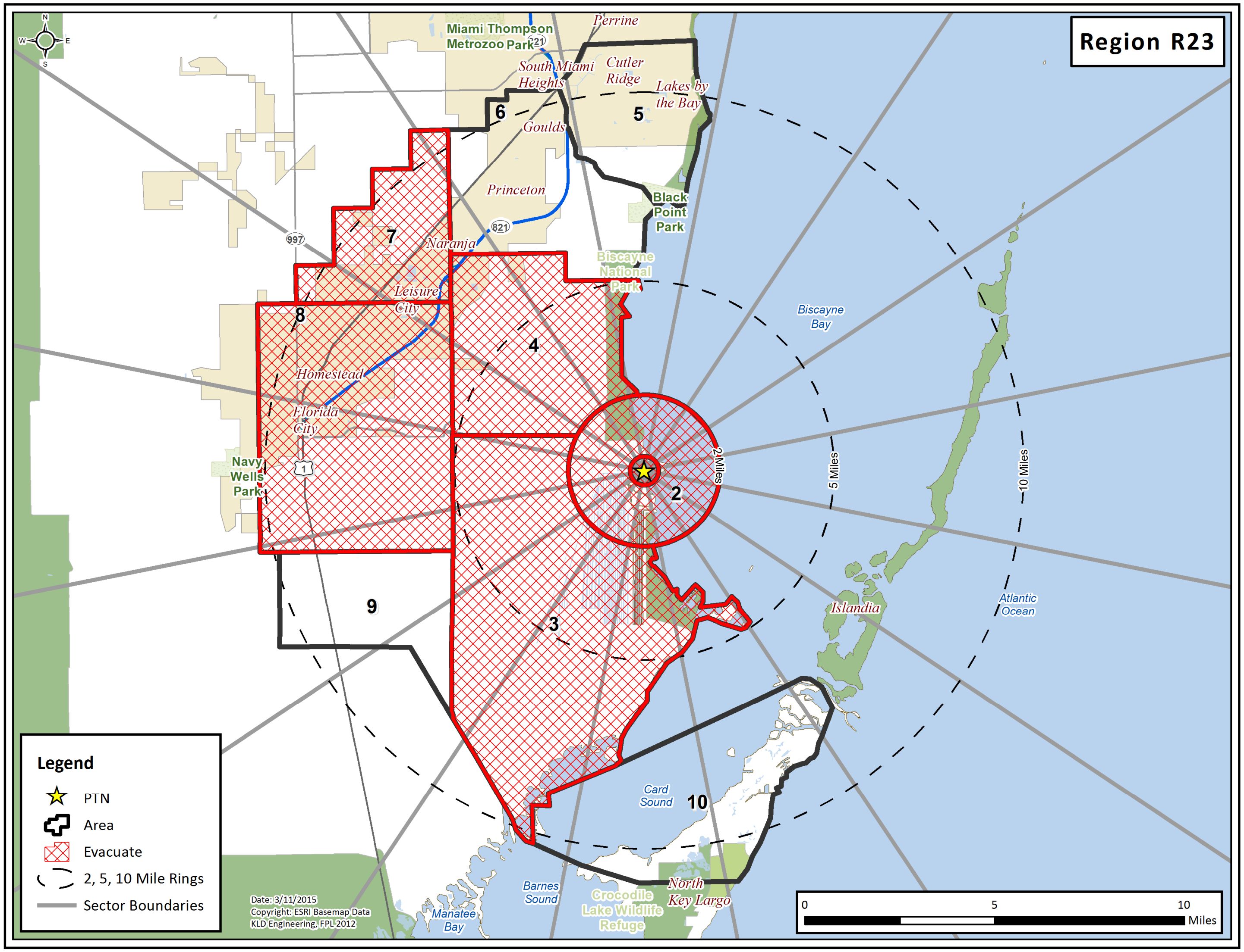


Figure H-23. Region R23

APPENDIX J

Representative Inputs to and Outputs from the DYNEV II System

J. REPRESENTATIVE INPUTS TO AND OUTPUTS FROM THE DYNEV II SYSTEM

This appendix presents data input to and output from the DYNEV II System. Table J-1 provides the volume and queues for the ten highest volume signalized intersections in the study area. Refer to Table K-2 and the figures in Appendix K for a map showing the geographic location of each intersection.

Table J-2 provides source (vehicle loading) and destination information for several roadway segments (links) in the analysis network. Refer to Table K-1 and the figures in Appendix K for a map showing the geographic location of each link.

Table J-3 provides network–wide statistics (average travel time, average speed and number of vehicles) for an evacuation of the entire EPZ (region R03) for each scenario. As expected, scenario 12 (roadway impact – one lane closed northbound on Florida Turnpike), exhibit the slowest average speeds and longest average travel times.

Table J-4 provides statistics (average speed and travel time) for the major evacuation routes – Florida Turnpike, Krome Ave, CR 905 and US-1 – for an evacuation of the entire EPZ (region R03) under scenario 1 conditions. As discussed in Section 7.3 and shown in Figures 7-3 through 7-7, US-1 Northbound and Krome Ave are congested for most of the evacuation. As such, the average speeds are comparably slower (and travel times longer) on these routes than on other evacuation routes.

Table J-5 provides the number of vehicles discharged and the cumulative percent of total vehicles discharged for each link exiting the analysis network, for an evacuation of the entire EPZ (region R03) under scenario 1 conditions. Refer to Table K-1 and the figures in Appendix K for a map showing the geographic location of each link.

Figure J-1 through Figure J-12 plot the trip generation time versus the ETE for each of the 12 scenarios considered. The distance between the trip generation and ETE curves is the travel time. Plots of trip generation versus ETE are indicative of the level of traffic congestion during evacuation. For low population density sites, the curves are close together, indicating short travel times and minimal traffic congestion. For higher population density sites, the curves are farther apart indicating longer travel times and the presence of traffic congestion. As seen in Figure J-1 through Figure J-12, the curves are spatially separated as a result of the pronounced traffic congestion in the EPZ, which is discussed in detail in Section 7.3.

Table J-1. Characteristics of the Ten Highest Volume Signalized Intersections

Node	Location	Intersection Control	Approach (Up Node)	Total Volume (Veh)	Max. Turn Queue (Veh)
452	US-1 & SH 992	Actuated	663	21,085	637
			747	1,030	0
			459	7,336	368
			466	8,545	79
			TOTAL	37,996	-
436	Turnpike On Ramp & SH 992	TCP-Actuated	435	9,359	420
			454	16,897	94
			481	7,695	41
			TOTAL	33,951	-
433	SW 117th Ave & SH 992	Actuated	717	8,650	571
			432	13,097	348
			435	11,640	108
			477	0	0
			TOTAL	33,387	-
454	Olivia L. Edwards Blvd & SH 992	Actuated	669	14,383	302
			443	8,427	93
			436	7,449	178
			TOTAL	30,259	-
109	US-1 & SW 184th St	TCP-Actuated	107	8,569	213
			105	14,407	148
			122	1,027	0
			418	4,327	38
			TOTAL	28,330	-
480	SW 137th Ave & SH 992	Actuated	430	5,259	0
			725	12,620	338
			128	10,336	424
			TOTAL	28,215	-
437	Turnpike On Ramp & SW 117th Ave	TCP-Actuated	436	14,859	159
			477	11,658	50
			TOTAL	26,517	-
450	US-1 & Colonial Dr	Actuated	663	1,020	0
			465	6,125	68
			485	19,021	558
			TOTAL	26,166	-

Node	Location	Intersection Control	Approach (Up Node)	Total Volume (Veh)	Max. Turn Queue (Veh)
777	US-1 & SH 973	Actuated	781	989	0
			775	24,499	1,747
			776	170	1
			TOTAL	25,658	-
775	US-1 & SW 136th St	Actuated	777	991	0
			747	18,458	1,650
			774	156	9
			783	5,879	1,360
			TOTAL	25,484	-

Table J-2. Sample Simulation Model Input

Link Number	Vehicles Entering Network on this Link	Directional Preference	Destination Nodes	Destination Capacity
6	1,505	N	8129	5,715
			8124	5,715
			8788	1,700
279	246	N	8129	5,715
			8124	5,715
			8788	1,700
410	115	NW	8114	1,700
			8788	1,700
			8458	3,810
584	355	NW	8129	5,715
			8124	5,715
			8788	1,700
735	31	NW	8124	5,715
			8788	1,700
			8458	3,810
819	72	NW	8788	1,700
			8458	3,810
			8474	6,750
915	365	NW	8129	5,715
			8124	5,715
			8788	1,700
1105	47	N	8129	5,715
			8124	5,715
			8788	1,700
1326	27	N	8458	3,810
			8474	6,750
			8010	6,750
1433	299	N	8129	5,715
			8124	5,715
			8788	1,700

Table J-3. Selected Model Outputs for the Evacuation of the Entire EPZ (Region R03)

Scenario	1	2	3	4	5	6	7	8	9	10	11	12
Network-Wide Average Travel Time (Min/Veh-Mi)	7.2	8.3	6.8	7.8	6.3	7.3	8.3	7.0	7.8	6.6	7.8	8.5
Network-Wide Average Speed (mph)	8.3	7.2	8.9	7.7	9.5	8.2	7.3	8.5	7.7	9.1	7.7	7.0
Total Vehicles Exiting Network	150,907	151,195	134,430	135,239	122,925	153,604	153,647	138,228	138,745	123,471	173,980	150,979

Table J-4. Average Speed (mph) and Travel Time (min) for Major Evacuation Routes

Road Name	Length (miles)	Elapsed Time (hours) 1 Speed (mph)	1 Travel Time (min)	2 Speed	2 Travel Time	3 Speed	3 Travel Time	4 Speed	4 Travel Time	5 Speed	5 Travel Time
US-1 Northbound	39.2	9.0	261.2	3.9	596.8	4.5	517.9	6.1	383.1	6.4	368.3
US-1 Southbound	39.1	34.0	69.0	15.1	155.3	6.1	384.1	38.2	61.5	53.1	44.2
Florida Turnpike Northbound	40.3	22.8	106.0	12.6	191.6	13.7	176.6	13.7	176.7	13.3	182.0
Florida Turnpike Southbound	41.1	34.0	72.5	14.1	175.0	6.0	408.5	28.7	85.9	37.0	66.7
Krome Ave	12.9	9.9	78.3	3.0	257.5	2.6	300.3	2.7	283.7	2.6	297.6
CR 905	10.0	24.3	24.7	9.5	62.9	14.8	40.6	53.2	11.3	52.6	11.4

Road Name	Length (miles)	6 Speed	6 Travel Time	7 Speed	7 Travel Time	8 Speed	8 Travel Time	9 Speed	9 Travel Time	10 Speed	10 Travel Time
US-1 Northbound	39.2	8.7	270.8	18.6	126.4	39.1	60.1	53.1	44.2	53.1	44.2
US-1 Southbound	39.1	53.4	43.9	53.2	44.1	53.4	43.9	53.4	43.9	53.4	43.9
Florida Turnpike Northbound	40.3	21.0	115.2	25.2	96.0	44.9	53.8	58.2	41.5	58.2	41.5
Florida Turnpike Southbound	41.1	44.9	54.9	49.5	49.8	58.4	42.2	58.8	41.9	58.8	41.9
Krome Ave	12.9	2.7	289.9	3.2	239.3	3.1	247.0	5.9	131.0	21.9	35.3
CR 905	10.0	52.6	11.4	52.6	11.4	52.6	11.4	53.2	11.3	53.2	11.3

Table J-5. Simulation Model Outputs at Network Exit Links for Region R03, Scenario 1

Network Exit Link	Road Name	Elapsed Time (hours)									
		1	2	3	4	5	6	7	8	9	10
		Vehicles Discharged During the Indicated Time Interval									
		Cumulative Percent of Vehicles Discharged by the Indicated Time									
176	Krome Ave	1,401	3,099	4,797	6,407	8,051	9,650	11,348	12,958	14,532	16,080
		10%	9%	8%	8%	8%	8%	9%	9%	10%	11%
641	US-1 Southbound	1,269	2,964	4,655	6,377	6,708	6,721	6,741	6,749	6,749	6,749
		9%	9%	8%	8%	7%	6%	5%	5%	5%	5%
1089	Florida Turnpike	1,742	6,225	10,692	14,791	18,969	23,039	26,270	26,785	26,833	26,833
		13%	18%	19%	19%	19%	20%	20%	18%	18%	18%
1331	Don Shula Expressway	4,341	8,466	13,433	18,560	22,818	26,274	30,016	34,876	35,191	35,191
		32%	24%	24%	24%	23%	23%	23%	24%	24%	24%
1507	SH 973	437	1,828	3,274	4,728	5,696	7,110	8,289	9,198	10,002	10,002
		3%	5%	6%	6%	6%	6%	6%	6%	7%	7%
1508	Busway	0	0	3	3	3	3	3	3	3	3
		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1511	US-1 Northbound	1,429	3,693	5,690	7,066	9,267	10,495	12,358	14,691	15,022	15,022
		11%	11%	10%	9%	9%	9%	9%	10%	10%	10%
1523	Old Cutler Rd	811	1,298	2,209	2,917	3,629	4,397	5,080	5,866	6,119	6,119
		6%	4%	4%	4%	4%	4%	4%	4%	4%	4%
1524	SW 67th Ave	14	224	600	858	1,068	1,311	1,584	1,808	1,873	1,873
		0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
1531	SW 117th Ave	590	2,659	4,391	6,599	8,233	9,387	10,130	11,089	11,188	11,188
		4%	8%	8%	8%	8%	9%	8%	8%	8%	8%
1563	SW 137th Ave	1,393	4,354	7,274	10,154	13,166	16,041	19,035	20,849	21,062	21,062
		10%	13%	13%	13%	13%	14%	15%	14%	14%	14%

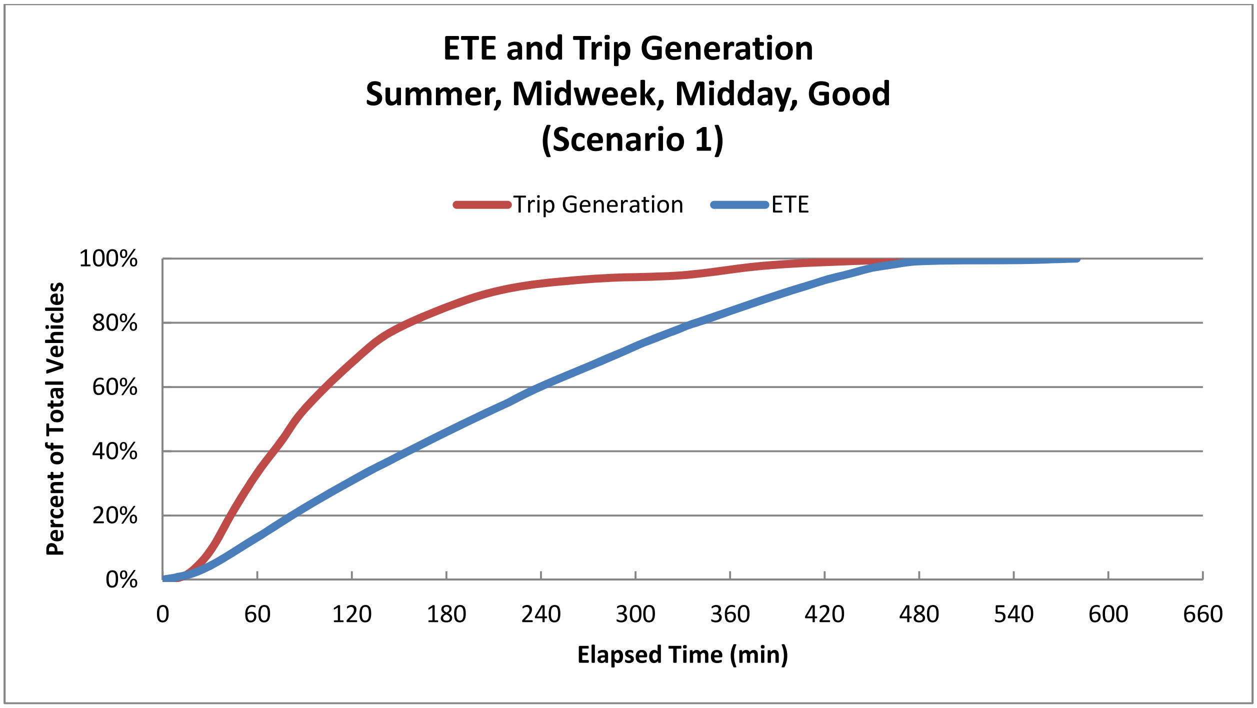


Figure J-1. ETE and Trip Generation: Summer, Midweek, Midday, Good Weather (Scenario 1)

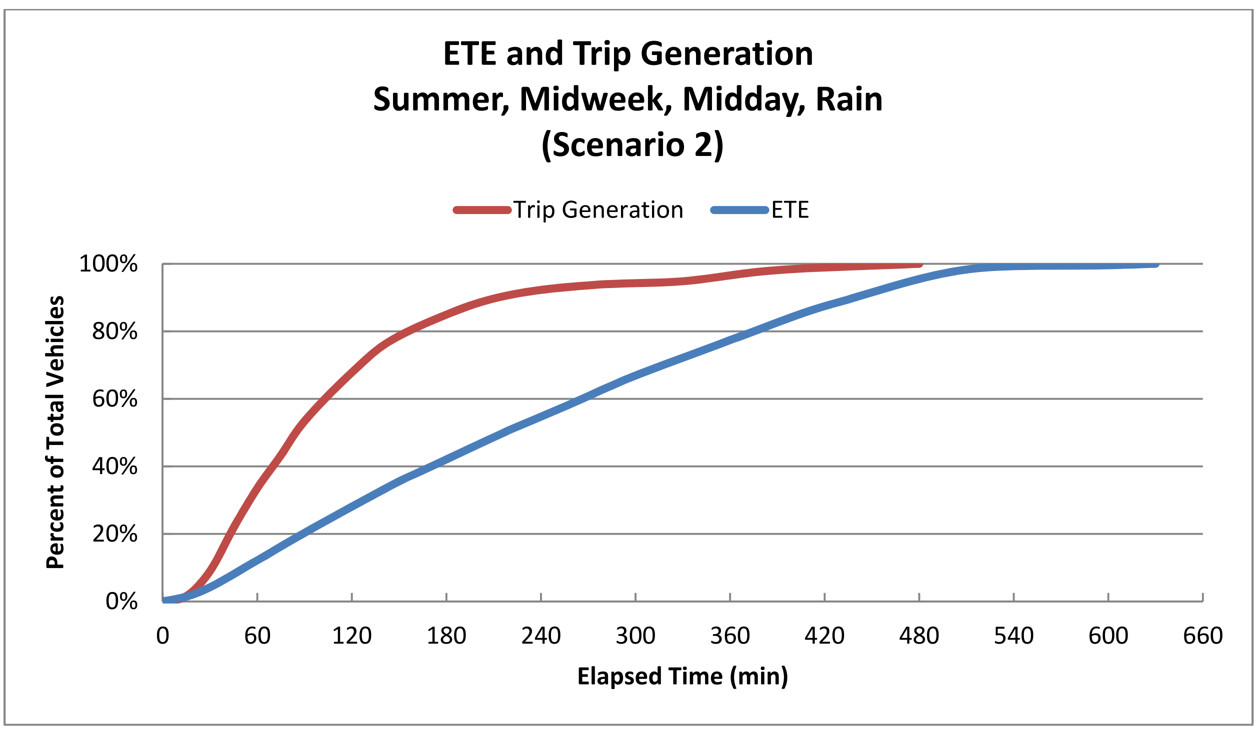


Figure J-2. ETE and Trip Generation: Summer, Midweek, Midday, Rain (Scenario 2)

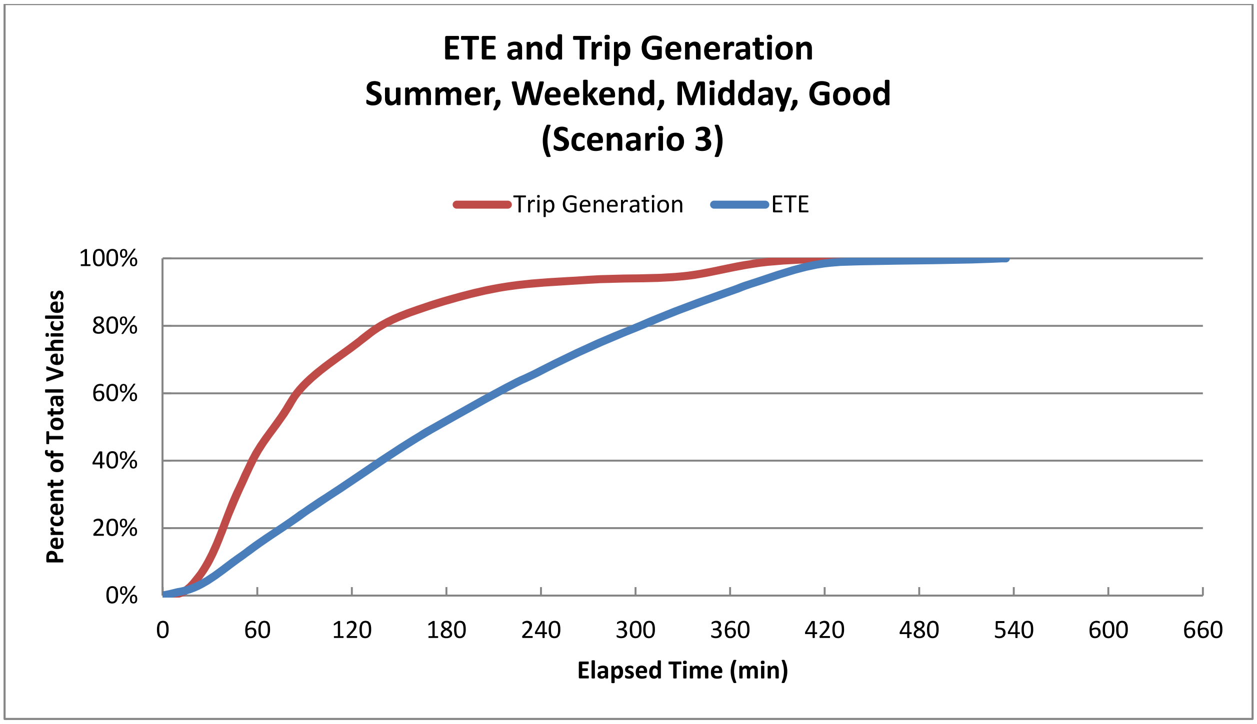


Figure J-3. ETE and Trip Generation: Summer, Weekend, Midday, Good Weather (Scenario 3)

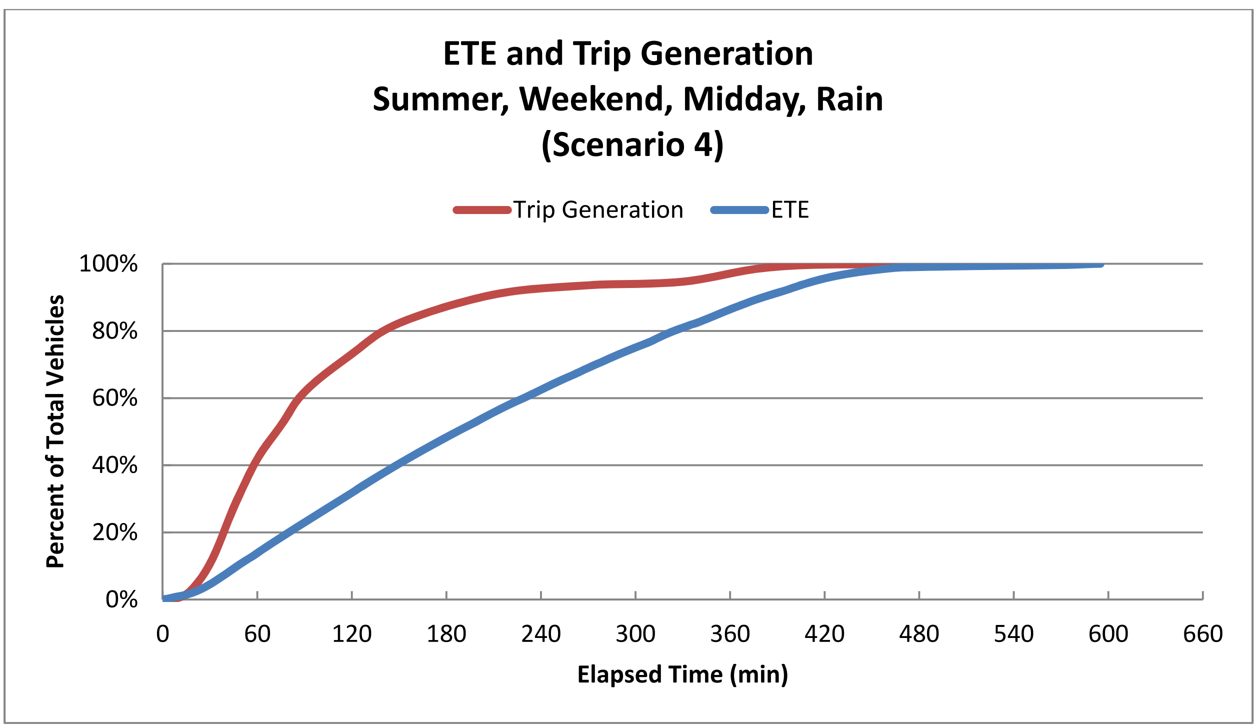


Figure J-4. ETE and Trip Generation: Summer, Weekend, Midday, Rain (Scenario 4)

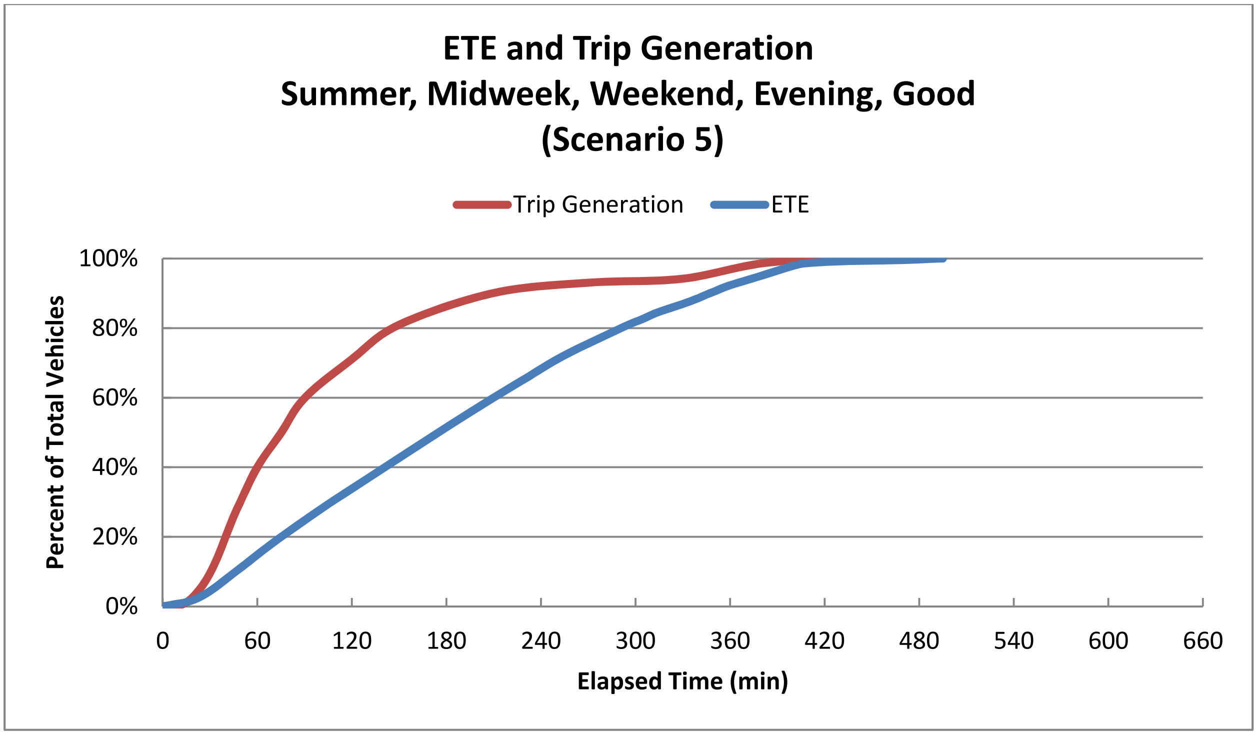


Figure J-5. ETE and Trip Generation: Summer, Midweek, Weekend, Evening, Good Weather (Scenario 5)

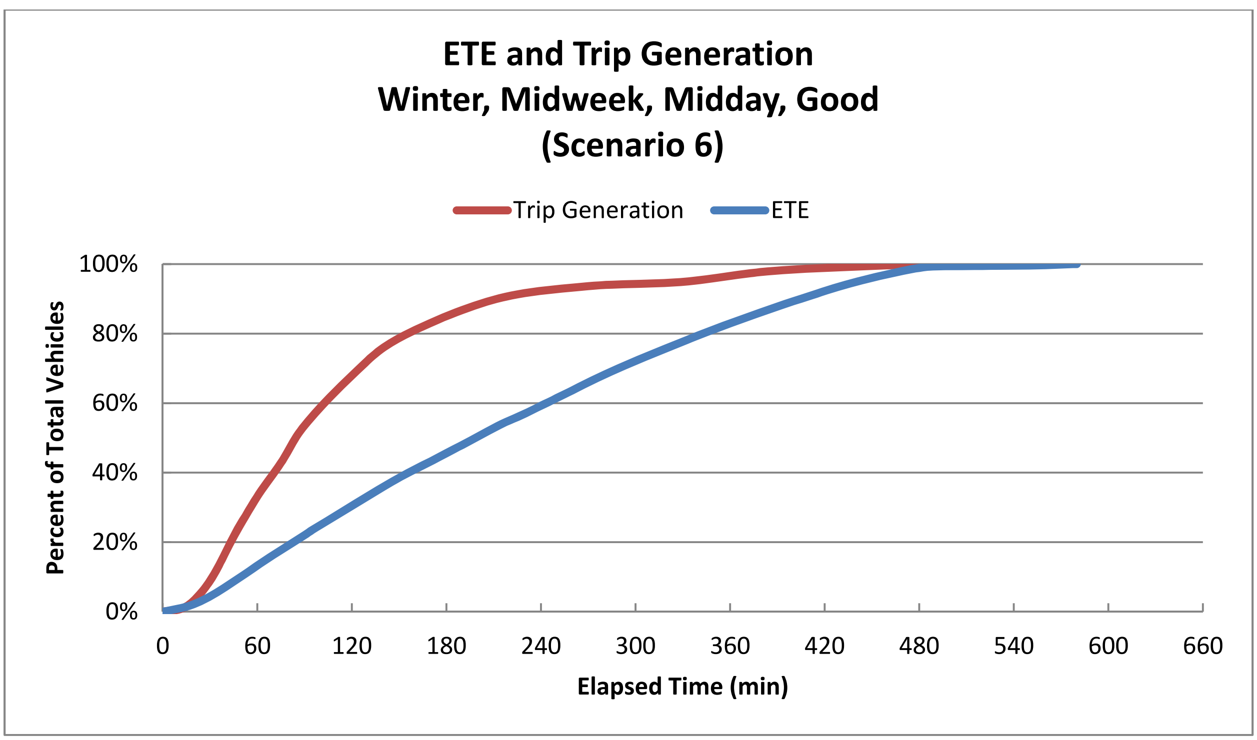


Figure J-6. ETE and Trip Generation: Winter, Midweek, Midday, Good Weather (Scenario 6)

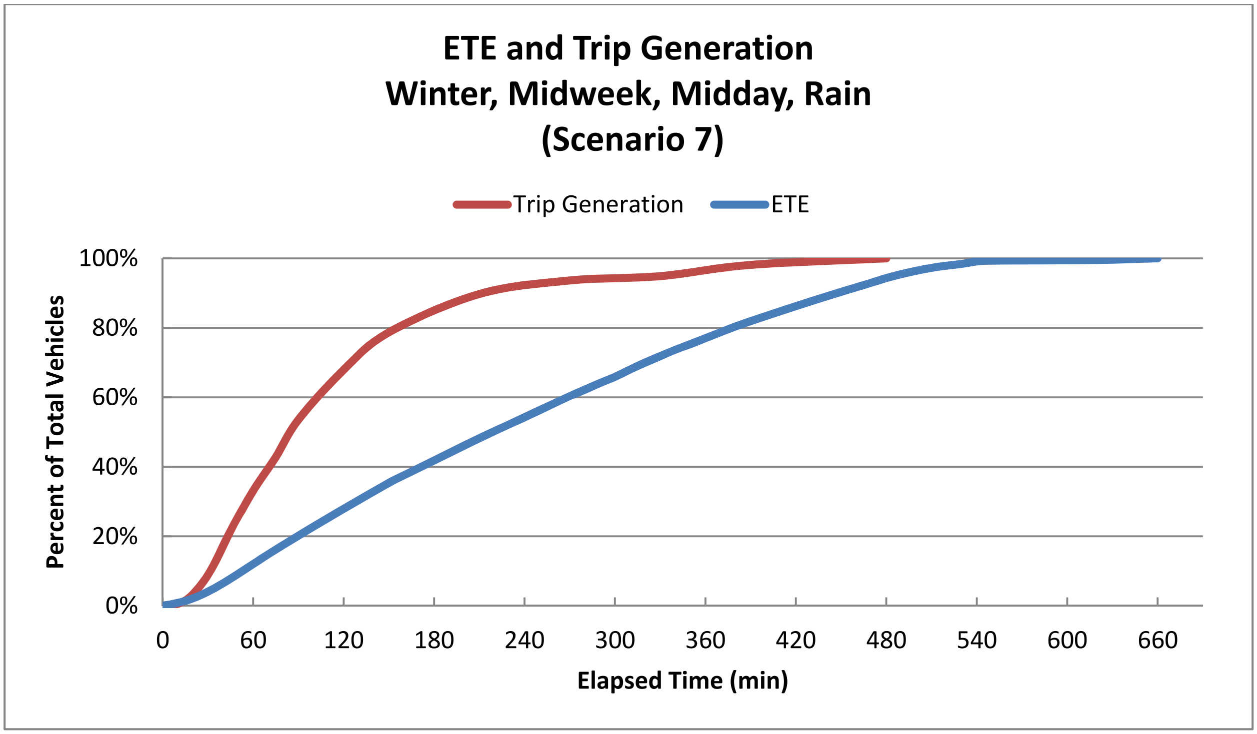


Figure J-7. ETE and Trip Generation: Winter, Midweek, Midday, Rain (Scenario 7)

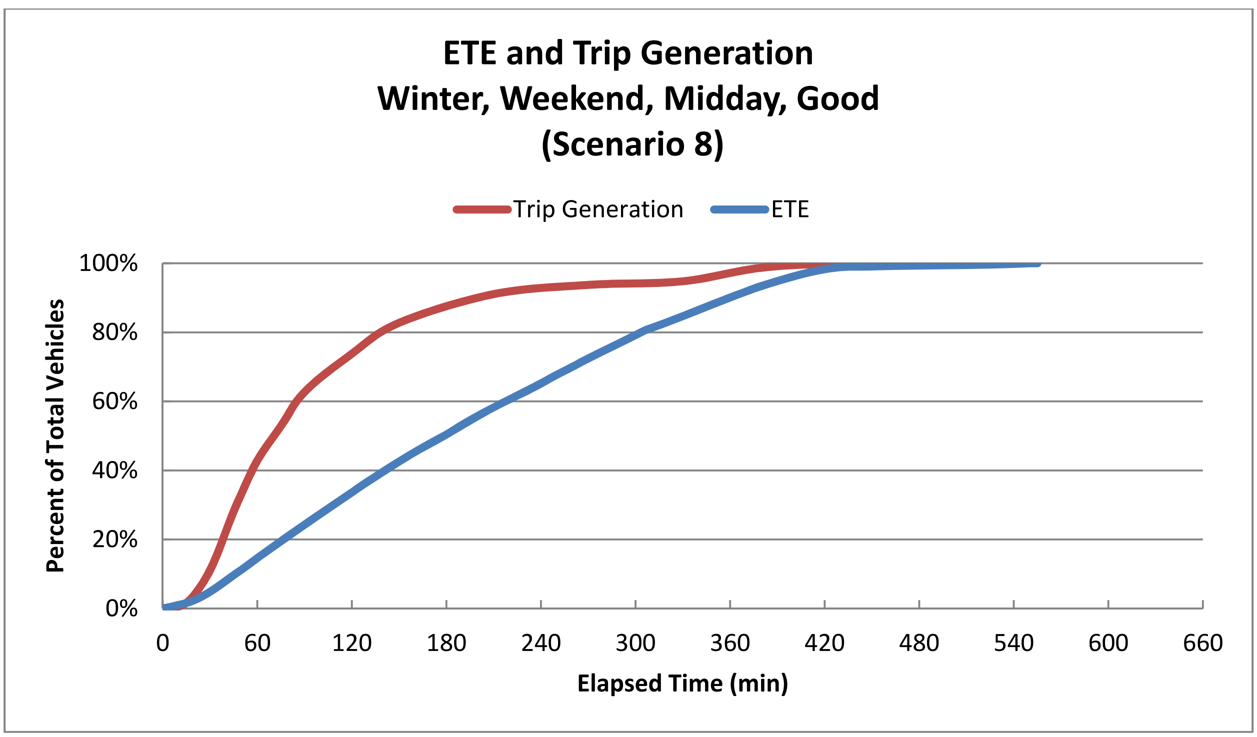


Figure J-8. ETE and Trip Generation: Winter, Weekend, Midday, Good Weather (Scenario 8)

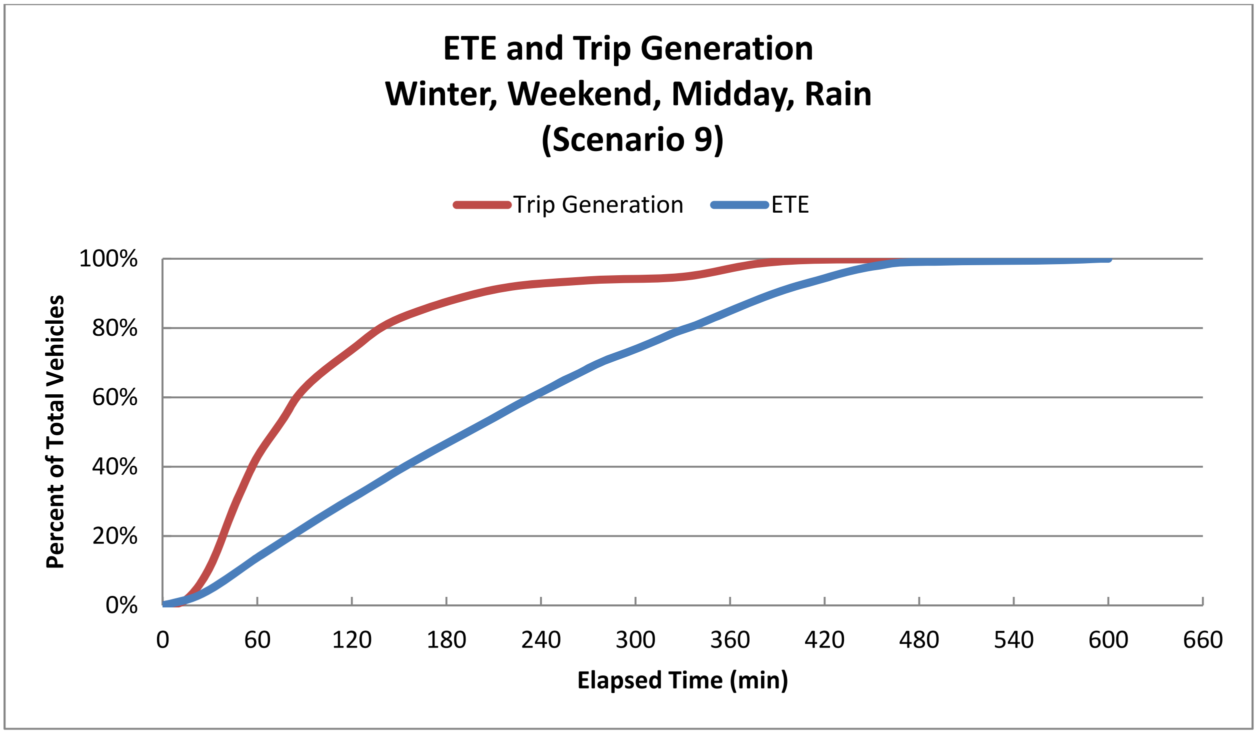


Figure J-9. ETE and Trip Generation: Winter, Weekend, Midday, Rain (Scenario 9)

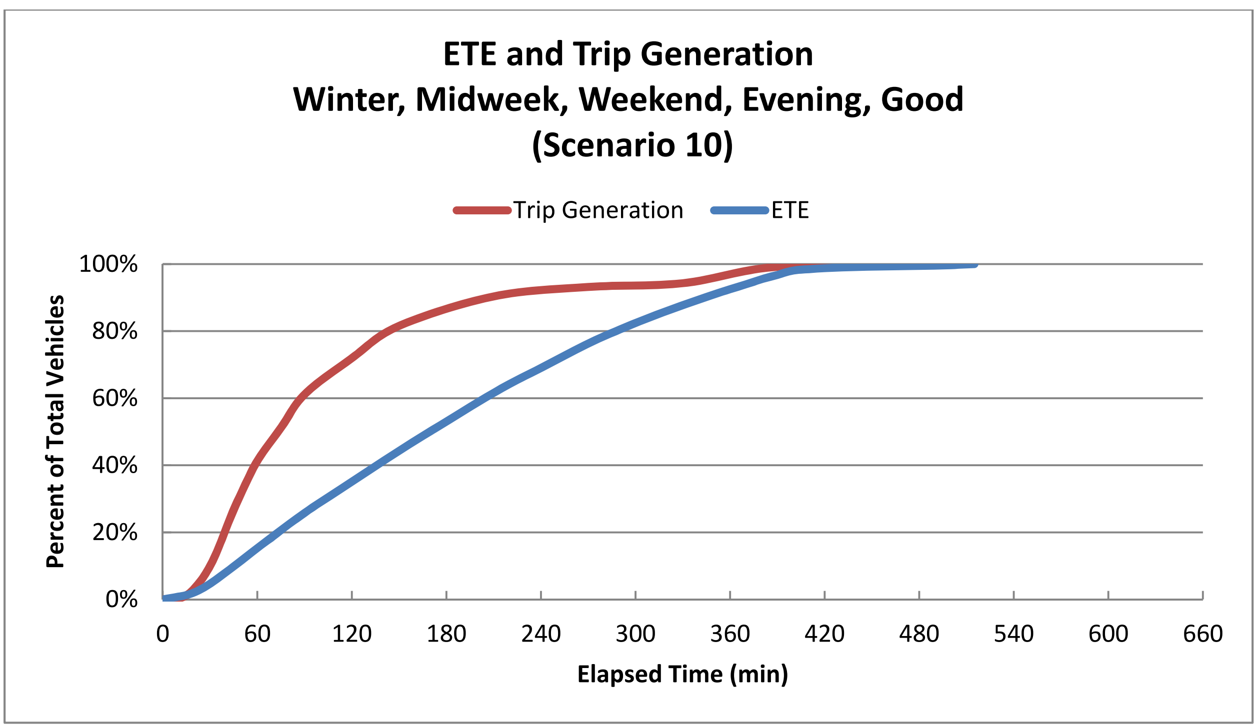


Figure J-10. ETE and Trip Generation: Winter, Midweek, Evening, Good Weather (Scenario 10)

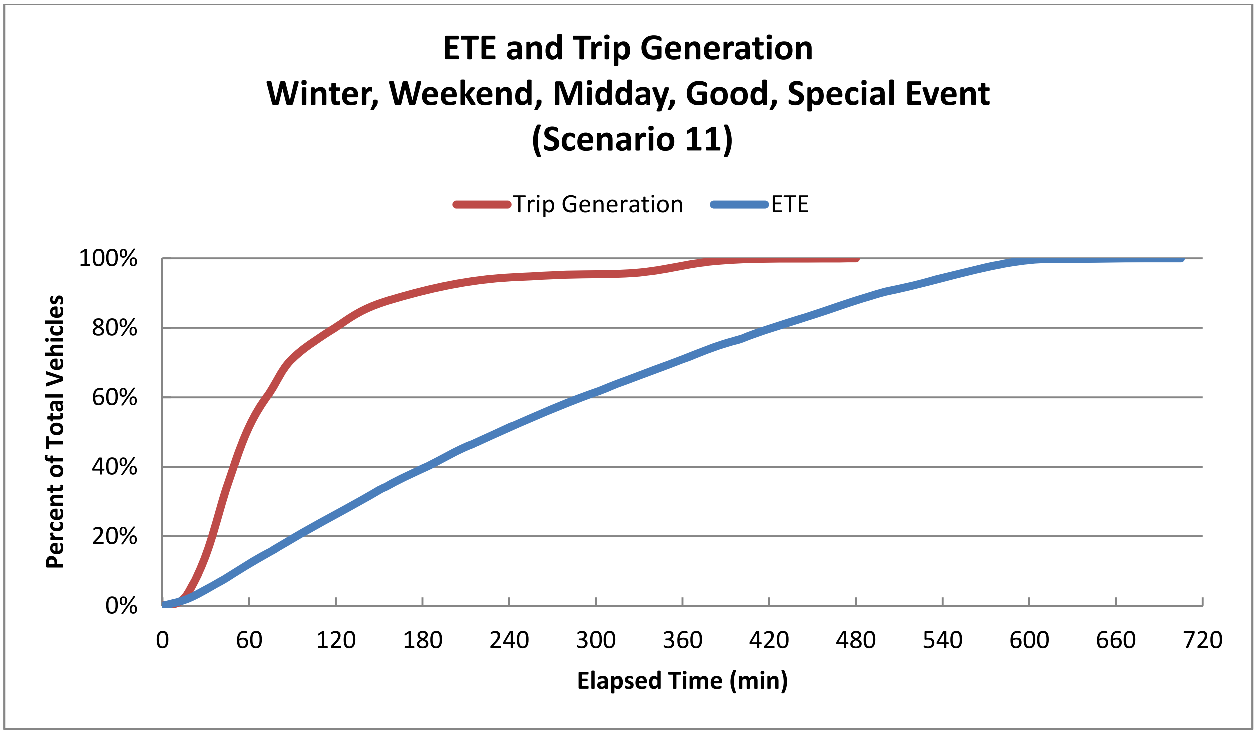


Figure J-11. ETE and Trip Generation: Winter, Weekend, Midday, Good Weather, Special Event (Scenario 11)

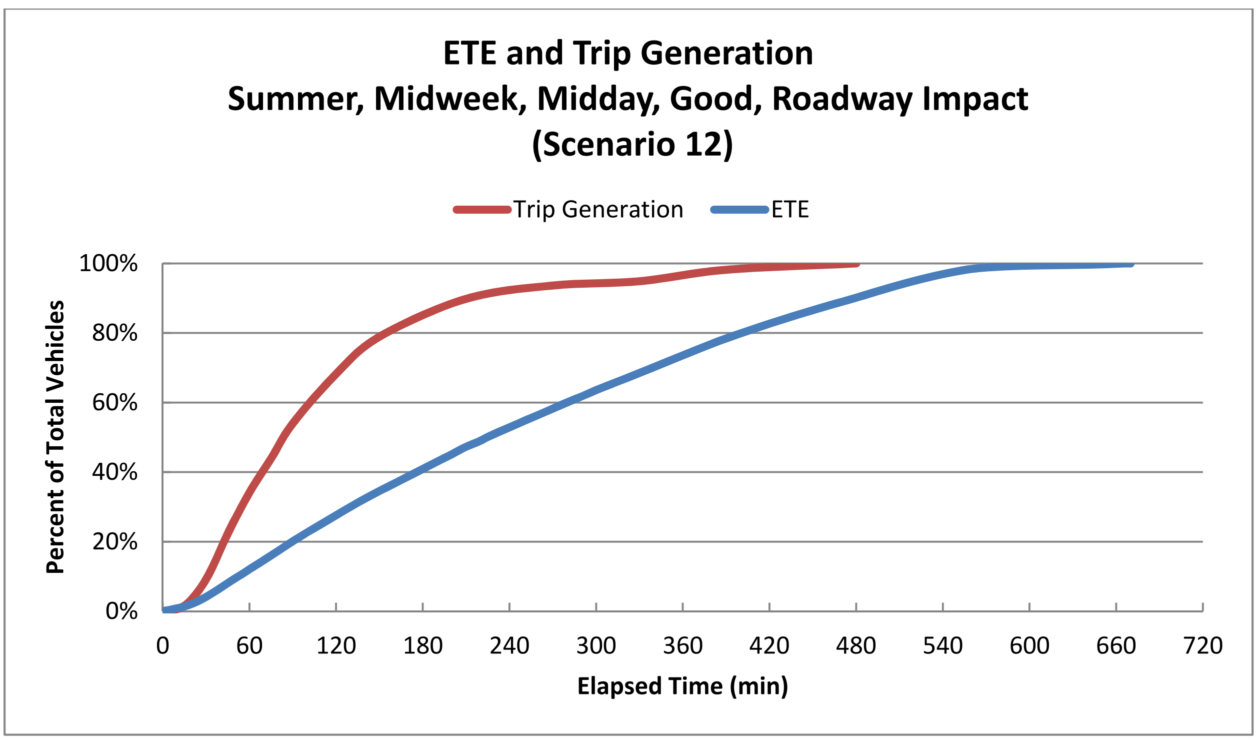


Figure J-12. ETE and Trip Generation: Summer, Midweek, Midday, Good Weather, Roadway Impact (Scenario 12)

APPENDIX K

Evacuation Roadway Network

K. EVACUATION ROADWAY NETWORK

As discussed in Section 1.3, a link-node analysis network was constructed to model the roadway network within the study area. Figure K-1 provides an overview of the link-node analysis network. The figure has been divided up into 32 more detailed figures (Figure K-2 through Figure K-33) which show each of the links and nodes in the network.

The analysis network was calibrated using the observations made during the field survey conducted in February 2012. Table K-1 lists the characteristics of each roadway section modeled in the ETE analysis. Each link is identified by its road name and the upstream and downstream node numbers. The geographic location of each link can be observed by referencing the grid map number provided in Table K-1. The roadway type identified in Table K-1 is based on the following criteria:

- Freeway: limited access highway, 2 or more lanes in each direction, high free flow speeds
- Freeway ramp: ramp on to or off of a limited access highway
- Major arterial: 3 or more lanes in each direction
- Minor arterial: 2 or more lanes in each direction
- Collector: single lane in each direction
- Local roadways: single lane in each direction, local roads with low free flow speeds

The term, "No. of Lanes" in Table K-1 identifies the number of lanes that extend throughout the length of the link. Many links have additional lanes on the immediate approach to an intersection (turn pockets); these have been recorded and entered into the input stream for the DYNEV II System.

As discussed in Section 1.3, lane width and shoulder width were not physically measured during the road survey. Rather, estimates of these measures were based on visual observations and recorded images.

Table K-2 identifies each node in the network that is controlled and the type of control (stop sign, yield sign, pre-timed signal, actuated signal, traffic control point) at that node. Two types of traffic control points are identified – if the intersection is normally controlled (stop sign, yield sign, pre-timed signal or actuated signal), it is labeled TCP – actuated as it is modeled as an actuated signal. If the intersection is normally uncontrolled and it is a TCP, it is labeled TCP – uncontrolled. All other uncontrolled nodes are not included in Table K-2. The location of each node can be observed by referencing the grid map number provided.

Table K-1. Evacuation Roadway Network Characteristics

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1	1	78	SH 994	COLLECTOR	5256	1	12	4	1700	50	5
2	1	623	SH 997	COLLECTOR	2750	1	12	4	1700	50	5
3	1	699	SH 997	COLLECTOR	2649	1	12	4	1700	50	5
4	2	243	SH 905	COLLECTOR	4414	1	12	0	1700	45	29
5	2	244	CARD SOUND	COLLECTOR	2635	1	12	0	1700	60	29
6	3	27	OLD CULTER RD	COLLECTOR	3315	1	12	4	1750	45	9
7	3	257	OLD CULTER RD	COLLECTOR	2311	1	12	4	1700	45	9
8	4	6	TURNPIKE OFF RAMP TO SW 184TH ST	FREEWAY RAMP	1225	2	12	4	1750	40	7
9	4	9	FLORIDA TURNPIKE	FREEWAY	3767	3	12	10	2250	70	7
10	4	10	FLORIDA TURNPIKE	FREEWAY	8634	4	12	10	2250	70	7
11	5	4	TURNPIKE ON RAMP FROM SW 184TH ST	FREEWAY RAMP	1474	2	12	4	1900	50	7
12	5	6	SW 184TH ST	MINOR ARTERIAL	525	2	12	4	1750	45	7
13	5	650	SW 184TH ST	MINOR ARTERIAL	565	2	12	4	1750	45	7
14	6	5	SW 184TH ST	MINOR ARTERIAL	525	4	12	4	1750	45	7
15	6	8	TURNPIKE SERVICE RD	LOCAL ROAD	1382	1	12	4	1750	40	7
16	6	646	SW 184TH ST	MINOR ARTERIAL	991	2	12	4	1750	40	7
17	7	5	TURNPIKE SERVICE RD	MINOR ARTERIAL	1315	2	12	4	1750	40	7
18	7	8	SH 994	MAJOR ARTERIAL	516	2	12	4	1750	40	7
19	7	103	SH 994	MINOR ARTERIAL	2254	2	12	4	1750	40	7
20	8	7	SH 994	MAJOR ARTERIAL	516	3	12	4	1750	40	7
21	8	102	SH 994	MINOR ARTERIAL	997	2	12	4	1900	40	7
22	8	642	TURNPIKE SERVICE RD	MINOR ARTERIAL	603	2	12	4	1900	40	7

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
23	9	4	FLORIDA TURNPIKE	FREEWAY	3767	3	12	10	2250	70	7
24	9	11	FLORIDA TURNPIKE	FREEWAY	4429	3	12	10	2250	70	9
25	9	643	TURNPIKE OFF RAMP TO SW 186TH ST	FREEWAY RAMP	508	1	12	4	1700	40	7
26	10	4	FLORIDA TURNPIKE	FREEWAY	8633	4	12	10	2250	70	7
27	10	440	FLORIDA TURNPIKE	FREEWAY	737	4	12	10	2250	70	2
28	10	481	TURNPIKE OFF RAMP TO SR 992	FREEWAY RAMP	486	1	12	4	1700	45	7
29	11	9	FLORIDA TURNPIKE	FREEWAY	4429	3	12	10	2250	70	9
30	11	15	TURNPIKE OFF RAMP TO OLD CUTTLER RD	FREEWAY RAMP	1621	1	12	4	1750	40	9
31	11	219	FLORIDA TURNPIKE	FREEWAY	648	3	12	10	2250	70	9
32	12	13	TURNPIKE ON RAMP FROM US 1	FREEWAY RAMP	373	1	12	4	1575	35	9
33	12	215	US 1	MAJOR ARTERIAL	1390	3	12	3	1750	45	9
34	12	268	US 1	MAJOR ARTERIAL	268	3	12	3	1900	45	9
35	13	14	TURNPIKE ON RAMP FROM US 1	FREEWAY RAMP	335	1	12	4	1575	35	9
36	14	11	TURNPIKE ON RAMP FROM US 1	FREEWAY RAMP	524	1	12	4	1575	35	9
37	15	19	CARIBBEAN BLVD	MAJOR ARTERIAL	339	3	12	4	1750	40	9
38	15	20	TURNPIKE EXTENTION	MINOR ARTERIAL	927	2	12	4	1900	40	9
39	15	496	CARIBBEAN BLVD	MINOR ARTERIAL	371	2	12	4	1900	40	9
40	16	267	CARIBBEAN BLVD	COLLECTOR	1560	1	12	4	1700	40	9
41	16	637	CARIBBEAN BLVD	COLLECTOR	1921	1	12	4	1750	40	9
42	17	21	CUTLER RIDGE BLVD	MINOR ARTERIAL	372	2	12	4	1750	40	9
43	17	23	TURNPIKE EXTENTION	MAJOR ARTERIAL	233	3	12	4	1900	40	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
44	17	492	CUTLER RIDGE BLVD	MINOR ARTERIAL	445	2	12	4	1750	45	9
45	18	20	TURNPIKE OFF RAMP	FREEWAY RAMP	582	1	12	4	1700	40	9
46	18	24	FLORIDA TURNPIKE	FREEWAY	1342	2	12	10	2250	70	9
47	18	219	FLORIDA TURNPIKE	FREEWAY	1336	3	12	10	2250	70	9
48	19	15	CARIBBEAN BLVD	MAJOR ARTERIAL	339	3	12	4	1750	40	9
49	19	129	SW 107TH AVE	MINOR ARTERIAL	1924	2	12	4	1900	40	9
50	19	267	CARIBBEAN BLVD	MINOR ARTERIAL	554	2	12	4	1900	40	9
51	20	17	TURNPIKE EXTENTION	MAJOR ARTERIAL	678	3	12	4	1750	40	9
52	21	17	CUTLER RIDGE BLVD	MINOR ARTERIAL	372	2	12	4	1750	40	9
53	21	22	TURNPIKE EXTENTION	MAJOR ARTERIAL	630	3	12	4	1900	40	9
54	22	18	TURNPIKE ON RAMP	FREEWAY RAMP	529	1	12	4	1700	50	9
55	22	19	TURNPIKE EXTENTION	MINOR ARTERIAL	700	2	12	4	1750	40	9
56	23	25	TURNPIKE ON RAMP	FREEWAY RAMP	1633	1	12	4	1700	50	9
57	23	260	TURNPIKE EXTENTION	MINOR ARTERIAL	2054	1	12	4	1750	40	9
58	24	18	FLORIDA TURNPIKE	FREEWAY	1342	3	12	10	2250	70	9
59	24	25	FLORIDA TURNPIKE	FREEWAY	1764	2	12	10	2250	70	9
60	25	24	FLORIDA TURNPIKE	FREEWAY	1764	2	12	10	2250	70	9
61	25	26	TURNPIKE OFF RAMP	COLLECTOR	988	1	12	4	1700	40	9
62	25	29	FLORIDA TURNPIKE	FREEWAY	2070	2	12	10	2250	70	9
63	26	21	TURNPIKE EXTENTION	MAJOR ARTERIAL	1048	3	12	4	1750	40	9
64	27	3	OLD CULTER RD	COLLECTOR	3315	1	12	4	1700	45	9
65	27	28	SW 216TH ST	MINOR ARTERIAL	3461	2	12	0	1750	45	9
66	27	262	SW 216TH ST	MINOR ARTERIAL	2603	2	12	4	1900	40	9
67	27	266	OLD CULTER RD	COLLECTOR	3621	1	12	4	1750	40	9
68	28	26	TURNPIKE EXTENTION	MINOR ARTERIAL	1404	2	12	4	1900	40	9
69	28	27	SW 216TH ST	MINOR ARTERIAL	3461	2	12	0	1750	45	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
70	28	260	SW 216TH ST	MAJOR ARTERIAL	362	2	12	0	1750	45	9
71	29	25	FLORIDA TURNPIKE	FREEWAY	2070	2	12	10	2250	70	9
72	29	31	FLORIDA TURNPIKE	FREEWAY	6534	2	12	10	2250	70	13
73	29	265	TURNPIKE OFF RAMP	FREEWAY RAMP	729	1	12	4	1700	40	9
74	30	29	TURNPIKE ON RAMP	FREEWAY RAMP	726	1	12	4	1700	50	9
75	31	29	FLORIDA TURNPIKE	FREEWAY	6534	2	12	10	2250	70	13
76	31	32	FLORIDA TURNPIKE	FREEWAY	4136	2	12	10	2250	70	13
77	32	31	FLORIDA TURNPIKE	FREEWAY	4140	2	12	10	2250	70	13
78	32	33	FLORIDA TURNPIKE	FREEWAY	1589	2	12	10	2250	70	13
79	32	35	TURNPIKE OFF RAMP TO SH 989	FREEWAY RAMP	1152	1	12	4	1700	40	13
80	33	32	FLORIDA TURNPIKE	FREEWAY	1589	2	12	10	2250	70	13
81	33	34	FLORIDA TURNPIKE	FREEWAY	854	2	12	10	2250	70	13
82	33	37	TURNPIKE ON RAMP FROM SH 989	FREEWAY RAMP	920	1	12	4	1350	30	13
83	34	33	FLORIDA TURNPIKE	FREEWAY	854	2	12	10	2250	70	13
84	34	36	TURNPIKE OFF RAMP TO SH 989	FREEWAY RAMP	1165	1	12	4	1750	40	13
85	34	39	FLORIDA TURNPIKE	FREEWAY	4394	2	12	10	2250	70	13
86	35	34	TURNPIKE ON RAMP FROM SH 989	FREEWAY RAMP	1635	1	12	4	1700	50	13
87	35	38	SH 989	MINOR ARTERIAL	216	2	12	4	1900	55	13
88	35	220	SH 989	MINOR ARTERIAL	1026	2	12	4	1750	55	13
89	36	32	TURNPIKE ON RAMP FROM SH 989	FREEWAY RAMP	1492	1	12	4	1700	50	13
90	36	38	SH 989	MINOR ARTERIAL	832	2	12	4	1900	50	13
91	36	221	SH 989	COLLECTOR	4723	2	12	4	1750	50	13

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
92	37	38	TURNPIKE ON RAMP FROM SH 989	FREEWAY RAMP	710	1	12	4	1350	30	13
93	38	35	SH 989	MINOR ARTERIAL	216	2	12	4	1900	55	13
94	38	36	SH 989	MINOR ARTERIAL	832	2	12	4	1750	55	13
95	39	34	FLORIDA TURNPIKE	FREEWAY	4394	2	12	10	2250	70	13
96	39	40	FLORIDA TURNPIKE	FREEWAY	2609	2	12	10	2250	70	13
97	40	39	FLORIDA TURNPIKE	FREEWAY	2607	2	12	10	2250	70	13
98	40	41	FLORIDA TURNPIKE	FREEWAY	6379	2	12	10	2250	70	13
99	41	40	FLORIDA TURNPIKE	FREEWAY	6379	2	12	10	2250	70	13
100	41	42	TURNPIKE OFF RAMP TO SW 137TH ST	FREEWAY RAMP	1233	1	12	4	1750	40	13
101	41	44	FLORIDA TURNPIKE	FREEWAY	2363	2	12	10	2250	70	13
102	42	43	SW 137TH AVE	MAJOR ARTERIAL	2166	3	12	4	1900	50	13
103	42	383	SW 137TH AVE	MINOR ARTERIAL	513	2	12	4	1750	50	13
104	43	42	SW 137TH AVE	MINOR ARTERIAL	2166	2	12	4	1750	50	13
105	43	45	TURNPIKE ON RAMP FROM SW 137TH ST	FREEWAY RAMP	518	1	12	4	1700	40	13
106	43	690	SW 137TH AVE	MINOR ARTERIAL	1593	2	12	4	1750	45	13
107	44	41	FLORIDA TURNPIKE	FREEWAY	2363	2	12	10	2250	70	13
108	44	46	FLORIDA TURNPIKE	FREEWAY	1266	2	12	10	2250	70	13
109	45	44	TURNPIKE ON RAMP FROM SW 137TH ST	FREEWAY RAMP	654	1	12	4	1700	50	13
110	46	44	FLORIDA TURNPIKE	FREEWAY	1266	2	12	10	2250	70	13
111	46	47	FLORIDA TURNPIKE	FREEWAY	742	2	12	10	2250	70	13
112	47	46	FLORIDA TURNPIKE	FREEWAY	742	2	12	10	2250	70	13
113	47	48	TURNPIKE OFF RAMP TO SW 288TH ST	FREEWAY RAMP	1796	1	12	4	1750	40	13

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
114	47	52	FLORIDA TURNPIKE	FREEWAY	2174	2	12	10	2250	70	13
115	48	49	SW 288TH ST	MINOR ARTERIAL	468	2	12	4	1900	45	13
116	48	53	TURNPIKE ON RAMP FROM SW 288TH ST	FREEWAY RAMP	1303	1	12	4	1700	50	13
117	48	364	SW 288TH ST	MINOR ARTERIAL	2171	2	12	4	1750	45	12
118	49	47	TURNPIKE ON RAMP FROM SW 288TH ST	FREEWAY RAMP	1768	1	12	4	1700	50	13
119	49	48	SW 288TH ST	MAJOR ARTERIAL	468	3	12	4	1750	45	13
120	49	50	SW 288TH ST	MINOR ARTERIAL	419	2	12	4	1750	45	13
121	49	51	TURNPIKE ON RAMP FROM SW 288TH ST	FREEWAY RAMP	525	1	12	4	1350	30	13
122	50	49	SW 288TH ST	MAJOR ARTERIAL	419	3	12	4	1900	45	13
123	50	367	SW 288TH ST	MINOR ARTERIAL	962	2	12	4	1750	45	13
124	51	52	TURNPIKE ON RAMP FROM SW 288TH ST	FREEWAY RAMP	899	1	12	4	1700	50	13
125	52	47	FLORIDA TURNPIKE	FREEWAY	2174	2	12	10	2250	70	13
126	52	53	FLORIDA TURNPIKE	FREEWAY	902	2	12	10	2250	70	13
127	53	52	FLORIDA TURNPIKE	FREEWAY	902	2	12	10	2250	70	13
128	53	54	TURNPIKE OFF RAMP TO SW 288TH ST	FREEWAY RAMP	854	1	12	4	1700	40	13
129	53	57	FLORIDA TURNPIKE	FREEWAY	4513	2	12	10	2250	70	12
130	54	55	TURNPIKE OFF RAMP TO SW 288TH ST	FREEWAY RAMP	353	1	12	4	1700	40	13
131	55	50	TURNPIKE OFF RAMP TO SW 288TH ST	FREEWAY RAMP	429	1	12	4	1750	40	13
132	56	57	FLORIDA TURNPIKE	FREEWAY	5767	2	12	10	2250	70	17
133	56	60	FLORIDA TURNPIKE	FREEWAY	930	2	12	10	2250	70	17

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
134	57	53	FLORIDA TURNPIKE	FREEWAY	4528	2	12	10	2250	70	12
135	57	56	FLORIDA TURNPIKE	FREEWAY	5767	2	12	10	2250	70	17
136	58	209	TURNPIKE ON RAMP FROM CAMPBELL DR	FREEWAY RAMP	483	1	12	4	1350	30	17
137	59	61	CAMPBELL DR	MINOR ARTERIAL	1011	3	12	4	1750	45	17
138	59	341	SW 157TH AVE	COLLECTOR	538	1	12	4	1750	40	17
139	59	343	TURNPIKE ON RAMP FROM CAMPBELL DR	FREEWAY RAMP	569	1	12	4	1700	40	17
140	59	807	CAMPBELL DR	MINOR ARTERIAL	362	2	12	4	1750	45	17
141	60	56	FLORIDA TURNPIKE	FREEWAY	930	2	12	10	2250	70	17
142	60	59	TURNPIKE OFF RAMP TO CAMPBELL DR	COLLECTOR	946	2	12	4	1750	40	17
143	60	344	FLORIDA TURNPIKE	FREEWAY	771	2	12	10	2250	70	17
144	61	59	CAMPBELL DR	MAJOR ARTERIAL	1011	3	12	4	1750	45	17
145	61	94	CAMPBELL DR	MINOR ARTERIAL	1031	1	12	4	1700	45	17
146	62	63	FLORIDA TURNPIKE	FREEWAY	6041	2	12	10	2250	70	16
147	62	223	TURNPIKE OFF RAMP TO US 1	FREEWAY RAMP	1026	2	12	4	1900	60	18
148	62	673	TURNPIKE OFF RAMP TO US 1	FREEWAY RAMP	1051	1	12	4	1750	35	18
149	63	62	FLORIDA TURNPIKE	FREEWAY	6041	2	12	10	2250	70	16
150	63	344	FLORIDA TURNPIKE	FREEWAY	5191	2	12	10	2250	70	17
151	64	351	SW 152ND ST	COLLECTOR	1510	1	12	4	1700	40	17
152	65	66	TURNPIKE OFF RAMP TO US 1	FREEWAY RAMP	672	1	12	4	1700	50	18
153	66	67	US 1	MINOR ARTERIAL	739	2	12	4	1900	50	18

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
154	66	68	TURNPIKE ON RAMP FROM US 1	FREEWAY RAMP	1135	2	12	4	1900	50	18
155	66	158	US 1	MINOR ARTERIAL	1082	3	12	4	1750	50	18
156	67	66	US 1	MINOR ARTERIAL	739	2	12	4	1900	50	18
157	67	68	TURNPIKE ON RAMP FROM US 1	FREEWAY RAMP	427	1	12	4	1700	50	18
158	67	673	US 1	MINOR ARTERIAL	801	2	12	4	1750	50	18
159	68	62	FLORIDA TURNPIKE	FREEWAY	983	2	12	4	2250	60	18
160	69	70	US 1	MINOR ARTERIAL	452	2	12	4	1900	50	18
161	69	140	SH 997	COLLECTOR	1409	1	12	2	1700	40	18
162	69	218	US 1	MINOR ARTERIAL	3070	3	12	4	1900	50	18
163	70	69	US 1	MINOR ARTERIAL	452	3	12	4	1900	50	18
164	70	72	US 1	MINOR ARTERIAL	515	3	12	4	1900	50	18
165	71	70	CARD SOUND	COLLECTOR	596	1	12	0	1700	40	18
166	71	72	CARD SOUND	COLLECTOR	228	1	12	0	1700	40	18
167	72	70	US 1	MINOR ARTERIAL	515	2	12	4	1900	50	18
168	72	604	US 1	MINOR ARTERIAL	1588	2	12	4	1900	50	18
169	73	224	US 1	COLLECTOR	10028	1	12	5	1700	65	23
170	73	604	US 1	COLLECTOR	1531	1	12	4	1700	60	18
171	74	71	CARD SOUND	COLLECTOR	9512	1	12	0	1700	50	18
172	75	76	SH 997	COLLECTOR	6439	1	12	4	1700	50	5
173	75	488	SW 184TH ST	COLLECTOR	2631	1	12	4	1700	45	5
174	75	699	SH 997	COLLECTOR	2672	1	12	4	1700	50	5
175	76	75	SH 997	COLLECTOR	6439	1	12	4	1750	50	5
176	76	424	SH 997	COLLECTOR	4310	1	12	4	1700	50	5
177	77	85	SW 184TH ST	COLLECTOR	5329	2	12	4	1750	45	5

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
178	77	488	SW 184TH ST	COLLECTOR	8006	1	12	4	1700	45	5
179	77	731	SW 157TH AVE	COLLECTOR	5596	1	12	4	1700	40	5
180	78	1	SH 994	COLLECTOR	5256	1	12	4	1750	50	5
181	78	81	SH 994	COLLECTOR	2691	1	12	4	1700	50	5
182	79	618	SH 994	COLLECTOR	2709	1	12	4	1700	50	5
183	80	82	SW 216TH ST	COLLECTOR	5301	1	12	0	1575	35	5
184	80	130	SH 997	COLLECTOR	5152	1	12	4	1750	50	12
185	80	623	SH 997	COLLECTOR	2689	1	12	4	1700	50	5
186	81	78	SH 994	COLLECTOR	2691	1	12	4	1700	50	5
187	81	86	SH 994	COLLECTOR	8022	1	12	4	1750	50	5
188	82	78	SW 167TH AVE	COLLECTOR	5385	1	12	4	1700	40	5
189	82	80	SW 216TH ST	COLLECTOR	5301	1	12	0	1750	35	5
190	82	83	SW 216TH ST	COLLECTOR	2657	1	12	0	1700	50	5
191	83	81	SW 162ND AVE	COLLECTOR	5432	1	12	4	1700	45	5
192	83	82	SW 216TH ST	COLLECTOR	2657	1	12	0	1700	50	5
193	83	84	SW 216TH ST	COLLECTOR	2726	1	12	0	1700	50	5
194	84	83	SW 216TH ST	COLLECTOR	2726	1	12	0	1700	50	5
195	84	87	SW 216TH ST	COLLECTOR	5353	1	12	0	1750	50	5
196	85	77	SW 184TH ST	COLLECTOR	5329	1	12	4	1700	45	5
197	85	648	SW 184TH ST	COLLECTOR	4104	2	12	4	1900	45	5
198	85	730	SW 147TH AVE	COLLECTOR	5529	1	12	4	1700	40	5
199	86	81	SH 994	COLLECTOR	8022	1	12	4	1700	50	5
200	86	85	SW 147TH AVE	COLLECTOR	5505	1	12	4	1750	50	5
201	86	88	SH 994	COLLECTOR	5330	1	12	4	1750	45	5
202	87	84	SW 216TH ST	COLLECTOR	5353	1	12	0	1700	50	5
203	87	86	SW 147TH AVE	COLLECTOR	5579	1	12	4	1750	50	5

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
204	87	259	SW 216TH ST	COLLECTOR	6626	1	12	4	1750	50	5
205	88	86	SH 994	COLLECTOR	5330	1	12	4	1750	45	5
206	88	89	SW 137TH AVE	COLLECTOR	4666	1	12	4	1700	40	8
207	88	91	SH 994	COLLECTOR	4790	1	12	4	1700	45	8
208	89	127	SW 137TH AVE	COLLECTOR	1062	2	12	4	1750	40	6
209	90	92	SW 184TH ST	MINOR ARTERIAL	4001	2	12	4	1750	45	6
210	90	127	SW 184TH ST	MINOR ARTERIAL	1381	2	12	4	1750	45	6
211	91	88	SH 994	COLLECTOR	4790	1	12	4	1750	45	8
212	91	93	SH 994	MINOR ARTERIAL	561	2	12	4	1750	45	8
213	92	90	SW 184TH ST	MINOR ARTERIAL	4001	2	12	4	1750	45	6
214	92	126	SW 184TH ST	MINOR ARTERIAL	1395	2	12	4	1900	45	6
215	93	91	SH 994	MINOR ARTERIAL	561	2	12	4	1900	45	8
216	93	92	SW 127TH AVE	COLLECTOR	5878	1	12	4	1750	40	8
217	93	95	SH 994	MINOR ARTERIAL	1291	2	12	4	1900	40	8
218	94	58	TURNPIKE ON RAMP FROM CAMPBELL DR	FREEWAY RAMP	906	1	12	4	1700	40	17
219	94	61	CAMPBELL DR	MINOR ARTERIAL	1031	2	12	4	1750	45	17
220	94	399	CAMPBELL DR	MINOR ARTERIAL	596	1	12	4	1750	45	17
221	95	93	SH 994	MINOR ARTERIAL	1291	2	12	4	1750	40	8
222	95	96	SH 994	MINOR ARTERIAL	1755	2	12	4	1750	40	8
223	96	95	SH 994	MINOR ARTERIAL	1755	2	12	4	1900	40	8
224	96	97	SH 994	MINOR ARTERIAL	3643	2	12	4	1750	40	8
225	96	98	SW 122ND AVE	COLLECTOR	4763	1	12	4	1750	40	8
226	96	100	SW 122ND AVE	COLLECTOR	1230	1	12	4	1700	40	8
227	97	96	SH 994	MINOR ARTERIAL	3643	2	12	4	1750	40	8
228	97	99	SW 117TH AVE	COLLECTOR	2412	1	12	4	1750	40	6

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
229	97	101	SW 117TH AVE	COLLECTOR	3661	1	12	4	1750	40	8
230	97	645	SH 994	MINOR ARTERIAL	967	2	12	4	1750	40	7
231	98	99	SW 184TH ST	MINOR ARTERIAL	2641	2	12	4	1750	45	6
232	98	126	SW 184TH ST	MINOR ARTERIAL	1250	2	12	4	1900	45	6
233	98	649	SW 122ND AVE	COLLECTOR	5387	1	12	4	1700	40	6
234	99	98	SW 184TH ST	MINOR ARTERIAL	2641	2	12	4	1750	45	6
235	99	432	SW 117TH AVE	COLLECTOR	5445	2	12	4	1750	40	6
236	99	646	SW 184TH ST	MINOR ARTERIAL	676	2	12	4	1750	45	7
237	100	96	SW 122ND AVE	COLLECTOR	1230	1	12	4	1750	40	8
238	100	101	CARIBBEAN BLVD	COLLECTOR	2818	1	12	4	1750	40	8
239	101	97	SW 117TH AVE	COLLECTOR	3661	1	12	4	1750	40	8
240	101	100	CARIBBEAN BLVD	COLLECTOR	2818	1	12	4	1700	40	8
241	101	213	SW 117TH AVE	COLLECTOR	2144	1	12	4	1700	40	9
242	101	639	CARIBBEAN BLVD	COLLECTOR	1270	1	12	4	1750	40	9
243	102	8	SH 994	MINOR ARTERIAL	997	2	12	4	1750	40	7
244	102	645	SH 994	MINOR ARTERIAL	1151	2	12	4	1750	40	7
245	103	7	SH 994	MINOR ARTERIAL	2254	2	12	4	1750	45	7
246	103	104	MARLIN RD	MINOR ARTERIAL	868	2	12	4	1750	40	7
247	103	110	MARLIN RD	MINOR ARTERIAL	2105	2	12	4	1750	40	7
248	103	653	SH 994	MINOR ARTERIAL	2170	2	12	4	1750	45	7
249	104	103	MARLIN RD	MINOR ARTERIAL	868	2	12	4	1750	45	7
250	104	125	SW 107TH AVE	COLLECTOR	5450	1	12	4	1750	40	7
251	104	650	SW 184TH ST	MINOR ARTERIAL	2615	2	12	4	1750	45	7
252	104	652	SW 184TH ST	MINOR ARTERIAL	2553	2	12	4	1750	45	7
253	105	106	SH 994	COLLECTOR	2315	1	12	4	1700	40	7
254	105	109	US 1	MINOR ARTERIAL	922	3	12	3	1750	45	7

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
255	105	111	US 1	MINOR ARTERIAL	2974	3	12	3	1750	45	7
256	105	417	SH 994	MINOR ARTERIAL	254	2	12	4	1750	40	7
257	106	105	SH 994	COLLECTOR	2315	1	12	4	1750	40	7
258	106	107	SW 97TH ST	COLLECTOR	965	1	12	4	1750	40	7
259	106	108	SW 97TH ST	COLLECTOR	1259	1	12	4	1700	40	7
260	107	106	SW 97TH ST	COLLECTOR	965	1	12	4	1700	40	7
261	107	109	SW 184TH ST	MINOR ARTERIAL	1966	2	12	4	1750	45	7
262	107	123	SW 97TH ST	COLLECTOR	2771	1	12	4	1750	40	7
263	107	752	SW 184TH ST	MINOR ARTERIAL	511	1	12	4	1750	45	7
264	108	106	SW 97TH ST	COLLECTOR	1259	1	12	4	1700	40	7
265	108	119	FRANJO RD	COLLECTOR	2797	1	12	4	1750	40	9
266	109	105	US 1	MINOR ARTERIAL	922	3	12	3	1750	45	7
267	109	107	SW 184TH ST	MINOR ARTERIAL	1966	2	12	4	1750	45	7
268	109	122	US 1	MINOR ARTERIAL	1038	3	12	3	1900	50	7
269	109	418	SW 184TH ST	MINOR ARTERIAL	234	2	12	4	1750	30	7
270	110	103	MARLIN RD	MINOR ARTERIAL	2104	2	12	4	1750	40	7
271	110	416	MARLIN RD	MINOR ARTERIAL	848	2	12	4	1750	40	9
272	111	105	US 1	MINOR ARTERIAL	2974	3	12	3	1750	45	7
273	111	217	MARLIN RD	MINOR ARTERIAL	1804	2	12	4	1900	40	9
274	111	416	MARLIN RD	MINOR ARTERIAL	257	2	12	4	1750	40	9
275	111	660	US 1	MAJOR ARTERIAL	958	3	12	3	1750	45	9
276	112	115	SW 184TH ST	COLLECTOR	1170	1	12	4	1750	45	10
277	112	117	SW 87TH AVE	COLLECTOR	1972	1	12	4	1750	45	10
278	112	482	SW 87TH AVE	COLLECTOR	3433	1	12	4	1700	40	10
279	112	752	SW 184TH ST	COLLECTOR	4811	1	12	4	1750	45	10
280	113	114	OLD CULTER RD	COLLECTOR	3363	1	12	0	1750	45	10

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
281	113	115	SW 184TH ST	COLLECTOR	4037	1	12	4	1750	45	10
282	113	382	OLD CULTER RD	COLLECTOR	6390	1	11	0	1700	45	10
283	114	113	OLD CULTER RD	COLLECTOR	3363	1	12	0	1750	45	10
284	114	461	OLD CULTER RD	COLLECTOR	2729	1	12	0	1750	45	10
285	115	112	SW 184TH ST	COLLECTOR	1170	1	12	4	1750	45	10
286	115	113	SW 184TH ST	COLLECTOR	4037	1	12	4	1750	45	10
287	115	116	CARIBBEAN BLVD	COLLECTOR	1811	1	12	4	1700	40	10
288	116	115	CARIBBEAN BLVD	COLLECTOR	1811	1	12	4	1750	40	10
289	116	117	CARIBBEAN BLVD	COLLECTOR	1024	1	12	4	1750	40	10
290	117	112	SW 87TH AVE	COLLECTOR	1972	1	12	4	1750	45	10
291	117	116	CARIBBEAN BLVD	COLLECTOR	1030	1	12	4	1700	40	10
292	117	118	CARIBBEAN BLVD	COLLECTOR	889	1	12	4	1700	40	10
293	117	121	SW 87TH AVE	COLLECTOR	5048	1	12	4	1750	40	10
294	118	117	CARIBBEAN BLVD	COLLECTOR	877	1	12	4	1750	40	10
295	118	737	CARIBBEAN BLVD	COLLECTOR	990	1	12	4	1750	40	10
296	119	108	FRANJO RD	COLLECTOR	2797	1	12	4	1700	40	9
297	119	120	FRANJO RD	COLLECTOR	3647	1	12	4	1750	40	10
298	119	269	CARIBBEAN BLVD	COLLECTOR	2518	1	12	4	1750	40	9
299	119	737	CARIBBEAN BLVD	COLLECTOR	2675	1	12	4	1750	40	10
300	120	119	FRANJO RD	COLLECTOR	3647	1	12	4	1750	40	10
301	120	121	OLD CULTER RD	COLLECTOR	1315	1	12	4	1750	30	10
302	120	271	OLD CULTER RD	COLLECTOR	1619	1	12	4	1750	30	10
303	121	117	SW 87TH AVE	COLLECTOR	5048	1	12	4	1750	45	10
304	121	120	OLD CULTER RD	COLLECTOR	1315	1	12	4	1750	30	10
305	121	274	OLD CULTER RD	COLLECTOR	406	1	12	4	1700	45	10
306	122	109	US 1	MINOR ARTERIAL	1038	3	12	3	1750	45	7

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
307	122	661	US 1	MINOR ARTERIAL	1661	3	12	3	1750	30	7
308	123	483	US 1	MINOR ARTERIAL	730	3	12	3	1750	50	7
309	124	484	SW 168TH ST	MINOR ARTERIAL	248	1	12	4	1750	40	7
310	124	485	US 1	MAJOR ARTERIAL	592	3	12	3	1900	50	7
311	124	754	SW 168TH ST	COLLECTOR	4403	1	12	4	1700	40	10
312	125	444	SW 107TH AVE	COLLECTOR	2692	1	12	4	1750	40	7
313	125	445	SW 168TH ST	COLLECTOR	2709	1	12	4	1750	40	7
314	125	811	SW 168TH ST	COLLECTOR	2711	1	12	4	1750	40	7
315	126	92	SW 184TH ST	MINOR ARTERIAL	1395	2	12	4	1750	45	6
316	126	98	SW 184TH ST	MINOR ARTERIAL	1250	2	12	4	1750	45	6
317	127	90	SW 184TH ST	MINOR ARTERIAL	1381	2	12	4	1750	45	6
318	127	128	SW 137TH AVE	COLLECTOR	8169	3	12	4	1750	50	6
319	127	648	SW 184TH ST	MINOR ARTERIAL	1256	2	12	4	1900	45	6
320	128	480	SW 137TH AVE	MAJOR ARTERIAL	2673	3	12	4	1750	50	6
321	129	268	SW 107TH AVE	COLLECTOR	543	1	12	4	1700	40	9
322	130	80	SH 997	COLLECTOR	5152	1	12	4	1750	50	12
323	130	131	SH 997	COLLECTOR	5369	1	12	4	1750	50	12
324	130	141	SW 232ND ST	COLLECTOR	5299	1	12	4	1700	50	12
325	131	130	SH 997	COLLECTOR	5369	1	12	4	1750	50	12
326	131	142	SW 248TH ST	COLLECTOR	5367	1	12	4	1750	50	12
327	131	624	SH 997	COLLECTOR	2621	1	12	4	1700	50	12
328	132	143	SW 264TH ST	COLLECTOR	5360	1	12	4	1750	50	12
329	132	286	SH 997	COLLECTOR	2693	1	12	4	1750	50	12
330	132	624	SH 997	COLLECTOR	2669	1	12	4	1700	50	12
331	133	134	SH 997	COLLECTOR	2648	1	12	4	1750	50	12
332	133	144	SW 288TH ST	COLLECTOR	2698	1	12	4	1700	45	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
333	133	149	SW 288TH ST	COLLECTOR	2692	1	12	4	1700	50	12
334	133	625	SH 997	COLLECTOR	2611	1	12	4	1750	50	12
335	134	133	SH 997	COLLECTOR	2648	1	12	4	1750	50	12
336	134	135	SH 997	COLLECTOR	2664	2	12	3	1750	40	16
337	134	159	SW 296TH ST	COLLECTOR	2777	1	12	4	1700	40	12
338	134	160	SW 296TH ST	COLLECTOR	2645	1	12	4	1700	40	12
339	135	134	SH 997	COLLECTOR	2664	1	12	3	1750	40	16
340	135	136	SH 997	COLLECTOR	2667	1	14	8	1750	30	16
341	135	150	NE 15TH ST	COLLECTOR	2702	1	12	4	1750	40	16
342	135	742	NE 15TH ST	COLLECTOR	2621	1	12	4	1700	40	16
343	136	135	SH 997	COLLECTOR	2667	1	14	8	1750	30	16
344	136	151	CAMPBELL DR	COLLECTOR	2748	1	12	4	1750	35	16
345	136	362	CAMPBELL DR	MINOR ARTERIAL	2590	2	12	4	1750	45	16
346	136	678	SH 997	COLLECTOR	1959	1	12	2	1750	40	16
347	137	161	SH 997	COLLECTOR	493	1	12	2	1750	40	16
348	137	511	BUSWAY	LOCAL ROADWAY	673	1	12	4	1750	45	16
349	137	676	SH 997	COLLECTOR	360	1	12	2	1750	40	16
350	138	155	SW 328TH AVE	MINOR ARTERIAL	712	2	12	4	1750	40	16
351	138	509	SW 328TH AVE	COLLECTOR	1540	1	12	4	1750	35	16
352	138	674	SH 997	COLLECTOR	2690	1	12	2	1750	40	16
353	138	676	SH 997	COLLECTOR	1803	1	12	2	1750	40	16
354	139	140	SH 997	COLLECTOR	2829	1	12	2	1700	40	18
355	139	158	SW 344TH ST	MAJOR ARTERIAL	721	2	12	4	1750	40	18
356	139	519	SW 344TH ST	MINOR ARTERIAL	545	2	12	4	1750	40	18
357	139	674	SH 997	COLLECTOR	2655	1	12	2	1750	40	18
358	140	69	SH 997	COLLECTOR	1417	1	12	2	1700	40	18

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
359	140	139	SH 997	COLLECTOR	2829	1	12	2	1750	40	18
360	141	82	SW 167TH AVE	COLLECTOR	5164	1	12	4	1700	45	5
361	141	130	SW 232ND ST	COLLECTOR	5299	1	12	4	1750	50	12
362	141	278	SW 232ND ST	COLLECTOR	2667	1	12	4	1700	50	12
363	142	131	SW 248TH ST	COLLECTOR	5367	1	12	4	1750	50	12
364	142	141	SW 167TH AVE	COLLECTOR	5356	1	12	4	1700	45	12
365	142	283	SW 248TH ST	COLLECTOR	2643	1	12	4	1700	50	12
366	143	132	SW 264TH ST	COLLECTOR	5360	1	12	4	1750	50	12
367	143	142	SW 167TH AVE	COLLECTOR	5343	1	12	4	1750	45	12
368	143	279	SW 264TH ST	COLLECTOR	2673	1	12	4	1700	50	12
369	144	133	SW 288TH ST	COLLECTOR	2698	1	12	4	1750	45	12
370	144	159	SW 172ND AVE	COLLECTOR	2626	1	12	4	1700	40	12
371	144	288	SW 288TH ST	COLLECTOR	2683	1	12	4	1750	45	12
372	145	336	OLD DIXIE HWY	COLLECTOR	653	1	12	4	1700	45	16
373	145	361	NE 15TH ST	COLLECTOR	2130	1	12	4	1700	40	16
374	145	512	NE 15TH ST	COLLECTOR	256	1	12	4	1750	40	16
375	145	744	OLD DIXIE HWY	COLLECTOR	1899	1	12	4	1750	45	16
376	146	130	SW 232ND ST	COLLECTOR	2650	1	12	4	1750	50	12
377	147	131	SW 248TH ST	COLLECTOR	2652	1	12	4	1750	50	12
378	147	146	SW 182ND AVE	COLLECTOR	5338	1	12	4	1700	45	12
379	148	132	SW 264TH ST	COLLECTOR	2687	1	12	4	1750	50	12
380	148	614	SW 182ND AVE	COLLECTOR	2717	1	12	4	1700	50	12
381	149	133	SW 288TH ST	COLLECTOR	2692	1	12	4	1750	45	12
382	149	313	SW 288TH ST	COLLECTOR	2695	1	12	4	1750	50	12
383	149	607	SW 182ND AVE	COLLECTOR	2621	1	12	4	1700	50	12
384	150	135	NE 15TH ST	COLLECTOR	2702	1	12	4	1750	40	16

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
385	150	160	SW 182ND AVE	COLLECTOR	2665	1	12	4	1700	40	16
386	150	315	NE 15TH ST	COLLECTOR	2666	1	12	4	1750	40	16
387	151	136	CAMPBELL DR	COLLECTOR	2748	1	12	4	1750	40	16
388	151	150	SW 182ND AVE	COLLECTOR	2609	1	12	4	1750	40	16
389	151	316	CAMPBELL DR	COLLECTOR	2621	1	12	4	1750	35	16
390	152	163	SW 182ND AVE	COLLECTOR	2656	1	12	4	1750	35	16
391	152	318	SW 328TH AVE	COLLECTOR	2682	1	12	4	1750	40	16
392	152	509	SW 328TH AVE	COLLECTOR	1116	1	12	4	1750	35	16
393	153	152	SW 182ND AVE	COLLECTOR	5318	1	12	4	1750	35	18
394	153	295	SW 344TH ST	COLLECTOR	2637	1	12	4	1750	40	18
395	153	519	SW 344TH ST	MINOR ARTERIAL	2154	2	12	4	1750	40	18
396	154	168	FLAGLER AVE	COLLECTOR	2937	1	12	0	1750	40	16
397	154	170	CAMPBELL DR	MINOR ARTERIAL	1108	2	12	4	1750	40	16
398	154	173	FLAGLER AVE	COLLECTOR	1810	1	12	0	1750	40	16
399	154	513	CAMPBELL DR	MINOR ARTERIAL	237	2	12	4	1750	45	16
400	155	138	SW 328TH AVE	MINOR ARTERIAL	712	1	12	4	1750	35	16
401	155	167	US 1	MINOR ARTERIAL	1465	2	12	4	1900	50	16
402	155	612	SW 328TH AVE	COLLECTOR	2031	1	12	4	1750	45	16
403	155	673	US 1	MINOR ARTERIAL	2699	2	12	4	1750	50	16
404	158	66	US 1	MINOR ARTERIAL	1082	3	12	4	1900	50	18
405	158	139	SW 344TH ST	MINOR ARTERIAL	721	2	12	4	1750	40	18
406	158	218	US 1	MINOR ARTERIAL	981	3	12	4	1900	50	18
407	159	134	SW 296TH ST	COLLECTOR	2777	1	12	4	1750	40	12
408	159	144	SW 172ND AVE	COLLECTOR	2626	1	12	4	1700	45	12
409	159	358	SW 296TH ST	COLLECTOR	2661	1	12	4	1700	40	12
410	159	756	SW 172ND AVE	COLLECTOR	1331	1	12	4	1700	40	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
411	160	134	SW 296TH ST	COLLECTOR	2645	1	12	4	1750	40	12
412	160	149	SW 182ND AVE	COLLECTOR	2670	1	12	4	1700	50	12
413	160	314	SW 296TH ST	COLLECTOR	2663	1	12	4	1750	40	12
414	161	137	SH 997	COLLECTOR	493	1	12	2	1750	40	16
415	161	511	SW 320TH ST	COLLECTOR	483	1	12	4	1750	40	16
416	161	677	SH 997	COLLECTOR	334	1	12	2	1750	40	16
417	161	710	SW 320TH ST	COLLECTOR	1310	1	12	4	1750	35	16
418	162	168	FLAGLER AVE	COLLECTOR	678	1	12	0	1750	40	16
419	162	511	SW 320TH ST	COLLECTOR	272	1	12	4	1750	40	16
420	162	676	FLAGLER AVE	COLLECTOR	1007	1	12	0	1750	40	16
421	163	151	SW 182ND AVE	COLLECTOR	2684	1	12	4	1750	35	16
422	163	317	SW 320TH ST	COLLECTOR	2664	1	12	4	1750	40	16
423	163	710	SW 320TH ST	COLLECTOR	1355	1	12	4	1750	30	16
424	164	165	SE 12TH AVE	COLLECTOR	5342	1	12	0	1750	45	18
425	164	507	SW 344TH ST	MINOR ARTERIAL	3399	2	12	4	1900	45	18
426	165	164	SE 12TH AVE	COLLECTOR	5342	1	12	0	1750	45	18
427	165	355	SW 328TH AVE	COLLECTOR	2698	1	12	4	1750	45	16
428	165	612	SW 328TH AVE	COLLECTOR	2699	1	12	4	1750	45	16
429	166	167	US 1	MINOR ARTERIAL	1567	3	12	4	1900	50	16
430	166	168	SW 320TH ST	COLLECTOR	835	1	12	4	1750	40	16
431	166	172	US 1	MINOR ARTERIAL	838	2	12	4	1900	50	16
432	166	613	SW 320TH ST	COLLECTOR	818	1	12	4	1700	40	16
433	167	155	US 1	MINOR ARTERIAL	1465	3	12	4	1750	50	16
434	167	166	US 1	MINOR ARTERIAL	1567	2	12	4	1750	50	16
435	168	154	FLAGLER AVE	COLLECTOR	2937	1	12	0	1750	40	16
436	168	162	FLAGLER AVE	COLLECTOR	678	1	12	0	1750	40	16

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
437	168	166	SW 320TH ST	COLLECTOR	835	1	12	4	1750	40	16
438	168	711	SW 320TH ST	COLLECTOR	400	1	12	4	1750	40	16
439	169	171	NE 12TH AVE	COLLECTOR	2612	1	12	4	1750	40	16
440	169	613	SW 320TH ST	COLLECTOR	2664	1	12	4	1700	40	16
441	170	154	CAMPBELL DR	MINOR ARTERIAL	1108	2	12	4	1750	40	16
442	170	171	CAMPBELL DR	MINOR ARTERIAL	1320	2	12	4	1750	45	16
443	170	172	US 1	MINOR ARTERIAL	2543	2	12	4	1900	50	16
444	170	174	US 1	MINOR ARTERIAL	1438	3	12	4	1750	50	16
445	171	169	NE 12TH AVE	COLLECTOR	2612	1	12	4	1700	40	16
446	171	170	CAMPBELL DR	MINOR ARTERIAL	1320	2	12	4	1750	45	16
447	171	175	NE 12TH ST	COLLECTOR	1328	1	12	4	1700	35	16
448	171	340	CAMPBELL DR	MINOR ARTERIAL	2655	2	12	4	1750	45	16
449	172	166	US 1	MINOR ARTERIAL	838	2	12	4	1750	50	16
450	172	170	US 1	MINOR ARTERIAL	2543	2	12	4	1750	50	16
451	173	154	FLAGLER AVE	COLLECTOR	1810	1	12	0	1750	40	16
452	173	174	NE 11TH ST	COLLECTOR	361	2	12	4	1750	40	16
453	173	743	NE 11TH ST	COLLECTOR	308	1	12	4	1750	40	16
454	174	170	US 1	MINOR ARTERIAL	1438	2	12	4	1750	50	16
455	174	173	NE 11TH ST	COLLECTOR	361	1	12	4	1750	40	16
456	174	175	NE 11TH ST	COLLECTOR	800	1	12	4	1700	40	16
457	174	176	US 1	MINOR ARTERIAL	1622	2	12	3	1750	50	16
458	175	171	NE 12TH ST	COLLECTOR	1328	1	12	4	1750	40	16
459	175	174	NE 11TH ST	COLLECTOR	800	1	12	4	1750	40	16
460	176	174	US 1	MINOR ARTERIAL	1622	2	12	3	1750	50	16
461	176	177	NE 15TH ST	COLLECTOR	2569	1	12	4	1700	40	16
462	176	178	US 1	MINOR ARTERIAL	3566	2	12	3	1750	50	16

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
463	176	512	NE 15TH ST	COLLECTOR	213	1	12	4	1750	40	16
464	177	176	NE 15TH ST	COLLECTOR	2569	1	12	4	1750	40	16
465	177	180	SW 162ND AVE	COLLECTOR	2693	1	12	4	1750	40	17
466	177	340	SW 162ND AVE	COLLECTOR	2626	1	12	4	1750	40	17
467	178	176	US 1	MINOR ARTERIAL	3566	2	12	3	1750	50	16
468	178	179	US 1	MINOR ARTERIAL	3621	2	12	3	1750	50	12
469	178	180	SW 296TH ST	COLLECTOR	243	1	12	4	1750	40	12
470	178	514	SW 296TH ST	COLLECTOR	223	1	12	4	1750	40	12
471	179	178	US 1	MINOR ARTERIAL	3621	2	12	3	1750	50	12
472	179	183	SW 288TH ST	MINOR ARTERIAL	413	2	12	4	1750	45	12
473	179	337	US 1	MINOR ARTERIAL	619	2	12	3	1750	50	12
474	179	515	SW 288TH ST	COLLECTOR	213	1	12	4	1750	45	12
475	180	177	SW 162ND AVE	COLLECTOR	2693	1	12	4	1700	40	17
476	180	178	SW 296TH ST	COLLECTOR	243	1	12	4	1750	40	12
477	180	338	SW 296TH ST	COLLECTOR	2608	1	12	4	1750	40	12
478	181	291	OLD DIXIE HWY	COLLECTOR	1412	1	12	4	1750	40	12
479	181	335	OLD DIXIE HWY	COLLECTOR	2281	1	12	4	1700	45	12
480	181	359	SW 288TH ST	COLLECTOR	1729	1	12	4	1700	45	12
481	181	515	SW 288TH ST	COLLECTOR	336	1	12	4	1750	45	12
482	182	335	OLD DIXIE HWY	COLLECTOR	1250	1	12	4	1700	45	12
483	182	336	OLD DIXIE HWY	COLLECTOR	2937	1	12	4	1700	45	16
484	182	358	SW 296TH ST	COLLECTOR	2029	1	12	4	1700	40	12
485	182	514	SW 296TH ST	COLLECTOR	200	1	12	4	1750	40	12
486	183	179	SW 288TH ST	MINOR ARTERIAL	413	2	12	4	1750	45	12
487	183	337	SW 157TH AVE	COLLECTOR	469	1	12	4	1750	45	12
488	183	338	SW 157TH AVE	COLLECTOR	2658	1	12	4	1750	40	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
489	183	347	SW 288TH ST	MINOR ARTERIAL	2650	2	12	4	1750	45	12
490	184	186	WALDEN ST	COLLECTOR	641	1	12	4	1700	45	12
491	184	337	US 1	MINOR ARTERIAL	2951	2	12	3	1750	50	12
492	184	517	WALDEN ST	COLLECTOR	297	1	12	4	1750	30	12
493	184	806	US 1	MINOR ARTERIAL	827	2	12	3	1750	50	12
494	185	188	SW 157TH AVE	COLLECTOR	2657	1	12	4	1700	45	12
495	185	290	WALDEN ST	COLLECTOR	2686	1	12	4	1700	45	12
496	185	291	SW 157TH AVE	COLLECTOR	1611	1	12	4	1750	45	12
497	185	346	WALDEN ST	COLLECTOR	1439	1	12	4	1750	45	12
498	186	184	WALDEN ST	COLLECTOR	641	2	12	4	1750	45	12
499	186	347	SW 152ND ST	COLLECTOR	2633	1	12	4	1750	40	12
500	186	363	WALDEN ST	MINOR ARTERIAL	2671	2	12	4	1900	45	12
501	186	806	SW 152ND ST	COLLECTOR	558	1	12	4	1750	40	12
502	187	202	US 1	MINOR ARTERIAL	2180	2	12	3	1750	50	12
503	187	518	SW 272ND ST	COLLECTOR	222	1	12	4	1750	30	12
504	187	806	US 1	MINOR ARTERIAL	2458	2	12	3	1750	50	12
505	188	280	NEWTON RD	COLLECTOR	2695	1	12	4	1700	45	12
506	188	284	SW 272ND ST	COLLECTOR	2635	1	12	4	1700	40	12
507	188	345	SW 272ND ST	COLLECTOR	3911	1	12	4	1750	40	12
508	189	190	SW 264TH ST	COLLECTOR	3906	1	12	4	1200	40	12
509	189	192	US 1	MINOR ARTERIAL	1677	2	12	3	1750	50	12
510	189	202	US 1	MINOR ARTERIAL	1739	2	12	3	1750	50	12
511	189	409	SW 264TH ST	COLLECTOR	246	1	12	4	1750	30	12
512	190	189	SW 264TH ST	COLLECTOR	3906	1	12	4	1750	50	12
513	190	196	SW 137TH AVE	COLLECTOR	1350	1	12	4	1700	40	13
514	190	203	SW 137TH AVE	COLLECTOR	1340	1	12	4	1750	40	13

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
515	191	280	SW 264TH ST	COLLECTOR	5392	1	12	4	1700	50	12
516	191	281	SW 147TH AVE	COLLECTOR	5326	1	12	4	1700	50	12
517	191	409	SW 264TH ST	COLLECTOR	1178	1	12	4	1750	50	12
518	192	189	US 1	MINOR ARTERIAL	1677	2	12	3	1750	50	12
519	192	196	SW 260TH ST	COLLECTOR	2903	1	12	4	1700	40	13
520	192	410	SW 260TH ST	COLLECTOR	257	1	12	4	1750	30	12
521	192	655	US 1	MINOR ARTERIAL	3567	2	12	2	1750	50	13
522	193	195	SW 248TH ST	COLLECTOR	668	1	12	4	1750	50	13
523	193	197	US 1	MINOR ARTERIAL	1045	2	12	2	1750	50	13
524	193	411	SW 248TH ST	COLLECTOR	214	1	12	4	1750	50	13
525	193	656	US 1	MINOR ARTERIAL	1459	2	12	3	1750	50	13
526	194	281	SW 248TH ST	COLLECTOR	2722	1	12	4	1700	50	12
527	194	411	SW 248TH ST	COLLECTOR	3054	1	12	4	1750	50	13
528	195	193	SW 248TH ST	COLLECTOR	668	1	12	4	1750	50	13
529	195	204	SW 248TH ST	COLLECTOR	4032	1	12	4	1750	50	13
530	196	190	SW 137TH AVE	COLLECTOR	1350	1	12	4	1700	40	13
531	196	192	SW 260TH ST	COLLECTOR	2903	1	12	4	1750	40	13
532	196	654	SW 137TH AVE	COLLECTOR	2660	1	12	4	1700	40	13
533	197	193	US 1	MINOR ARTERIAL	1045	2	12	2	1750	50	13
534	197	654	SW 137TH AVE	COLLECTOR	518	1	12	4	1700	40	13
535	197	655	US 1	MINOR ARTERIAL	733	2	12	2	1750	50	13
536	197	712	BUSWAY	COLLECTOR	207	1	12	4	1700	40	13
537	198	200	US 1	MINOR ARTERIAL	4036	2	12	3	1750	45	13
538	198	420	SW 132ND ST	COLLECTOR	514	1	12	4	1750	30	13
539	198	656	US 1	MINOR ARTERIAL	1531	2	12	3	1750	50	13
540	199	332	SW 232ND ST	COLLECTOR	2295	1	12	4	1750	40	13

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
541	199	420	SW 132ND ST	COLLECTOR	2688	1	12	4	1750	40	13
542	199	636	SW 232ND ST	COLLECTOR	1340	1	12	4	1700	50	13
543	200	198	US 1	MINOR ARTERIAL	4036	2	12	3	1750	45	13
544	200	204	SW 127TH AVE	COLLECTOR	5209	1	12	4	1750	45	13
545	200	332	SW 232ND ST	MINOR ARTERIAL	384	2	12	4	1750	30	13
546	200	632	US 1	MINOR ARTERIAL	3821	2	12	3	1750	45	13
547	201	633	BUSWAY	LOCAL ROADWAY	2952	1	12	4	1750	45	13
548	202	187	US 1	MINOR ARTERIAL	2180	2	12	3	1750	50	12
549	202	189	US 1	MINOR ARTERIAL	1739	2	12	3	1750	50	12
550	202	203	SW 268TH ST	MINOR ARTERIAL	5091	2	12	4	1750	40	12
551	203	190	SW 137TH AVE	COLLECTOR	1340	1	12	4	1700	40	13
552	203	202	SW 268TH ST	MINOR ARTERIAL	5091	2	12	4	1750	50	12
553	203	334	SW 268TH ST	MINOR ARTERIAL	1315	2	12	4	1900	50	13
554	203	383	SW 137TH AVE	COLLECTOR	1364	1	12	4	1750	40	13
555	204	195	SW 248TH ST	COLLECTOR	4032	1	12	4	1750	50	13
556	204	200	SW 127TH AVE	COLLECTOR	5209	1	12	4	1750	45	13
557	204	220	SW 248TH ST	COLLECTOR	7975	1	12	4	1750	50	13
558	205	206	US 1	MINOR ARTERIAL	1715	2	12	3	1750	45	8
559	205	255	OLD CULTER RD	COLLECTOR	4170	1	12	4	1750	45	9
560	205	632	US 1	MINOR ARTERIAL	1865	2	12	3	1750	45	8
561	205	635	OLD CULTER RD	COLLECTOR	580	1	12	4	1750	45	8
562	206	205	US 1	MINOR ARTERIAL	1715	2	12	3	1750	45	8
563	206	207	US 1	MINOR ARTERIAL	2641	2	12	3	1750	45	9
564	206	211	SW 216TH ST	COLLECTOR	3054	1	12	4	1750	45	9
565	206	412	SW 216TH ST	COLLECTOR	338	1	12	4	1750	30	8
566	207	206	US 1	MINOR ARTERIAL	2641	2	12	3	1750	45	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
567	207	208	US 1	MINOR ARTERIAL	1882	2	12	3	1750	45	9
568	207	214	CUTLER RIDGE BLVD	MAJOR ARTERIAL	1348	2	12	4	1750	40	9
569	207	413	CUTLER RIDGE BLVD	MINOR ARTERIAL	233	2	12	4	1750	40	9
570	208	207	US 1	MINOR ARTERIAL	1882	2	12	3	1750	45	9
571	208	414	SH 989	COLLECTOR	216	1	12	4	1750	40	9
572	208	489	SH 989	MINOR ARTERIAL	708	2	12	4	1900	40	9
573	208	493	US 1	MINOR ARTERIAL	418	3	12	3	1900	45	9
574	209	56	TURNPIKE ON RAMP FROM CAMPBELL DR	FREEWAY RAMP	782	1	12	4	1700	50	17
575	210	399	CAMPBELL DR	MINOR ARTERIAL	2639	2	12	4	1750	50	17
576	211	206	SW 216TH ST	COLLECTOR	3054	1	12	4	1750	45	9
577	211	214	SH 989	MINOR ARTERIAL	1733	2	12	0	1750	50	9
578	211	255	SH 989	MINOR ARTERIAL	1318	2	12	0	1750	50	9
579	211	260	SW 216TH ST	MINOR ARTERIAL	2883	2	12	0	1750	45	9
580	212	93	SW 127TH AVE	COLLECTOR	5371	1	12	4	1750	45	8
581	212	259	SW 216TH ST	COLLECTOR	4003	1	12	4	1750	50	8
582	212	681	SW 216TH ST	COLLECTOR	2675	1	12	4	1700	40	8
583	213	101	SW 117TH AVE	COLLECTOR	2146	1	12	4	1750	40	9
584	213	413	CUTLER RIDGE BLVD	MINOR ARTERIAL	1509	2	12	4	1750	30	9
585	214	207	CUTLER RIDGE BLVD	MAJOR ARTERIAL	1351	2	12	4	1750	40	9
586	214	211	SH 989	MINOR ARTERIAL	1733	2	12	0	1750	50	9
587	214	261	CUTLER RIDGE BLVD	MINOR ARTERIAL	606	2	12	4	1900	45	9
588	214	490	SH 989	MINOR ARTERIAL	505	2	12	4	1750	40	9
589	215	12	US 1	MAJOR ARTERIAL	1390	3	12	3	1900	45	9
590	215	415	CARIBBEAN BLVD	MINOR ARTERIAL	256	2	12	4	1750	30	9
591	215	494	US 1	MAJOR ARTERIAL	542	3	12	3	1900	45	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
592	215	495	CARIBBEAN BLVD	MINOR ARTERIAL	384	2	12	4	1750	40	9
593	216	415	CARIBBEAN BLVD	MINOR ARTERIAL	765	2	12	4	1750	40	9
594	216	639	CARIBBEAN BLVD	COLLECTOR	1829	1	12	4	1750	40	9
595	217	111	MARLIN RD	MINOR ARTERIAL	1804	2	12	4	1750	40	9
596	217	269	MARLIN RD	COLLECTOR	3369	1	12	4	1750	35	9
597	218	69	US 1	MINOR ARTERIAL	3070	2	12	4	1900	50	18
598	218	158	US 1	MINOR ARTERIAL	981	3	12	4	1750	50	18
599	219	11	FLORIDA TURNPIKE	FREEWAY	648	3	12	10	2250	70	9
600	219	18	FLORIDA TURNPIKE	FREEWAY	1336	2	12	10	2250	70	9
601	220	35	SH 989	MINOR ARTERIAL	1026	2	12	4	1900	55	13
602	220	204	SW 248TH ST	COLLECTOR	7975	1	12	4	1750	50	13
603	220	683	SH 989	MINOR ARTERIAL	5283	2	12	0	1750	50	13
604	221	36	SH 989	MINOR ARTERIAL	4723	2	12	4	1750	50	13
605	221	685	SW 268TH ST	MINOR ARTERIAL	639	2	12	4	1900	50	13
606	222	685	SW 268TH ST	MAJOR ARTERIAL	7318	2	12	4	1900	50	13
607	222	686	SW 268TH ST	MINOR ARTERIAL	2630	2	12	4	1750	50	13
608	223	65	TURNPIKE OFF RAMP TO US 1	FREEWAY RAMP	857	1	12	4	1700	40	18
609	224	73	US 1	COLLECTOR	10028	1	12	5	1700	65	23
610	224	229	US 1	COLLECTOR	5820	1	12	5	1700	65	23
611	225	226	US 1	COLLECTOR	5459	1	12	5	1700	65	23
612	225	229	US 1	COLLECTOR	5730	1	12	5	1700	65	23
613	226	225	US 1	COLLECTOR	5459	1	12	5	1700	65	23
614	226	230	US 1	MINOR ARTERIAL	9890	2	12	5	1900	65	24
615	227	228	US 1	MINOR ARTERIAL	5206	2	12	5	1900	65	27
616	227	231	US 1	COLLECTOR	7275	1	12	5	1700	65	24

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
617	228	227	US 1	MINOR ARTERIAL	5206	2	12	5	1900	65	27
618	228	232	US 1	COLLECTOR	8048	1	12	5	1700	65	27
619	229	224	US 1	COLLECTOR	5820	1	12	5	1700	65	23
620	229	225	US 1	COLLECTOR	5730	1	12	5	1700	65	23
621	230	226	US 1	MINOR ARTERIAL	9890	2	12	5	1900	65	24
622	230	231	US 1	COLLECTOR	9269	1	12	5	1700	65	24
623	231	227	US 1	COLLECTOR	7275	1	12	5	1700	65	24
624	231	230	US 1	COLLECTOR	9269	1	12	5	1700	65	24
625	232	228	US 1	COLLECTOR	8048	1	12	5	1700	65	27
626	232	233	US 1	COLLECTOR	7740	1	12	5	1700	65	27
627	233	232	US 1	COLLECTOR	7740	1	12	5	1700	65	27
628	233	234	US 1	COLLECTOR	10817	1	12	5	1700	65	30
629	234	233	US 1	COLLECTOR	10817	1	12	5	1700	65	30
630	234	235	US 1	COLLECTOR	8381	1	12	4	1700	45	31
631	235	234	US 1	COLLECTOR	8381	1	12	4	1700	45	31
632	235	236	US 1	COLLECTOR	7644	1	12	4	1700	40	31
633	236	235	US 1	COLLECTOR	7644	1	12	4	1700	40	31
634	236	239	US 1	COLLECTOR	1533	1	12	4	1700	45	31
635	237	239	US 1	MINOR ARTERIAL	4343	2	12	4	1900	45	31
636	238	239	SH 905	COLLECTOR	9281	1	12	0	1700	45	31
637	238	240	SH 905	COLLECTOR	6852	1	12	0	1700	60	31
638	239	236	US 1	MINOR ARTERIAL	1541	2	12	4	1900	40	31
639	239	237	US 1	MINOR ARTERIAL	4343	2	12	4	1900	45	31
640	239	238	SH 905	COLLECTOR	9281	1	12	0	1700	55	31
641	240	238	SH 905	COLLECTOR	6852	1	12	0	1700	60	31
642	240	241	SH 905	COLLECTOR	12320	1	12	0	1700	60	29

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
643	241	240	SH 905	COLLECTOR	12320	1	12	0	1700	60	29
644	241	242	SH 905	COLLECTOR	7977	1	12	0	1700	60	29
645	242	241	SH 905	COLLECTOR	7977	1	12	0	1700	60	29
646	242	243	SH 905	COLLECTOR	7567	1	12	0	1700	55	29
647	243	2	SH 905	COLLECTOR	4414	1	12	0	1700	45	29
648	243	242	SH 905	COLLECTOR	7567	1	12	0	1700	55	29
649	244	245	CARD SOUND	COLLECTOR	7306	1	12	0	1700	60	29
650	245	246	CARD SOUND	COLLECTOR	2550	1	12	0	1700	60	29
651	246	248	CARD SOUND	COLLECTOR	7487	1	12	0	1700	60	28
652	247	2	SH 905	COLLECTOR	4215	1	12	4	1575	35	26
653	248	249	CARD SOUND	COLLECTOR	6864	1	12	0	1700	45	25
654	249	253	CARD SOUND	COLLECTOR	11881	1	12	0	1700	60	25
655	250	74	CARD SOUND	COLLECTOR	9449	1	12	0	1700	60	23
656	251	250	CARD SOUND	COLLECTOR	9423	1	12	0	1700	60	23
657	252	251	CARD SOUND	COLLECTOR	9619	1	12	0	1700	60	23
658	253	252	CARD SOUND	COLLECTOR	9841	1	12	0	1700	60	25
659	254	220	SW 248TH ST	COLLECTOR	2705	1	12	4	1750	50	13
660	255	205	OLD CULTER RD	COLLECTOR	4170	1	12	4	1750	45	9
661	255	211	SH 989	MINOR ARTERIAL	1318	2	12	0	1750	50	9
662	255	257	OLD CULTER RD	COLLECTOR	2597	1	12	4	1700	45	9
663	255	631	SH 989	MINOR ARTERIAL	1311	2	12	0	1750	50	9
664	256	299	SW 182ND AVE	COLLECTOR	896	1	12	4	1700	40	18
665	257	3	OLD CULTER RD	COLLECTOR	2310	1	12	4	1700	45	9
666	257	255	OLD CULTER RD	COLLECTOR	2595	1	12	4	1750	45	9
667	258	254	SW 248TH ST	COLLECTOR	10673	1	12	4	1700	45	13
668	258	264	SW 87TH AVE	COLLECTOR	9584	1	12	4	1750	40	14

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
669	259	87	SW 216TH ST	COLLECTOR	6626	1	12	4	1750	50	5
670	259	212	SW 216TH ST	COLLECTOR	4003	1	12	4	1700	50	8
671	260	28	SW 216TH ST	MAJOR ARTERIAL	362	3	12	0	1750	45	9
672	260	30	TURNPIKE EXTENTION	MINOR ARTERIAL	929	2	12	4	1900	40	9
673	260	211	SW 216TH ST	MINOR ARTERIAL	2883	1	12	0	1750	45	9
674	261	214	CUTLER RIDGE BLVD	MINOR ARTERIAL	606	2	12	4	1750	45	9
675	261	491	CUTLER RIDGE BLVD	MINOR ARTERIAL	817	2	12	4	1750	45	9
676	262	27	SW 216TH ST	MINOR ARTERIAL	2603	2	12	4	1750	40	9
677	262	263	SW 216TH ST	MINOR ARTERIAL	1681	2	12	4	1900	40	10
678	263	262	SW 216TH ST	MINOR ARTERIAL	1681	2	12	4	1900	40	10
679	263	264	SW 216TH ST	MINOR ARTERIAL	2627	1	12	4	1750	40	10
680	264	263	SW 216TH ST	MINOR ARTERIAL	2627	2	12	4	1900	40	10
681	264	378	SW 87TH AVE	COLLECTOR	2197	1	12	4	1750	40	10
682	265	28	TURNPIKE EXTENTION	MINOR ARTERIAL	936	2	12	4	1750	40	9
683	266	27	OLD CULTER RD	COLLECTOR	3621	1	12	4	1750	45	9
684	266	270	MARLIN RD	COLLECTOR	1431	1	11	0	1575	35	9
685	266	271	OLD CULTER RD	COLLECTOR	1660	1	12	4	1750	40	10
686	267	16	CARIBBEAN BLVD	COLLECTOR	1560	1	12	4	1750	40	9
687	267	19	CARIBBEAN BLVD	MINOR ARTERIAL	554	2	12	4	1750	40	9
688	268	12	US 1	MAJOR ARTERIAL	268	3	12	3	1900	45	9
689	268	660	US 1	MAJOR ARTERIAL	1842	3	12	3	1750	45	9
690	269	119	CARIBBEAN BLVD	COLLECTOR	2522	1	12	4	1750	40	9
691	269	217	MARLIN RD	COLLECTOR	3365	1	12	4	1575	35	9
692	269	270	MARLIN RD	COLLECTOR	1459	1	11	0	1575	35	9
693	269	637	CARIBBEAN BLVD	COLLECTOR	2089	1	12	4	1750	40	9
694	270	266	MARLIN RD	COLLECTOR	1431	1	11	0	1750	35	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
695	270	269	MARLIN RD	COLLECTOR	1459	1	11	0	1750	35	9
696	271	120	OLD CULTER RD	COLLECTOR	1619	1	12	4	1750	30	10
697	271	266	OLD CULTER RD	COLLECTOR	1660	1	12	4	1750	40	10
698	274	121	OLD CULTER RD	COLLECTOR	406	1	12	4	1750	45	10
699	274	382	OLD CULTER RD	COLLECTOR	2098	1	11	0	1700	45	10
700	275	121	SW 87TH AVE	COLLECTOR	2132	1	12	4	1750	40	10
701	276	87	SW 147TH AVE	COLLECTOR	5108	1	12	4	1750	50	5
702	276	636	SW 232ND ST	COLLECTOR	6673	1	12	4	1700	50	12
703	276	748	SW 232ND ST	COLLECTOR	2680	1	12	4	1750	50	12
704	277	84	NEWTON RD	COLLECTOR	5064	1	12	4	1700	40	5
705	277	278	SW 232ND ST	COLLECTOR	2637	1	12	4	1700	50	12
706	277	748	SW 232ND ST	COLLECTOR	2739	1	12	4	1750	50	12
707	278	83	SW 162ND AVE	COLLECTOR	5128	1	12	4	1700	45	5
708	278	141	SW 232ND ST	COLLECTOR	2667	1	12	4	1700	50	12
709	278	277	SW 232ND ST	COLLECTOR	2637	1	12	4	1750	50	12
710	279	143	SW 264TH ST	COLLECTOR	2673	1	12	4	1750	50	12
711	279	280	SW 264TH ST	COLLECTOR	2662	1	12	4	1700	50	12
712	279	283	SW 162ND AVE	COLLECTOR	5333	1	12	4	1700	45	12
713	280	191	SW 264TH ST	COLLECTOR	5392	1	12	4	1700	50	12
714	280	279	SW 264TH ST	COLLECTOR	2662	1	12	4	1700	50	12
715	280	282	NEWTON RD	COLLECTOR	5316	1	12	4	1750	45	12
716	281	194	SW 248TH ST	COLLECTOR	2722	1	12	4	1700	50	12
717	281	276	SW 147TH AVE	COLLECTOR	5364	1	12	4	1750	50	12
718	281	713	SW 248TH ST	COLLECTOR	2682	1	12	4	1700	50	12
719	282	277	NEWTON RD	COLLECTOR	5379	1	12	4	1750	45	12
720	282	283	SW 248TH ST	COLLECTOR	2727	1	12	4	1700	50	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
721	282	713	SW 248TH ST	COLLECTOR	2643	1	12	4	1700	50	12
722	283	142	SW 248TH ST	COLLECTOR	2643	1	12	4	1750	50	12
723	283	278	SW 162ND AVE	COLLECTOR	5360	1	12	4	1700	45	12
724	283	282	SW 248TH ST	COLLECTOR	2727	1	12	4	1750	50	12
725	284	188	SW 272ND ST	COLLECTOR	2635	1	12	4	1700	40	12
726	284	279	SW 162ND AVE	COLLECTOR	2708	1	12	4	1700	45	12
727	284	285	SW 272ND ST	COLLECTOR	2684	1	12	4	1750	40	12
728	285	143	SW 167TH AVE	COLLECTOR	2626	1	12	4	1750	45	12
729	285	284	SW 272ND ST	COLLECTOR	2684	1	12	4	1700	40	12
730	285	286	SW 272ND ST	COLLECTOR	5334	1	12	4	1750	40	12
731	286	132	SH 997	COLLECTOR	2693	1	12	4	1750	50	12
732	286	285	SW 272ND ST	COLLECTOR	5334	1	12	4	1750	40	12
733	286	625	SH 997	COLLECTOR	2695	1	12	4	1750	50	12
734	287	148	SW 182ND AVE	COLLECTOR	2626	1	12	4	1700	50	12
735	287	286	SW 272ND ST	COLLECTOR	2718	1	12	4	1750	50	12
736	288	144	SW 288TH ST	COLLECTOR	2683	1	12	4	1700	45	12
737	288	289	SW 167TH AVE	COLLECTOR	2613	1	12	4	1700	45	12
738	288	358	SW 167TH AVE	COLLECTOR	2651	1	12	4	1700	45	12
739	288	359	SW 288TH ST	COLLECTOR	2653	1	12	4	1700	45	12
740	289	285	SW 167TH AVE	COLLECTOR	2737	1	12	4	1750	45	12
741	289	290	WALDEN ST	COLLECTOR	2719	1	12	4	1700	45	12
742	290	185	WALDEN ST	COLLECTOR	2686	1	12	4	1700	45	12
743	290	284	SW 162ND AVE	COLLECTOR	2663	1	12	4	1700	45	12
744	290	289	WALDEN ST	COLLECTOR	2719	1	12	4	1700	45	12
745	291	181	OLD DIXIE HWY	COLLECTOR	1412	1	12	4	1750	45	12
746	291	185	SW 157TH AVE	COLLECTOR	1611	1	12	4	1700	45	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
747	291	346	OLD DIXIE HWY	COLLECTOR	2152	1	12	4	1750	45	12
748	291	516	SW 157TH AVE	COLLECTOR	306	1	12	4	1750	45	12
749	292	16	ARCHOR RD	COLLECTOR	1156	1	12	4	1750	35	9
750	293	216	SW 110TH CT	COLLECTOR	646	1	12	4	1750	35	9
751	294	100	SW 122ND AVE	COLLECTOR	1441	1	12	4	1575	35	8
752	295	153	SW 344TH ST	COLLECTOR	2637	1	12	4	1750	40	18
753	295	296	SW 344TH ST	COLLECTOR	2670	1	12	4	1700	45	15
754	295	318	SW 187TH AVE	COLLECTOR	5328	1	12	4	1750	40	18
755	296	295	SW 344TH ST	COLLECTOR	2670	1	12	4	1750	40	15
756	296	331	TOWER RD	COLLECTOR	5253	1	12	4	1700	45	15
757	297	296	TOWER RD	COLLECTOR	2662	1	12	4	1700	45	15
758	298	295	SW 187TH AVE	COLLECTOR	2674	1	12	4	1750	40	18
759	298	297	SW 7TH ST	COLLECTOR	2688	1	12	4	1700	40	15
760	299	153	SW 182ND AVE	COLLECTOR	2626	1	12	4	1750	35	18
761	299	298	SW 7TH ST	COLLECTOR	2650	1	12	4	1750	40	18
762	300	301	LUCILLE DR	COLLECTOR	1292	1	12	4	1700	40	18
763	301	298	SW 187TH AVE	COLLECTOR	2617	1	12	4	1750	40	18
764	301	302	LUCILLE DR	COLLECTOR	2695	1	12	4	1700	40	15
765	302	297	TOWER RD	COLLECTOR	2649	1	12	4	1700	50	15
766	303	302	TOWER RD	COLLECTOR	5279	1	12	4	1700	50	15
767	304	303	SW 392ND ST	COLLECTOR	3553	1	12	0	1700	45	22
768	308	615	SW 187TH AVE	COLLECTOR	2697	1	12	4	1700	50	4
769	309	146	SW 232ND ST	COLLECTOR	2702	1	12	4	1700	50	12
770	309	308	SW 187TH AVE	COLLECTOR	5250	1	12	4	1700	50	11
771	310	147	SW 248TH ST	COLLECTOR	2708	1	12	4	1700	50	12
772	310	309	SW 187TH AVE	COLLECTOR	5324	1	12	4	1700	50	11

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
773	311	148	SW 264TH ST	COLLECTOR	2668	1	12	4	1700	50	12
774	311	606	SW 187TH AVE	COLLECTOR	2645	1	12	4	1700	50	11
775	312	287	SW 272ND ST	COLLECTOR	2651	1	12	4	1700	50	12
776	312	311	SW 187TH AVE	COLLECTOR	2679	1	12	4	1700	50	11
777	313	149	SW 288TH ST	COLLECTOR	2695	1	12	4	1700	50	12
778	313	605	SW 187TH AVE	COLLECTOR	2605	1	12	4	1700	50	11
779	314	160	SW 296TH ST	COLLECTOR	2663	1	12	4	1700	40	12
780	314	313	SW 187TH AVE	COLLECTOR	2633	1	12	4	1750	50	11
781	315	150	NE 15TH ST	COLLECTOR	2666	1	12	4	1750	40	16
782	315	314	SW 187TH AVE	COLLECTOR	2683	1	12	4	1750	40	15
783	316	151	CAMPBELL DR	COLLECTOR	2621	1	12	4	1750	35	16
784	316	315	SW 187TH AVE	COLLECTOR	2667	1	12	4	1750	40	15
785	317	163	SW 320TH ST	COLLECTOR	2664	1	12	4	1750	35	16
786	317	316	SW 187TH AVE	COLLECTOR	2642	1	12	4	1750	40	16
787	318	152	SW 328TH AVE	COLLECTOR	2682	1	12	4	1750	35	16
788	318	317	SW 187TH AVE	COLLECTOR	2647	1	12	4	1750	40	16
789	318	331	SW 328TH AVE	COLLECTOR	2622	1	12	4	1700	40	15
790	319	602	SW 217TH AVE	COLLECTOR	8015	1	12	4	1700	50	15
791	319	706	SW 344TH ST	COLLECTOR	7941	1	12	4	1700	45	15
792	322	701	SW 232ND ST	COLLECTOR	5264	1	12	4	1700	50	11
793	323	310	SW 248TH ST	COLLECTOR	15834	1	12	4	1700	50	11
794	323	322	SW 217TH AVE	COLLECTOR	5298	1	12	4	1700	50	11
795	324	311	SW 264TH ST	COLLECTOR	15863	1	12	4	1700	50	11
796	324	323	SW 217TH AVE	COLLECTOR	5314	1	12	4	1700	50	11
797	325	324	SW 217TH AVE	COLLECTOR	2755	1	12	4	1700	50	11
798	327	314	SW 296TH ST	COLLECTOR	15954	1	12	4	1750	50	11

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
799	327	704	SW 217TH AVE	COLLECTOR	5323	1	12	4	1700	50	11
800	328	315	SW 304TH ST	COLLECTOR	15921	1	12	4	1750	40	15
801	328	327	SW 217TH AVE	COLLECTOR	2621	1	12	4	1700	50	15
802	329	328	SW 217TH AVE	COLLECTOR	2603	1	12	4	1700	50	15
803	329	709	CAMPBELL DR	COLLECTOR	10651	1	12	4	1575	35	15
804	330	317	SW 320TH ST	COLLECTOR	2620	1	12	4	1750	40	15
805	330	331	TOWER RD	COLLECTOR	2726	1	12	4	1700	45	15
806	331	296	TOWER RD	COLLECTOR	5253	1	12	4	1700	45	15
807	331	318	SW 328TH AVE	COLLECTOR	2622	1	12	4	1750	40	15
808	331	330	TOWER RD	COLLECTOR	2726	1	12	4	1700	45	15
809	332	199	SW 232ND ST	COLLECTOR	2295	1	12	4	1700	50	13
810	332	200	SW 232ND ST	MAJOR ARTERIAL	384	2	12	4	1750	30	13
811	332	201	BUSWAY	LOCAL ROADWAY	718	1	12	4	1700	45	13
812	333	204	SW 127TH AVE	MINOR ARTERIAL	2654	1	12	4	1750	40	13
813	334	195	SW 134TH AVE	COLLECTOR	6651	1	12	4	1750	45	13
814	334	203	SW 268TH ST	MINOR ARTERIAL	1315	2	12	4	1750	50	13
815	334	687	SW 268TH ST	MINOR ARTERIAL	1075	2	12	4	1750	50	13
816	335	181	OLD DIXIE HWY	COLLECTOR	2281	1	12	4	1750	45	12
817	335	182	OLD DIXIE HWY	COLLECTOR	1250	1	12	4	1750	45	12
818	335	359	SW 162ND AVE	COLLECTOR	1727	1	12	4	1700	45	12
819	336	145	OLD DIXIE HWY	COLLECTOR	653	1	12	4	1750	45	16
820	336	182	OLD DIXIE HWY	COLLECTOR	2937	1	12	4	1750	45	16
821	336	358	SW 167TH AVE	COLLECTOR	2166	1	12	4	1700	45	16
822	337	179	US 1	MINOR ARTERIAL	619	2	12	3	1750	50	12
823	337	183	SW 157TH AVE	COLLECTOR	469	1	12	4	1750	45	12
824	337	184	US 1	MINOR ARTERIAL	2951	2	12	3	1750	50	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
825	337	516	SW 157TH AVE	COLLECTOR	281	1	12	4	1750	45	12
826	338	180	SW 296TH ST	COLLECTOR	2608	1	12	4	1750	40	12
827	338	183	SW 157TH AVE	COLLECTOR	2658	1	12	4	1750	40	12
828	338	348	SW 296TH ST	COLLECTOR	2660	1	12	4	1750	40	12
829	338	802	SW 157TH AVE	COLLECTOR	4174	1	12	4	1750	40	17
830	340	171	CAMPBELL DR	MINOR ARTERIAL	2655	2	12	4	1750	45	16
831	340	177	SW 162ND AVE	COLLECTOR	2626	1	12	4	1700	40	17
832	340	807	CAMPBELL DR	MINOR ARTERIAL	2463	2	12	4	1750	40	17
833	341	59	SW 157TH AVE	MINOR ARTERIAL	553	2	12	4	1750	45	17
834	341	802	SW 157TH AVE	COLLECTOR	677	1	12	4	1750	40	17
835	342	341	MALL ENTRANCE	LOCAL ROADWAY	516	2	12	4	1750	20	17
836	343	344	TURNPIKE ON RAMP FROM CAMPBELL DR	FREEWAY RAMP	634	1	12	4	1700	50	17
837	344	60	FLORIDA TURNPIKE	FREEWAY	771	2	12	10	2250	70	17
838	344	63	FLORIDA TURNPIKE	FREEWAY	5191	2	12	10	2250	70	17
839	345	188	SW 272ND ST	COLLECTOR	3911	1	12	4	1700	40	12
840	345	346	OLD DIXIE HWY	COLLECTOR	3604	1	12	4	1750	45	12
841	345	518	SW 272ND ST	COLLECTOR	232	1	12	4	1750	30	12
842	346	185	WALDEN ST	COLLECTOR	1439	1	12	4	1700	45	12
843	346	291	OLD DIXIE HWY	COLLECTOR	2152	1	12	4	1750	40	12
844	346	345	OLD DIXIE HWY	COLLECTOR	3604	1	12	4	1750	40	12
845	346	517	WALDEN ST	COLLECTOR	280	1	12	4	1750	30	12
846	347	183	SW 288TH ST	MINOR ARTERIAL	2650	2	12	4	1750	45	12
847	347	350	SW 288TH ST	MINOR ARTERIAL	2625	2	12	4	1750	45	12
848	348	338	SW 296TH ST	COLLECTOR	2660	1	12	4	1750	40	12
849	348	347	SW 152ND ST	COLLECTOR	2658	1	12	4	1750	40	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
850	348	349	SW 296TH ST	COLLECTOR	2660	1	12	4	1700	40	12
851	349	348	SW 296TH ST	COLLECTOR	2660	1	12	4	1750	40	12
852	349	350	SW 147TH AVE	COLLECTOR	2686	1	12	4	1750	40	12
853	350	347	SW 288TH ST	MINOR ARTERIAL	2625	2	12	4	1750	45	12
854	350	364	SW 288TH ST	MINOR ARTERIAL	1376	2	12	4	1750	45	12
855	351	348	SW 152ND ST	COLLECTOR	2630	1	12	4	1750	40	17
856	352	349	SW 147TH AVE	COLLECTOR	1467	1	12	4	1700	40	12
857	353	169	SW 320TH ST	COLLECTOR	2698	1	12	4	1700	40	16
858	353	809	NE 18TH AVE	COLLECTOR	1263	2	12	4	1750	40	17
859	355	165	SW 328TH AVE	COLLECTOR	2698	1	12	4	1750	45	16
860	355	353	NE 18TH AVE	MINOR ARTERIAL	2718	2	12	4	1900	40	17
861	355	392	SW 328TH AVE	MINOR ARTERIAL	5345	2	12	4	1750	45	17
862	358	159	SW 296TH ST	COLLECTOR	2661	1	12	4	1700	40	12
863	358	182	SW 296TH ST	COLLECTOR	2029	1	12	4	1750	40	12
864	358	288	SW 167TH AVE	COLLECTOR	2651	1	12	4	1750	45	12
865	358	336	SW 167TH AVE	COLLECTOR	2166	1	12	4	1700	45	16
866	359	181	SW 288TH ST	COLLECTOR	1729	1	12	4	1750	45	12
867	359	288	SW 288TH ST	COLLECTOR	2653	1	12	4	1750	45	12
868	359	290	SW 162ND AVE	COLLECTOR	2648	1	12	4	1700	45	12
869	360	289	WALDEN ST	COLLECTOR	797	1	12	4	1700	45	12
870	361	145	NE 15TH ST	COLLECTOR	2130	1	12	4	1750	40	16
871	361	741	SW 172ND AVE	COLLECTOR	192	1	12	4	1125	25	16
872	362	136	CAMPBELL DR	MINOR ARTERIAL	2590	2	12	4	1750	40	16
873	362	513	CAMPBELL DR	MINOR ARTERIAL	142	2	12	4	1750	45	16
874	362	744	OLD DIXIE HWY	COLLECTOR	1699	1	12	4	1750	45	16
875	363	186	WALDEN ST	MINOR ARTERIAL	2671	2	12	4	1900	45	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
876	363	350	SW 147TH AVE	COLLECTOR	2673	1	12	4	1750	40	12
877	363	366	WALDEN ST	MINOR ARTERIAL	1264	2	12	4	1900	45	12
878	364	48	SW 288TH ST	MINOR ARTERIAL	2171	2	12	4	1750	45	12
879	364	350	SW 288TH ST	MINOR ARTERIAL	1376	2	12	4	1750	45	12
880	365	364	SW 144TH AVE	COLLECTOR	1729	1	12	4	1750	40	12
881	366	363	WALDEN ST	MINOR ARTERIAL	1264	2	12	4	1900	45	12
882	366	364	SW 144TH AVE	COLLECTOR	2664	1	12	4	1750	40	12
883	366	387	WALDEN ST	MINOR ARTERIAL	1153	2	12	4	1900	45	12
884	367	50	SW 288TH ST	MINOR ARTERIAL	962	2	12	4	1750	45	13
885	367	690	SW 137TH AVE	MINOR ARTERIAL	1051	2	12	4	1750	50	13
886	368	367	SW 288TH ST	MINOR ARTERIAL	3316	2	12	4	1750	45	13
887	369	372	SW 127TH AVE	COLLECTOR	1485	2	12	4	1900	35	13
888	370	210	CAMPBELL DR	MINOR ARTERIAL	5239	2	12	4	1750	50	17
889	370	692	SW 137TH AVE	MINOR ARTERIAL	5381	2	12	4	1750	50	20
890	372	368	SW 288TH ST	MINOR ARTERIAL	2012	2	12	4	1900	45	13
891	372	805	SW 127TH AVE	COLLECTOR	2159	2	12	4	1750	45	13
892	373	222	SW 127TH AVE	COLLECTOR	1300	1	12	4	1750	35	13
893	374	258	SW 248TH ST	COLLECTOR	1711	1	12	4	1575	35	14
894	375	264	SW 216TH ST	COLLECTOR	1319	1	12	4	1750	40	10
895	376	377	SW 85TH AVE	MINOR ARTERIAL	1235	2	12	4	1750	40	10
896	376	378	SW 212TH AVE	MINOR ARTERIAL	1662	2	12	4	1750	40	10
897	377	275	SW 207TH AVE	COLLECTOR	1637	1	12	4	1700	40	10
898	377	380	SW 85TH AVE	MINOR ARTERIAL	1344	2	12	4	1900	40	10
899	378	275	SW 87TH AVE	COLLECTOR	1440	1	12	4	1700	40	10
900	378	629	SW 212TH AVE	MINOR ARTERIAL	2637	2	12	4	1900	40	10
901	379	377	SW 207TH AVE	MINOR ARTERIAL	1019	2	12	4	1750	40	10

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
902	380	274	SW 85TH AVE	MINOR ARTERIAL	1527	2	12	4	1900	40	10
903	381	376	SW 85TH AVE	MINOR ARTERIAL	927	2	12	4	1900	40	10
904	382	113	OLD CULTER RD	COLLECTOR	6392	1	11	0	1750	45	10
905	382	274	OLD CULTER RD	COLLECTOR	2094	1	11	0	1700	40	10
906	383	42	SW 137TH AVE	MAJOR ARTERIAL	513	3	12	4	1750	50	13
907	383	203	SW 137TH AVE	COLLECTOR	1364	1	12	4	1750	50	13
908	383	384	WALDEN ST	MINOR ARTERIAL	1153	2	12	4	1900	45	13
909	384	383	WALDEN ST	MINOR ARTERIAL	1153	2	12	4	1750	45	13
910	384	385	WALDEN ST	MINOR ARTERIAL	980	2	12	4	1900	45	13
911	385	384	WALDEN ST	MINOR ARTERIAL	976	2	12	4	1900	45	13
912	385	386	WALDEN ST	MINOR ARTERIAL	1554	2	12	4	1900	45	12
913	386	385	WALDEN ST	MINOR ARTERIAL	1554	2	12	4	1900	45	12
914	386	387	WALDEN ST	COLLECTOR	948	1	12	4	1700	45	12
915	387	366	WALDEN ST	MINOR ARTERIAL	1153	2	12	4	1900	45	12
916	387	386	WALDEN ST	MINOR ARTERIAL	946	1	12	4	1700	45	12
917	388	370	SW 137TH AVE	MINOR ARTERIAL	5356	2	12	4	1750	45	20
918	388	389	SW 137TH AVE	MINOR ARTERIAL	2641	2	12	4	1900	50	20
919	388	401	SW 328TH AVE	MINOR ARTERIAL	2641	1	12	4	1700	50	20
920	389	388	SW 137TH AVE	MINOR ARTERIAL	2641	2	12	4	1750	50	20
921	389	390	SW 336TH ST	COLLECTOR	2667	1	12	4	1700	40	20
922	389	528	SW 137TH AVE	MINOR ARTERIAL	2134	2	12	4	1900	40	20
923	390	389	SW 336TH ST	MINOR ARTERIAL	2667	1	12	4	1700	40	20
924	390	391	SE 38TH AVE	MINOR ARTERIAL	1412	2	12	4	1900	40	19
925	390	400	SW 336TH ST	COLLECTOR	2680	1	12	4	1700	40	19
926	390	401	SE 38TH AVE	MINOR ARTERIAL	2654	2	12	4	1900	40	17
927	391	390	SE 38TH AVE	MINOR ARTERIAL	1412	2	12	4	1900	40	19

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
928	391	395	SE 38TH AVE	MINOR ARTERIAL	1283	2	12	4	1900	40	19
929	391	397	SPEEDWAY BLVD	MINOR ARTERIAL	4524	2	12	4	1900	40	19
930	392	355	SW 328TH AVE	COLLECTOR	5345	1	12	4	1750	45	17
931	392	397	SW 152ND ST	MINOR ARTERIAL	3244	2	12	4	1900	40	17
932	392	399	SW 152ND ST	COLLECTOR	5407	2	12	4	1750	40	17
933	394	389	SW 336TH ST	COLLECTOR	2654	1	12	4	1700	40	20
934	395	391	SE 38TH AVE	MINOR ARTERIAL	1283	2	12	4	1900	40	19
935	395	396	SW 344TH ST	MINOR ARTERIAL	4837	2	12	4	1900	45	19
936	395	529	SW 344TH ST	MINOR ARTERIAL	1378	2	12	4	1750	40	20
937	396	397	SW 152ND ST	MINOR ARTERIAL	1697	2	12	4	1900	40	19
938	396	611	SW 344TH ST	MINOR ARTERIAL	5149	2	12	4	1750	45	19
939	397	392	SW 152ND ST	MINOR ARTERIAL	3244	2	12	4	1750	45	17
940	397	396	SW 152ND ST	MINOR ARTERIAL	1697	2	12	4	1900	40	19
941	398	392	SW 328TH AVE	MINOR ARTERIAL	842	1	12	4	1750	50	17
942	399	94	CAMPBELL DR	MINOR ARTERIAL	596	3	12	4	1900	45	17
943	399	392	SW 152ND ST	COLLECTOR	5407	2	12	4	1750	45	17
944	400	398	SW 336TH ST	COLLECTOR	3270	1	12	4	1700	40	17
945	401	388	SW 328TH AVE	MINOR ARTERIAL	2641	1	12	4	1750	40	20
946	401	390	SE 38TH AVE	MINOR ARTERIAL	2654	2	12	4	1900	40	17
947	401	627	SW 328TH AVE	MINOR ARTERIAL	2705	1	12	4	1700	50	17
948	402	355	SW 162ND AVE	MINOR ARTERIAL	2758	2	12	4	1750	45	17
949	402	611	SW 162ND AVE	MINOR ARTERIAL	1520	2	12	4	1750	45	19
950	403	404	SW 328TH AVE	COLLECTOR	10719	1	12	4	1750	40	20
951	404	405	SW 328TH AVE	COLLECTOR	5306	1	12	4	1700	50	20
952	404	522	SW 117TH AVE	COLLECTOR	5437	1	12	4	1700	40	20
953	405	388	SW 328TH AVE	COLLECTOR	5282	1	12	4	1750	50	20

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
954	406	403	SW 328TH AVE	COLLECTOR	1560	1	12	4	1700	40	20
955	407	177	NE 15TH ST	COLLECTOR	1137	1	12	4	1700	40	17
956	408	740	SW 172ND AVE	COLLECTOR	1041	1	12	4	1700	40	16
957	409	189	SW 264TH ST	COLLECTOR	246	2	12	4	1750	30	12
958	409	191	SW 264TH ST	COLLECTOR	1178	1	12	4	1700	50	12
959	409	410	BUSWAY	LOCAL ROADWAY	1673	1	12	4	1750	45	12
960	410	192	SW 260TH ST	COLLECTOR	257	1	12	4	1750	30	12
961	410	712	BUSWAY	LOCAL ROADWAY	4570	1	12	4	1700	45	13
962	411	193	SW 248TH ST	COLLECTOR	214	1	12	4	1750	30	13
963	411	194	SW 248TH ST	COLLECTOR	3054	1	12	4	1700	50	13
964	411	657	BUSWAY	LOCAL ROADWAY	1581	1	12	4	1750	45	13
965	412	206	SW 216TH ST	MINOR ARTERIAL	338	2	12	4	1750	30	8
966	412	413	BUSWAY	LOCAL ROADWAY	2834	1	12	4	1750	45	9
967	412	681	SW 216TH ST	COLLECTOR	2002	1	12	4	1200	40	8
968	413	207	CUTLER RIDGE BLVD	MAJOR ARTERIAL	233	3	12	4	1750	30	9
969	413	213	CUTLER RIDGE BLVD	MINOR ARTERIAL	1509	2	12	4	1900	40	9
970	413	414	BUSWAY	LOCAL ROADWAY	1989	1	12	4	1750	45	9
971	414	208	SH 989	MAJOR ARTERIAL	216	2	12	4	1750	30	9
972	414	415	BUSWAY	LOCAL ROADWAY	1916	1	12	4	1750	45	9
973	415	215	CARIBBEAN BLVD	MINOR ARTERIAL	256	2	12	4	1750	30	9
974	415	216	CARIBBEAN BLVD	MINOR ARTERIAL	765	2	12	4	1750	40	9
975	415	416	BUSWAY	LOCAL ROADWAY	4444	1	12	4	1750	45	9
976	416	110	MARLIN RD	MINOR ARTERIAL	848	2	12	4	1750	40	9
977	416	111	MARLIN RD	MINOR ARTERIAL	257	2	12	4	1750	40	9
978	416	417	BUSWAY	LOCAL ROADWAY	2803	1	12	4	1750	45	7
979	417	105	SH 994	MINOR ARTERIAL	254	2	12	4	1750	30	7

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
980	417	418	BUSWAY	LOCAL ROADWAY	924	1	12	4	1750	45	7
981	417	653	SH 994	MINOR ARTERIAL	577	2	12	4	1750	40	7
982	418	109	SW 184TH ST	MINOR ARTERIAL	234	3	12	4	1750	45	7
983	418	419	BUSWAY	LOCAL ROADWAY	6021	1	12	4	1750	45	7
984	418	652	SW 184TH ST	MINOR ARTERIAL	612	2	12	4	1750	40	7
985	419	465	BUSWAY	LOCAL ROADWAY	2034	1	12	4	1750	45	7
986	419	484	SW 168TH ST	MINOR ARTERIAL	302	1	12	4	1750	30	7
987	419	811	SW 168TH ST	COLLECTOR	3005	1	12	4	1750	40	7
988	420	198	SW 132ND ST	COLLECTOR	514	1	12	4	1750	30	13
989	420	199	SW 132ND ST	COLLECTOR	2688	1	12	4	1700	40	13
990	420	332	BUSWAY	LOCAL ROADWAY	3494	1	12	4	1750	45	13
991	421	422	SW 107TH AVE	COLLECTOR	8059	1	12	4	1700	40	13
992	422	423	SW 107TH AVE	COLLECTOR	3947	1	12	4	1700	40	13
993	423	221	SW 268TH ST	MINOR ARTERIAL	2612	2	12	4	1750	50	13
994	423	254	SW 107TH AVE	COLLECTOR	6759	1	12	4	1700	40	13
995	424	76	SH 997	COLLECTOR	4310	1	12	4	1700	50	5
996	425	427	SR 992	COLLECTOR	1606	1	12	4	1750	40	5
997	426	427	SW 157TH AVE	COLLECTOR	2697	1	12	4	1750	40	5
998	426	736	SW 160TH ST	COLLECTOR	2620	1	12	4	1750	40	5
999	427	479	SR 992	COLLECTOR	2643	1	12	4	1750	40	5
1000	428	128	SW 160TH ST	MINOR ARTERIAL	5159	1	12	4	1750	40	5
1001	428	429	SW 147TH AVE	COLLECTOR	2629	1	12	4	1750	40	5
1002	429	728	SR 992	MINOR ARTERIAL	2599	2	12	4	1750	40	1
1003	430	480	SR 992	MAJOR ARTERIAL	1319	3	12	4	1750	40	2
1004	432	433	SW 117TH AVE	COLLECTOR	5295	2	12	4	1750	40	6
1005	432	445	SW 168TH ST	COLLECTOR	2560	1	12	4	1750	40	7

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1006	433	435	SR 992	MAJOR ARTERIAL	686	2	12	4	1750	45	2
1007	433	477	SW 117TH AVE	MINOR ARTERIAL	817	2	12	4	1750	40	2
1008	433	717	SR 992	MAJOR ARTERIAL	2570	3	12	4	1750	40	2
1009	434	720	SR 992	MAJOR ARTERIAL	1470	3	12	4	1750	40	2
1010	434	722	SR 992	MAJOR ARTERIAL	451	3	12	4	1750	40	2
1011	435	10	TURNPIKE ON RAMP FROM SR 992	FREEWAY RAMP	1093	2	12	4	1900	45	2
1012	435	433	SR 992	MAJOR ARTERIAL	686	2	12	4	1750	50	2
1013	435	436	SR 992	MAJOR ARTERIAL	388	3	12	4	1750	50	2
1014	436	435	SR 992	MAJOR ARTERIAL	388	3	12	4	1750	45	2
1015	436	437	TURNPIKE ON RAMP	FREEWAY RAMP	1535	2	12	4	1750	45	2
1016	436	454	SR 992	MAJOR ARTERIAL	1529	2	12	4	1750	50	2
1017	437	457	SW 117TH AVE	MINOR ARTERIAL	1448	2	12	4	1750	40	2
1018	437	478	TURNPIKE ON RAMP	FREEWAY RAMP	536	2	12	4	1900	40	2
1019	438	477	TURNPIKE OFF RAMP TO SR 992	FREEWAY RAMP	848	3	12	4	1750	45	2
1020	439	438	TURNPIKE OFF RAMP TO SR 992	FREEWAY RAMP	469	2	12	4	1900	45	2
1021	439	441	FLORIDA TURNPIKE	FREEWAY	2138	4	12	10	2250	70	2
1022	439	442	FLORIDA TURNPIKE	FREEWAY	4322	5	12	10	2250	70	2
1023	440	10	FLORIDA TURNPIKE	FREEWAY	737	4	12	10	2250	70	2
1024	440	441	FLORIDA TURNPIKE	FREEWAY	582	4	12	10	2250	70	2
1025	441	439	FLORIDA TURNPIKE	FREEWAY	2138	4	12	10	2250	70	2
1026	441	440	FLORIDA TURNPIKE	FREEWAY	582	4	12	10	2250	70	2
1027	442	439	FLORIDA TURNPIKE	FREEWAY	4322	5	12	10	2250	70	2
1028	442	468	FLORIDA TURNPIKE	FREEWAY	1426	3	12	10	2250	70	2

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1029	442	671	DON SHULA EXPRESSWAY	FREEWAY	1348	3	12	4	2250	70	2
1030	443	444	COLONIAL DR	COLLECTOR	2686	1	12	4	1750	40	7
1031	443	454	SW 112TH AVE	COLLECTOR	2692	1	12	4	1750	40	7
1032	444	443	COLONIAL DR	COLLECTOR	2686	1	12	4	1750	40	7
1033	444	446	FAIRWAY HIGHTS BLVD	MINOR ARTERIAL	2025	2	12	4	1900	40	7
1034	444	810	COLONIAL DR	COLLECTOR	2726	1	12	4	1750	40	7
1035	445	125	SW 168TH ST	COLLECTOR	2709	1	12	4	1750	40	7
1036	445	432	SW 168TH ST	COLLECTOR	2560	1	12	4	1750	40	7
1037	445	443	SW 112TH AVE	COLLECTOR	2732	1	12	4	1750	40	7
1038	446	447	FAIRWAY HIGHTS BLVD	MINOR ARTERIAL	1375	2	12	4	1900	40	2
1039	447	448	FAIRWAY HIGHTS BLVD	MINOR ARTERIAL	692	2	12	4	1750	40	2
1040	448	667	SR 992	MINOR ARTERIAL	565	2	12	4	1750	50	2
1041	448	669	SR 992	MINOR ARTERIAL	2650	2	12	4	1750	50	2
1042	449	486	COLONIAL DR	COLLECTOR	907	1	12	4	1700	40	7
1043	449	810	COLONIAL DR	COLLECTOR	2245	1	12	4	1750	40	7
1044	450	465	COLONIAL DR	MINOR ARTERIAL	413	2	12	4	1750	30	7
1045	450	485	US 1	MAJOR ARTERIAL	1276	3	12	3	1900	50	7
1046	450	663	US 1	MINOR ARTERIAL	1593	3	12	3	1750	50	7
1047	451	460	SW 168TH ST	COLLECTOR	2487	1	12	4	1750	40	10
1048	451	754	SW 168TH ST	COLLECTOR	465	1	12	4	1125	25	10
1049	452	459	SR 992	MINOR ARTERIAL	1047	2	12	4	1900	40	3
1050	452	466	SR 992	MINOR ARTERIAL	275	2	12	4	1750	30	3
1051	452	663	US 1	MAJOR ARTERIAL	2323	3	12	3	1750	50	3
1052	452	747	US 1	MAJOR ARTERIAL	2887	3	12	3	1750	50	3
1053	453	781	US 1	MAJOR ARTERIAL	1468	3	12	3	1750	50	3
1054	454	436	SR 992	MAJOR ARTERIAL	1529	2	12	4	1750	50	2

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1055	454	455	OLIVIA L. EDWARDS BLVD	COLLECTOR	1411	1	12	4	1700	40	2
1056	454	669	SR 992	MINOR ARTERIAL	2713	2	12	4	1750	50	2
1057	455	456	OLIVIA L. EDWARDS BLVD	COLLECTOR	1719	1	12	4	1200	40	2
1058	456	457	OLIVIA L. EDWARDS BLVD	COLLECTOR	1164	1	12	4	1750	40	2
1059	457	458	SW 117TH AVE	MINOR ARTERIAL	2671	2	12	4	1900	40	2
1060	458	790	SW 117TH AVE	MINOR ARTERIAL	2250	2	12	4	1900	30	2
1061	459	452	SR 992	MINOR ARTERIAL	1047	2	12	4	1750	40	3
1062	459	715	SR 992	COLLECTOR	1355	1	12	4	1750	40	3
1063	460	451	SW 168TH ST	COLLECTOR	2487	1	12	4	1700	40	10
1064	460	461	SW 168TH ST	COLLECTOR	4655	1	12	4	1750	40	10
1065	460	487	SW 82ND AVE	COLLECTOR	5226	1	12	4	1750	40	10
1066	461	114	OLD CULTER RD	COLLECTOR	2724	1	12	0	1750	45	10
1067	461	460	SW 168TH ST	COLLECTOR	4655	1	12	4	1750	40	10
1068	461	462	OLD CULTER RD	COLLECTOR	5335	1	12	0	1750	45	10
1069	462	461	OLD CULTER RD	COLLECTOR	5335	1	12	0	1750	45	10
1070	462	787	OLD CULTER RD	COLLECTOR	2897	1	12	4	1750	40	3
1071	462	792	SR 992	COLLECTOR	2021	1	12	4	1750	40	3
1072	463	786	OLD CULTER RD	COLLECTOR	3317	1	12	4	1750	45	3
1073	464	445	SW 112TH AVE	COLLECTOR	3112	1	12	4	1750	40	7
1074	464	650	SW 112TH AVE	COLLECTOR	2262	1	12	4	1750	40	7
1075	465	450	COLONIAL DR	MINOR ARTERIAL	413	2	12	4	1750	30	7
1076	465	466	BUSWAY	LOCAL ROADWAY	3819	1	12	4	1750	45	7
1077	465	486	COLONIAL DR	MINOR ARTERIAL	494	2	12	4	1900	40	7
1078	466	452	SR 992	MINOR ARTERIAL	275	2	12	4	1750	30	3
1079	466	665	SR 992	MINOR ARTERIAL	688	2	12	4	1750	50	3
1080	466	789	BUSWAY	LOCAL ROADWAY	2911	1	12	4	1750	45	3

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1081	468	469	FLORIDA TURNPIKE	FREEWAY	1798	3	12	10	2250	70	2
1082	469	470	FLORIDA TURNPIKE	FREEWAY	3704	3	12	10	2250	70	2
1083	470	471	FLORIDA TURNPIKE	FREEWAY	2575	3	12	10	2250	70	2
1084	471	472	FLORIDA TURNPIKE	FREEWAY	1693	3	12	10	2250	70	2
1085	471	474	FLORIDA TURNPIKE	FREEWAY	1981	3	12	10	2250	70	2
1086	472	473	FLORIDA TURNPIKE	FREEWAY	4716	3	12	10	2250	70	2
1087	473	475	FLORIDA TURNPIKE	FREEWAY	1487	2	12	10	2250	70	2
1088	474	471	FLORIDA TURNPIKE	FREEWAY	1981	3	12	10	2250	70	2
1089	475	442	FLORIDA TURNPIKE	FREEWAY	1379	5	12	10	2250	70	2
1090	476	475	DON SHULA EXPRESSWAY	FREEWAY	1285	3	12	4	2250	70	2
1091	477	433	SW 117TH AVE	MINOR ARTERIAL	817	2	12	4	1750	40	2
1092	477	435	TURNPIKE OFF RAMP TO SR 992	FREEWAY RAMP	1025	2	12	4	1750	45	2
1093	477	437	SW 117TH AVE	MINOR ARTERIAL	412	2	12	4	1750	40	2
1094	478	439	TURNPIKE ON RAMP	FREEWAY RAMP	450	2	12	4	1900	50	2
1095	479	429	SR 992	MINOR ARTERIAL	2625	1	12	4	1750	40	1
1096	480	431	SW 137TH AVE	MAJOR ARTERIAL	2860	3	12	4	1900	50	2
1097	480	725	SR 992	MAJOR ARTERIAL	3001	3	12	4	1750	40	2
1098	481	436	TURNPIKE OFF RAMP TO SR 992	FREEWAY RAMP	611	2	12	4	1750	45	2
1099	482	483	SW 174TH ST	COLLECTOR	4917	1	12	4	1750	40	10
1100	482	753	SW 87TH AVE	COLLECTOR	1936	1	12	4	1700	40	10
1101	483	124	US 1	MINOR ARTERIAL	2104	3	12	3	1750	50	7
1102	483	482	SW 174TH ST	COLLECTOR	4917	1	12	4	1700	40	10
1103	484	124	SW 168TH ST	MINOR ARTERIAL	248	1	12	4	1750	40	7
1104	484	419	SW 168TH ST	MINOR ARTERIAL	302	1	12	4	1750	30	7

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1105	484	662	US 1	MINOR ARTERIAL	3452	3	12	3	1750	50	7
1106	485	450	US 1	MAJOR ARTERIAL	1276	3	12	3	1750	50	7
1107	485	484	US 1	MAJOR ARTERIAL	625	3	12	3	1750	40	7
1108	486	449	COLONIAL DR	COLLECTOR	907	1	12	4	1700	40	7
1109	486	465	COLONIAL DR	MAJOR ARTERIAL	494	2	12	4	1750	40	7
1110	487	715	SR 992	COLLECTOR	2658	1	12	4	1750	40	3
1111	487	746	SW 82ND AVE	COLLECTOR	2783	1	12	4	1750	40	3
1112	487	792	SR 992	COLLECTOR	2669	1	12	4	1750	40	3
1113	488	75	SW 184TH ST	COLLECTOR	2631	1	12	4	1750	45	5
1114	488	77	SW 184TH ST	COLLECTOR	8006	1	12	4	1700	45	5
1115	489	208	SH 989	MINOR ARTERIAL	708	1	12	4	1750	40	9
1116	489	490	SH 989	MINOR ARTERIAL	411	2	12	4	1750	40	9
1117	490	214	SH 989	MINOR ARTERIAL	505	2	12	4	1750	50	9
1118	490	489	SH 989	MINOR ARTERIAL	411	2	12	4	1900	40	9
1119	491	261	CUTLER RIDGE BLVD	MINOR ARTERIAL	817	2	12	4	1900	45	9
1120	491	492	CUTLER RIDGE BLVD	MINOR ARTERIAL	953	2	12	4	1750	45	9
1121	492	17	CUTLER RIDGE BLVD	MINOR ARTERIAL	445	2	12	4	1750	40	9
1122	492	491	CUTLER RIDGE BLVD	MINOR ARTERIAL	953	2	12	4	1750	45	9
1123	493	208	US 1	MINOR ARTERIAL	418	2	12	3	1750	45	9
1124	493	506	US 1	MAJOR ARTERIAL	482	3	12	3	1750	45	9
1125	494	215	US 1	MAJOR ARTERIAL	542	5	12	3	1750	45	9
1126	494	506	US 1	MAJOR ARTERIAL	567	3	12	3	1750	45	9
1127	495	215	CARIBBEAN BLVD	MAJOR ARTERIAL	384	2	12	4	1750	40	9
1128	495	496	CARIBBEAN BLVD	MINOR ARTERIAL	693	2	12	4	1900	40	9
1129	496	15	CARIBBEAN BLVD	MINOR ARTERIAL	371	2	12	4	1750	40	9
1130	496	495	CARIBBEAN BLVD	MINOR ARTERIAL	693	2	12	4	1750	40	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1131	497	494	MALL ACCESS RD	MINOR ARTERIAL	281	2	12	4	1900	25	9
1132	497	495	MALL ACCESS RD	MINOR ARTERIAL	579	2	12	4	1750	25	9
1133	497	498	MALL RD	COLLECTOR	622	1	12	4	1125	25	9
1134	498	497	MALL RD	COLLECTOR	622	1	12	4	1125	25	9
1135	498	499	MALL RD	COLLECTOR	513	1	12	4	1125	25	9
1136	498	506	MALL ACCESS RD	MINOR ARTERIAL	288	2	12	4	1750	25	9
1137	499	493	MALL ACCESS RD	COLLECTOR	303	1	12	4	1125	25	9
1138	499	498	MALL RD	COLLECTOR	513	1	12	4	1125	25	9
1139	499	500	MALL RD	COLLECTOR	739	1	12	4	1125	25	9
1140	500	489	MALL ACCESS RD	COLLECTOR	249	1	12	4	1125	25	9
1141	500	499	MALL RD	COLLECTOR	739	1	12	4	1125	25	9
1142	500	501	MALL RD	COLLECTOR	420	1	12	4	1125	25	9
1143	501	490	MALL ACCESS RD	MINOR ARTERIAL	306	2	12	4	1750	25	9
1144	501	500	MALL RD	COLLECTOR	420	1	12	4	1125	25	9
1145	501	502	MALL RD	COLLECTOR	364	1	12	4	1125	25	9
1146	502	261	MALL ACCESS RD	MINOR ARTERIAL	355	2	12	4	1900	25	9
1147	502	501	MALL RD	COLLECTOR	364	1	12	4	1125	25	9
1148	502	503	MALL RD	COLLECTOR	722	1	12	4	1125	25	9
1149	503	491	MALL ACCESS RD	MINOR ARTERIAL	357	2	12	4	1750	25	9
1150	503	502	MALL RD	COLLECTOR	722	1	12	4	1125	25	9
1151	503	504	MALL RD	COLLECTOR	997	1	12	4	1125	25	9
1152	504	492	MALL ACCESS RD	MINOR ARTERIAL	610	2	12	4	1750	25	9
1153	504	503	MALL RD	COLLECTOR	997	1	12	4	1125	25	9
1154	504	505	MALL RD	COLLECTOR	1137	1	12	4	1125	25	9
1155	505	496	MALL ACCESS RD	MINOR ARTERIAL	310	2	12	4	1900	25	9
1156	505	504	MALL RD	COLLECTOR	1137	1	12	4	1125	25	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1157	506	493	US 1	MAJOR ARTERIAL	482	3	12	3	1900	45	9
1158	506	494	US 1	MAJOR ARTERIAL	567	3	12	3	1900	45	9
1159	507	158	SW 344TH ST	MINOR ARTERIAL	1301	1	12	4	1750	45	18
1160	508	507	FLORIDA KEYS SHOPPING CENTER ENTRANCE	MINOR ARTERIAL	1336	2	12	4	1900	40	18
1161	509	138	SW 328TH AVE	COLLECTOR	1540	1	12	4	1750	35	16
1162	509	152	SW 328TH AVE	COLLECTOR	1116	1	12	4	1750	35	16
1163	509	510	BUSWAY	LOCAL ROADWAY	643	1	12	4	1750	45	16
1164	509	519	BUSWAY	LOCAL ROADWAY	5430	1	12	4	1750	50	18
1165	510	137	BUSWAY	LOCAL ROADWAY	2145	1	12	4	1750	45	16
1166	510	675	SW 4TH ST	LOCAL ROADWAY	255	1	12	4	1750	40	16
1167	511	161	SW 320TH ST	COLLECTOR	483	1	12	4	1750	30	16
1168	511	162	SW 320TH ST	COLLECTOR	272	1	12	4	1750	40	16
1169	511	711	BUSWAY	LOCAL ROADWAY	595	1	12	4	1750	45	16
1170	512	145	NE 15TH ST	COLLECTOR	256	1	12	4	1750	40	16
1171	512	176	NE 15TH ST	COLLECTOR	213	1	12	4	1750	30	16
1172	512	514	BUSWAY	LOCAL ROADWAY	3554	1	12	4	1750	45	16
1173	513	154	CAMPBELL DR	MINOR ARTERIAL	237	2	12	4	1750	40	16
1174	513	362	CAMPBELL DR	MINOR ARTERIAL	142	2	12	4	1750	45	16
1175	513	743	BUSWAY	LOCAL ROADWAY	1744	1	12	4	1750	45	16
1176	514	178	SW 296TH ST	COLLECTOR	223	1	12	4	1750	40	12
1177	514	182	SW 296TH ST	COLLECTOR	200	1	12	4	1750	40	12
1178	514	515	BUSWAY	LOCAL ROADWAY	3623	1	12	4	1750	45	12
1179	515	179	SW 288TH ST	MINOR ARTERIAL	213	2	12	4	1750	30	12
1180	515	181	SW 288TH ST	COLLECTOR	336	1	12	4	1750	45	12
1181	515	516	BUSWAY	LOCAL ROADWAY	968	1	12	4	1750	45	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1182	516	291	SW 157TH AVE	COLLECTOR	306	1	12	4	1750	45	12
1183	516	337	SW 157TH AVE	COLLECTOR	281	1	12	4	1750	45	12
1184	516	517	BUSWAY	LOCAL ROADWAY	2549	1	12	4	1750	45	12
1185	517	184	WALDEN ST	MINOR ARTERIAL	297	1	12	4	1750	30	12
1186	517	346	WALDEN ST	COLLECTOR	280	1	12	4	1750	45	12
1187	517	518	BUSWAY	LOCAL ROADWAY	3486	1	12	4	1750	45	12
1188	518	187	SW 272ND ST	COLLECTOR	222	1	12	4	1750	30	12
1189	518	345	SW 272ND ST	COLLECTOR	232	1	12	4	1750	40	12
1190	518	409	BUSWAY	LOCAL ROADWAY	3758	1	12	4	1750	45	12
1191	519	139	SW 344TH ST	MINOR ARTERIAL	545	2	12	4	1750	40	18
1192	519	153	SW 344TH ST	MINOR ARTERIAL	2154	2	12	4	1750	40	18
1193	519	509	BUSWAY	LOCAL ROADWAY	5430	1	12	4	1750	45	18
1194	521	527	SW 344TH ST	COLLECTOR	10678	1	12	4	1750	50	20
1195	521	531	SW 117TH AVE	COLLECTOR	4879	1	12	4	1700	40	20
1196	522	751	SW 312TH ST	COLLECTOR	2668	1	12	4	1700	40	20
1197	523	735	SW 344TH ST	COLLECTOR	1824	1	12	4	1750	40	20
1198	524	523	SW 344TH ST	COLLECTOR	4449	1	12	4	1700	40	21
1199	527	529	SW 344TH ST	MINOR ARTERIAL	1187	2	12	4	1750	50	20
1200	528	389	SW 137TH AVE	MINOR ARTERIAL	2134	2	12	4	1900	40	20
1201	528	391	SPEEDWAY BLVD	MINOR ARTERIAL	1464	2	12	4	1900	40	20
1202	528	529	SW 137TH AVE	MINOR ARTERIAL	934	2	12	4	1750	40	20
1203	529	395	SW 344TH ST	MINOR ARTERIAL	1378	2	12	4	1900	40	20
1204	529	528	SW 137TH AVE	MINOR ARTERIAL	934	2	12	4	1900	40	20
1205	530	527	SW 137TH AVE	COLLECTOR	4733	1	12	4	1750	40	20
1206	531	404	SW 117TH AVE	COLLECTOR	582	1	12	4	1750	40	20
1207	600	319	SW 217TH AVE	COLLECTOR	15895	1	11	0	1700	50	15

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1208	600	601	SW 392ND ST	COLLECTOR	4404	1	12	0	1700	50	22
1209	601	304	SW 392ND ST	COLLECTOR	7405	1	12	0	1700	50	22
1210	602	329	SW 217TH AVE	COLLECTOR	2654	1	12	4	1700	50	15
1211	602	707	SW 320TH ST	COLLECTOR	7961	1	12	4	1700	45	15
1212	603	600	SW 392ND ST	COLLECTOR	5701	1	12	0	1700	50	22
1213	604	72	US 1	MINOR ARTERIAL	1588	2	12	4	1900	50	18
1214	604	73	US 1	COLLECTOR	1531	2	12	4	1900	60	18
1215	605	312	SW 187TH AVE	COLLECTOR	2731	1	12	4	1700	50	11
1216	605	607	SW 280TH ST	COLLECTOR	2644	1	12	4	1700	50	12
1217	606	310	SW 187TH AVE	COLLECTOR	2645	1	12	4	1700	50	11
1218	606	614	SW 256TH ST	COLLECTOR	2626	1	12	4	1700	50	12
1219	607	287	SW 182ND AVE	COLLECTOR	2725	1	12	4	1700	50	12
1220	607	625	SW 280TH ST	COLLECTOR	2666	1	12	4	1750	40	12
1221	611	402	SW 162ND AVE	MINOR ARTERIAL	1520	2	12	4	1900	45	19
1222	611	694	SW 344TH ST	MINOR ARTERIAL	3159	2	12	4	1700	45	19
1223	612	155	SW 328TH AVE	COLLECTOR	2031	1	12	4	1750	40	16
1224	612	165	SW 328TH AVE	COLLECTOR	2699	1	12	4	1750	45	16
1225	612	613	SE 6TH ST	COLLECTOR	2743	1	12	4	1700	40	16
1226	613	166	SW 320TH ST	COLLECTOR	818	1	12	4	1750	40	16
1227	613	169	SW 320TH ST	COLLECTOR	2664	1	12	4	1700	40	16
1228	613	612	SE 6TH ST	COLLECTOR	2743	1	12	4	1750	40	16
1229	614	147	SW 182ND AVE	COLLECTOR	2604	1	12	4	1700	50	12
1230	614	624	SW 256TH ST	COLLECTOR	2693	1	12	4	1700	50	12
1231	615	79	SW 187TH AVE	COLLECTOR	2618	1	12	4	1700	50	4
1232	615	617	BUSH DR	COLLECTOR	2654	1	12	4	1700	50	5
1233	617	623	BUSH DR	COLLECTOR	2719	1	12	4	1700	40	5

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1234	618	1	SH 994	COLLECTOR	2637	1	12	4	1750	50	5
1235	619	309	SW 232ND ST	COLLECTOR	3992	1	12	4	1700	50	11
1236	619	620	SW 194TH AVE	COLLECTOR	5226	1	12	4	1700	50	11
1237	620	621	SW 194TH AVE	COLLECTOR	2654	1	12	4	1700	50	4
1238	621	615	BUSH DR	COLLECTOR	4003	1	12	4	1700	50	4
1239	621	622	SW 194TH AVE	COLLECTOR	2714	1	12	4	1700	50	4
1240	622	698	SW 194TH AVE	COLLECTOR	2642	1	12	4	1700	50	4
1241	623	1	SH 997	COLLECTOR	2750	1	12	4	1750	50	5
1242	623	80	SH 997	COLLECTOR	2689	1	12	4	1750	50	5
1243	624	131	SH 997	COLLECTOR	2621	1	12	4	1750	50	12
1244	624	132	SH 997	COLLECTOR	2669	1	12	4	1750	50	12
1245	625	133	SH 997	COLLECTOR	2611	1	12	4	1750	50	12
1246	625	286	SH 997	COLLECTOR	2695	1	12	4	1750	50	12
1247	626	370	CAMPBELL DR	COLLECTOR	1326	1	12	4	1750	40	20
1248	627	210	SW 147TH AVE	COLLECTOR	5444	1	12	4	1750	40	17
1249	627	398	SW 328TH AVE	MINOR ARTERIAL	1786	1	12	4	1700	50	17
1250	628	210	SW 147TH AVE	COLLECTOR	676	2	12	4	1750	40	17
1251	629	271	SW 92ND AVE	COLLECTOR	2389	1	12	4	1750	40	10
1252	630	114	SW 176TH ST	LOCAL ROADWAY	1503	1	12	4	1750	40	10
1253	631	255	SH 989	MINOR ARTERIAL	1311	2	12	0	1750	50	9
1254	631	632	SW 224TH ST	COLLECTOR	5456	1	12	4	1750	40	9
1255	631	683	SH 989	MINOR ARTERIAL	2686	2	12	0	1750	50	13
1256	632	200	US 1	MINOR ARTERIAL	3821	2	12	3	1750	45	13
1257	632	205	US 1	MINOR ARTERIAL	1865	2	12	3	1750	45	8
1258	632	631	SW 224TH ST	COLLECTOR	5456	1	12	4	1750	40	9
1259	632	633	MIAMI AVE	COLLECTOR	486	1	12	4	1750	30	8

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1260	633	632	MIAMI AVE	COLLECTOR	486	1	12	4	1750	40	8
1261	633	635	BUSWAY	LOCAL ROADWAY	1772	1	12	4	1750	45	8
1262	634	631	SW 224TH ST	COLLECTOR	1436	1	12	4	1750	40	9
1263	635	205	OLD CULTER RD	COLLECTOR	580	1	12	4	1750	30	8
1264	635	412	BUSWAY	LOCAL ROADWAY	1921	1	12	4	1750	45	8
1265	636	199	SW 232ND ST	COLLECTOR	1340	1	12	4	1700	50	13
1266	636	259	SW 134TH ST	COLLECTOR	5341	1	12	4	1750	50	8
1267	636	276	SW 232ND ST	COLLECTOR	6673	1	12	4	1750	50	12
1268	637	16	CARIBBEAN BLVD	COLLECTOR	1916	1	12	4	1750	40	9
1269	637	269	CARIBBEAN BLVD	COLLECTOR	2089	1	12	4	1750	40	9
1270	638	637	CORAL SEA RD	COLLECTOR	1165	1	12	4	1750	35	9
1271	639	101	CARIBBEAN BLVD	COLLECTOR	1270	1	12	4	1750	40	9
1272	639	216	CARIBBEAN BLVD	COLLECTOR	1829	1	12	4	1750	40	9
1273	640	639	SW 114TH AVE	COLLECTOR	2237	1	12	4	1750	35	9
1274	640	644	SW 114TH AVE	COLLECTOR	1616	1	12	4	1700	40	9
1275	641	110	SW 106TH AVE	LOCAL ROADWAY	674	2	12	4	1750	35	9
1276	642	9	TURNPIKE ON RAMP FROM SW 186TH ST	FREEWAY RAMP	647	1	12	4	1700	50	7
1277	643	7	TURNPIKE SERVICE RD	MINOR ARTERIAL	532	2	12	4	1750	40	7
1278	644	645	SW 114TH AVE	COLLECTOR	584	1	12	4	1750	40	7
1279	645	97	SH 994	MINOR ARTERIAL	967	2	12	4	1750	40	7
1280	645	102	SH 994	MINOR ARTERIAL	1151	2	12	4	1900	40	7
1281	645	646	SW 114TH AVE	COLLECTOR	1841	1	12	4	1750	40	7
1282	646	6	SW 184TH ST	MINOR ARTERIAL	991	2	12	4	1750	45	7
1283	646	99	SW 184TH ST	MINOR ARTERIAL	676	2	12	4	1750	45	7
1284	647	88	SW 137TH AVE	COLLECTOR	1899	1	12	4	1750	30	8

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1285	648	85	SW 184TH ST	COLLECTOR	4104	2	12	4	1750	45	5
1286	648	127	SW 184TH ST	MINOR ARTERIAL	1256	2	12	4	1750	45	6
1287	649	432	SW 168TH ST	COLLECTOR	2653	1	12	4	1750	40	6
1288	650	5	SW 184TH ST	MINOR ARTERIAL	565	2	12	4	1750	45	7
1289	650	104	SW 184TH ST	MINOR ARTERIAL	2615	2	12	4	1750	45	7
1290	650	464	SW 112TH AVE	COLLECTOR	2262	1	12	4	1700	40	7
1291	651	460	SW 82ND AVE	COLLECTOR	874	1	12	4	1750	40	10
1292	652	104	SW 184TH ST	MINOR ARTERIAL	2553	2	12	4	1750	45	7
1293	652	418	SW 184TH ST	MINOR ARTERIAL	612	2	12	4	1750	45	7
1294	652	653	HOMESTEAD AVE	COLLECTOR	919	1	12	4	1750	40	7
1295	653	103	SH 994	MINOR ARTERIAL	2170	2	12	4	1750	45	7
1296	653	417	SH 994	MINOR ARTERIAL	577	2	12	4	1750	45	7
1297	653	652	HOMESTEAD AVE	COLLECTOR	919	1	12	4	1750	40	7
1298	654	196	SW 137TH AVE	COLLECTOR	2660	1	12	4	1700	40	13
1299	654	197	SW 137TH AVE	COLLECTOR	518	1	12	4	1750	40	13
1300	654	655	SW 252ND ST	LOCAL ROADWAY	507	1	12	4	1750	45	13
1301	655	192	US 1	MINOR ARTERIAL	3567	2	12	2	1750	50	13
1302	655	197	US 1	MINOR ARTERIAL	733	2	12	2	1750	50	13
1303	656	193	US 1	MINOR ARTERIAL	1459	2	12	3	1750	50	13
1304	656	198	US 1	MINOR ARTERIAL	1531	2	12	3	1750	50	13
1305	657	420	BUSWAY	LOCAL ROADWAY	1932	1	12	4	1750	45	13
1306	657	656	SW 244TH ST	COLLECTOR	262	2	12	4	1750	45	13
1307	658	657	SW 244TH ST	COLLECTOR	220	1	12	4	1750	45	13
1308	659	660	SW 19500 BLK	LOCAL ROADWAY	482	1	12	4	1750	35	9
1309	660	111	US 1	MAJOR ARTERIAL	958	3	12	3	1750	45	9
1310	660	268	US 1	MAJOR ARTERIAL	1842	3	12	3	1900	45	9

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1311	661	123	US 1	MINOR ARTERIAL	744	3	12	3	1750	50	7
1312	661	662	HIBISCUS ST.	COLLECTOR	590	1	12	4	1750	30	7
1313	662	122	US 1	MINOR ARTERIAL	1558	3	12	3	1900	50	7
1314	662	661	HIBISCUS ST.	COLLECTOR	590	1	12	4	1750	30	7
1315	663	450	US 1	MINOR ARTERIAL	1593	3	12	3	1750	50	7
1316	663	452	US 1	MAJOR ARTERIAL	2323	3	12	3	1750	50	3
1317	664	663	SW 15900 BLK	COLLECTOR	374	1	12	4	1750	45	7
1318	665	466	SR 992	MINOR ARTERIAL	688	2	12	4	1750	50	3
1319	665	667	SR 992	MINOR ARTERIAL	4108	2	12	4	1750	50	2
1320	666	665	SW 93RD AVE	COLLECTOR	922	1	12	4	1750	45	2
1321	667	448	SR 992	MINOR ARTERIAL	565	2	12	4	1750	50	2
1322	667	665	SR 992	MINOR ARTERIAL	4108	2	12	4	1750	50	2
1323	668	667	SW 99TH CT	COLLECTOR	560	1	12	4	1750	30	2
1324	669	448	SR 992	MINOR ARTERIAL	2650	2	12	4	1750	50	2
1325	669	454	SR 992	MINOR ARTERIAL	2713	2	12	4	1750	50	2
1326	670	669	SW 107TH AVE	COLLECTOR	1957	1	12	4	1750	40	2
1327	671	476	DON SHULA EXPRESSWAY	FREEWAY	1236	3	12	4	2250	70	2
1328	672	61	MALL ENTRANCE	COLLECTOR	510	1	12	4	1750	45	17
1329	673	67	US 1	MINOR ARTERIAL	801	2	12	4	1900	50	18
1330	673	155	US 1	MINOR ARTERIAL	2699	2	12	4	1750	50	16
1331	673	674	NE 7TH ST	MINOR ARTERIAL	695	1	12	4	1750	30	18
1332	674	138	SH 997	COLLECTOR	2690	1	12	2	1750	40	16
1333	674	139	SH 997	COLLECTOR	2655	1	12	2	1750	40	18
1334	675	510	SW 4TH ST	LOCAL ROADWAY	255	1	12	4	1750	40	16
1335	675	676	FLAGLER AVE	COLLECTOR	1697	1	12	0	1750	40	16
1336	676	137	SH 997	COLLECTOR	360	1	12	2	1750	40	16

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1337	676	138	SH 997	COLLECTOR	1803	1	12	2	1750	40	16
1338	676	162	FLAGLER AVE	COLLECTOR	1007	1	12	0	1750	40	16
1339	676	675	FLAGLER AVE	COLLECTOR	1697	1	12	0	1750	40	16
1340	677	161	SH 997	COLLECTOR	334	1	12	2	1750	40	16
1341	677	678	SH 997	COLLECTOR	335	1	12	2	1750	40	16
1342	678	136	SH 997	COLLECTOR	1959	1	12	2	1750	40	16
1343	678	677	SH 997	COLLECTOR	335	1	12	2	1750	40	16
1344	679	677	NW 2ND ST	LOCAL ROADWAY	1293	1	12	4	1750	40	16
1345	679	710	NW 2ND AVE	COLLECTOR	343	1	12	4	1750	30	16
1346	680	678	NW 4TH ST	LOCAL ROADWAY	1310	1	12	4	1750	40	16
1347	681	212	SW 216TH ST	COLLECTOR	2675	1	12	4	1700	40	8
1348	681	412	SW 216TH ST	COLLECTOR	2002	2	12	4	1750	40	8
1349	682	681	SW 120TH AVE	COLLECTOR	949	1	12	4	1700	40	8
1350	683	220	SH 989	MINOR ARTERIAL	5283	2	12	0	1750	50	13
1351	683	631	SH 989	MINOR ARTERIAL	2686	2	12	0	1750	50	13
1352	684	683	SW 232 ST	COLLECTOR	1519	1	12	4	1750	40	13
1353	685	221	SW 268TH ST	COLLECTOR	639	1	12	4	1750	50	13
1354	685	222	SW 268TH ST	MINOR ARTERIAL	7318	2	12	4	1750	50	13
1355	686	222	SW 268TH ST	MINOR ARTERIAL	2630	2	12	4	1750	50	13
1356	686	687	SW 268TH ST	MINOR ARTERIAL	341	2	12	4	1750	50	13
1357	687	334	SW 268TH ST	MINOR ARTERIAL	1075	2	12	4	1900	50	13
1358	687	686	SW 268TH ST	MINOR ARTERIAL	341	2	12	4	1750	50	13
1359	688	687	SW 132 AVE	COLLECTOR	470	1	12	4	1750	45	13
1360	689	686	SW 132 AVE	COLLECTOR	4156	1	12	4	1750	45	13
1361	690	43	SW 137TH AVE	MINOR ARTERIAL	1593	2	12	4	1900	50	13
1362	690	367	SW 137TH AVE	MINOR ARTERIAL	1051	2	12	4	1750	45	13

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1363	691	690	SW 284TH ST	COLLECTOR	1093	1	12	4	1750	45	13
1364	692	367	SW 137TH AVE	MINOR ARTERIAL	2643	2	12	4	1750	50	13
1365	693	692	SW 296TH AVE	COLLECTOR	1082	1	12	4	1750	40	13
1366	694	695	SW 344TH ST	MINOR ARTERIAL	333	2	12	4	1700	45	18
1367	695	164	SW 344TH ST	MINOR ARTERIAL	483	2	12	4	1750	45	18
1368	696	694	SW 344TH ST	COLLECTOR	308	1	12	4	1700	40	18
1369	697	696	SE 13TH AVE	COLLECTOR	422	1	12	4	1700	40	18
1370	698	699	GROSSMAN FARM RD	COLLECTOR	9305	1	12	4	1700	50	5
1371	699	1	SH 997	COLLECTOR	2649	1	12	4	1750	50	5
1372	699	75	SH 997	COLLECTOR	2672	1	12	4	1750	50	5
1373	700	619	SW 232ND ST	COLLECTOR	3975	1	12	4	1700	50	11
1374	701	700	SW 232ND ST	COLLECTOR	2650	1	12	4	1700	50	11
1375	702	701	SW 207TH AVE	COLLECTOR	2679	1	12	4	1700	50	11
1376	703	700	SW 202ND AVE	COLLECTOR	2690	1	12	4	1700	50	11
1377	704	325	SW 217TH AVE	COLLECTOR	2644	1	12	4	1700	50	11
1378	704	705	SW 280TH ST	COLLECTOR	7943	1	12	4	1700	50	11
1379	705	605	SW 280TH ST	COLLECTOR	8000	1	12	4	1700	50	11
1380	706	296	SW 344TH ST	COLLECTOR	5272	1	12	4	1700	45	15
1381	706	707	SW 202 AVE	COLLECTOR	7995	1	12	4	1700	50	15
1382	707	708	SW 320TH ST	COLLECTOR	2682	1	12	4	1700	45	15
1383	708	330	SW 320TH ST	COLLECTOR	2655	1	12	4	1700	45	15
1384	708	709	SW 197TH AVE	COLLECTOR	2679	1	12	4	1700	50	15
1385	709	316	CAMPBELL DR	COLLECTOR	5283	1	12	4	1750	35	15
1386	710	161	SW 320TH ST	COLLECTOR	1310	1	12	4	1750	30	16
1387	710	163	SW 320TH ST	COLLECTOR	1355	1	12	4	1750	35	16
1388	711	168	SW 320TH ST	COLLECTOR	400	1	12	4	1750	40	16

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1389	711	513	BUSWAY	LOCAL ROADWAY	2920	1	12	4	1750	45	16
1390	712	197	BUSWAY	COLLECTOR	207	1	12	4	1750	40	13
1391	712	411	BUSWAY	LOCAL ROADWAY	787	1	12	4	1750	45	13
1392	713	281	SW 248TH ST	COLLECTOR	2682	1	12	4	1700	50	12
1393	713	282	SW 248TH ST	COLLECTOR	2643	1	12	4	1750	50	12
1394	714	713	SW 152ND AVE	COLLECTOR	2626	1	12	4	1700	40	12
1395	715	459	SR 992	COLLECTOR	1355	1	12	4	1700	40	3
1396	715	487	SR 992	COLLECTOR	2658	1	12	4	1750	40	3
1397	715	745	GALLOWAY RD	COLLECTOR	2655	1	12	4	1700	40	3
1398	716	715	GALLOWAY RD	COLLECTOR	2597	1	12	4	1750	40	3
1399	717	433	SR 992	MAJOR ARTERIAL	2570	3	12	4	1750	40	2
1400	717	722	SR 992	MAJOR ARTERIAL	1082	3	12	4	1750	40	2
1401	718	717	SW 122ND AVE	COLLECTOR	2342	2	12	4	1750	40	2
1402	719	434	SW 127TH AVE	COLLECTOR	1045	2	12	4	1750	40	2
1403	720	434	SR 992	MAJOR ARTERIAL	1470	3	12	4	1750	40	2
1404	720	724	SR 992	MAJOR ARTERIAL	1396	3	12	4	1900	40	2
1405	721	720	SW 129TH AVE	COLLECTOR	544	1	12	4	1750	40	2
1406	722	434	SR 992	MAJOR ARTERIAL	451	3	12	4	1750	40	2
1407	722	717	SR 992	MAJOR ARTERIAL	1082	3	12	4	1750	40	2
1408	723	722	SW 124TH AVE	COLLECTOR	686	2	12	4	1750	40	2
1409	724	720	SR 992	MAJOR ARTERIAL	1396	3	12	4	1750	40	2
1410	724	725	SR 992	MAJOR ARTERIAL	620	3	12	4	1750	25	2
1411	725	480	SR 992	MAJOR ARTERIAL	3001	3	12	4	1750	40	2
1412	725	724	SR 992	MAJOR ARTERIAL	620	3	12	4	1900	25	2
1413	726	725	SW 132ND AVE	COLLECTOR	359	1	12	4	1750	40	2
1414	727	430	SW 13800 BLK	COLLECTOR	671	1	12	4	1750	40	5

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1415	728	430	SR 992	MINOR ARTERIAL	1367	2	12	4	1750	40	1
1416	729	728	SW 142ND AVE	COLLECTOR	599	1	12	4	1750	40	1
1417	730	428	SW 147TH AVE	COLLECTOR	2691	1	12	4	1750	40	5
1418	731	426	SW 157TH AVE	COLLECTOR	2627	1	12	4	1700	40	5
1419	731	730	SW 168TH ST	COLLECTOR	5407	1	12	4	1000	40	5
1420	732	90	SW 134TH AVE	COLLECTOR	2074	1	12	4	1750	40	6
1421	733	92	BURR RD	LOCAL ROADWAY	932	1	12	4	1750	15	6
1422	734	735	UNNAMED ROAD	LOCAL ROADWAY	633	1	12	4	1750	20	20
1423	735	521	SW 344TH ST	COLLECTOR	8697	1	12	4	1700	40	20
1424	736	428	SW 160TH ST	COLLECTOR	2734	1	12	4	1750	40	5
1425	736	479	SW 152ND AVE	COLLECTOR	2673	1	12	4	1750	40	5
1426	737	118	CARIBBEAN BLVD	COLLECTOR	990	1	12	4	1700	40	10
1427	737	119	CARIBBEAN BLVD	COLLECTOR	2667	1	12	4	1750	40	10
1428	738	737	SW 89TH RD	LOCAL ROADWAY	450	1	12	4	1750	35	10
1429	739	737	SW 89TH RD	LOCAL ROADWAY	709	1	12	4	1750	35	10
1430	740	361	SW 172ND AVE	COLLECTOR	167	1	12	4	1125	25	16
1431	741	742	SW 172ND AVE	COLLECTOR	175	1	12	4	1125	25	16
1432	741	756	SW 172ND AVE	COLLECTOR	1222	1	12	4	1700	40	16
1433	742	135	NE 15TH ST	COLLECTOR	2621	1	12	4	1750	40	16
1434	742	740	SW 172ND AVE	COLLECTOR	173	1	12	4	1125	25	16
1435	743	173	NE 11TH ST	COLLECTOR	308	1	12	4	1750	40	16
1436	743	512	BUSWAY	LOCAL ROADWAY	1917	1	12	4	1750	45	16
1437	743	744	NE 11TH ST	COLLECTOR	220	1	12	4	1750	40	16
1438	744	145	OLD DIXIE HWY	COLLECTOR	1899	1	12	4	1750	45	16
1439	744	362	OLD DIXIE HWY	COLLECTOR	1699	1	12	4	1750	45	16
1440	744	743	NE 11TH ST	COLLECTOR	220	1	12	4	1750	40	16

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1441	745	746	SW 144TH ST	COLLECTOR	2717	1	12	4	1750	40	3
1442	745	747	SW 144TH ST	COLLECTOR	1150	1	12	4	1750	40	3
1443	746	745	SW 144TH ST	COLLECTOR	2717	1	12	4	1700	40	3
1444	746	782	SW 144TH ST	COLLECTOR	2695	1	12	4	1750	40	3
1445	746	783	SW 82ND AVE	COLLECTOR	2670	1	12	4	1750	40	3
1446	747	452	US 1	MAJOR ARTERIAL	2887	3	12	3	1750	50	3
1447	747	775	US 1	MAJOR ARTERIAL	2953	3	12	3	1750	50	3
1448	748	276	SW 232ND ST	COLLECTOR	2680	1	12	4	1750	50	12
1449	748	277	SW 232ND ST	COLLECTOR	2739	1	12	4	1750	50	12
1450	749	748	SW 152ND AVE	COLLECTOR	1967	1	12	4	1700	40	12
1451	750	421	SW 304TH ST	COLLECTOR	2646	1	12	4	1700	40	20
1452	751	750	SW 112TH AVE	COLLECTOR	2662	1	12	4	1700	40	20
1453	752	107	SW 184TH ST	COLLECTOR	511	2	12	4	1750	45	7
1454	752	112	SW 184TH ST	MINOR ARTERIAL	4811	1	12	4	1750	45	10
1455	753	451	SW 87TH AVE	COLLECTOR	275	1	12	4	1125	25	10
1456	754	124	SW 168TH ST	COLLECTOR	4403	1	12	4	1700	40	10
1457	754	753	SW 168TH ST	COLLECTOR	276	1	12	4	1125	25	10
1458	755	270	NASSAU DR	COLLECTOR	492	1	12	4	1700	40	9
1459	756	159	SW 172ND AVE	COLLECTOR	1331	1	12	4	1700	40	12
1460	756	741	SW 172ND AVE	COLLECTOR	1222	1	12	4	1700	40	16
1461	757	756	NE 19TH ST	COLLECTOR	1370	1	12	4	1700	40	16
1462	758	759	SW 112TH AVE	COLLECTOR	2644	1	12	4	1700	40	2
1463	758	763	SW 136TH ST	COLLECTOR	2599	1	12	4	1700	40	2
1464	759	790	SW 128TH ST	COLLECTOR	2665	1	12	4	1700	40	2
1465	760	759	SW 128TH ST	COLLECTOR	2635	1	12	4	1700	40	2
1466	761	760	SW 128TH ST	COLLECTOR	2749	1	12	4	1700	40	2

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1467	762	779	SW 128TH ST	COLLECTOR	5314	1	12	4	1700	40	3
1468	763	758	SW 136TH ST	COLLECTOR	2599	1	12	4	1700	40	2
1469	763	760	SW 107TH AVE	COLLECTOR	2635	1	12	4	1700	40	2
1470	763	765	SW 136TH ST	COLLECTOR	2723	1	12	4	1750	40	2
1471	764	763	SW 107TH AVE	COLLECTOR	1403	1	12	4	1700	40	2
1472	765	761	SW 102ND AVE	COLLECTOR	2611	1	12	4	1700	40	2
1473	765	763	SW 136TH ST	COLLECTOR	2723	1	12	4	1700	40	2
1474	765	769	SW 136TH ST	COLLECTOR	2672	1	12	4	1750	40	2
1475	766	765	SW 102ND AVE	COLLECTOR	2537	1	12	4	1750	40	2
1476	767	769	SW 97TH AVE	COLLECTOR	2670	1	12	4	1750	40	2
1477	767	793	SW 144TH ST	COLLECTOR	2613	1	12	4	1750	40	2
1478	768	767	SW 97TH AVE	COLLECTOR	1321	1	12	4	1700	40	2
1479	769	762	SW 97TH AVE	COLLECTOR	2653	1	12	4	1750	40	2
1480	769	765	SW 136TH ST	COLLECTOR	2672	1	12	4	1750	40	2
1481	769	770	SW 136TH ST	MINOR ARTERIAL	2801	2	12	4	1750	40	2
1482	770	771	SW 136TH ST	MINOR ARTERIAL	1012	2	12	4	1900	40	3
1483	771	772	SW 136TH ST	MINOR ARTERIAL	742	2	12	4	1750	40	3
1484	772	773	SW 136TH ST	MINOR ARTERIAL	823	2	12	4	1750	40	3
1485	772	778	SW 132ND ST	COLLECTOR	1321	1	12	4	1750	40	3
1486	773	774	SW 136TH ST	MINOR ARTERIAL	655	2	12	4	1750	40	3
1487	774	775	SW 136TH ST	COLLECTOR	232	2	12	4	1750	40	3
1488	774	776	BUSWAY	LOCAL ROADWAY	1226	1	12	4	1750	45	3
1489	775	747	US 1	MAJOR ARTERIAL	2953	3	12	3	1750	50	3
1490	775	777	US 1	MAJOR ARTERIAL	1166	3	12	3	1750	50	3
1491	776	777	SH 973	COLLECTOR	188	1	12	4	1750	40	3
1492	776	778	SH 973	COLLECTOR	394	2	12	4	1750	40	3

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1493	776	780	BUSWAY	LOCAL ROADWAY	1728	1	12	4	1750	45	3
1494	777	775	US 1	MAJOR ARTERIAL	1166	3	12	3	1750	50	3
1495	777	776	SH 973	COLLECTOR	188	2	12	4	1750	40	3
1496	777	781	US 1	MAJOR ARTERIAL	1836	3	12	3	1750	50	3
1497	778	776	SH 973	COLLECTOR	394	2	12	4	1750	40	3
1498	778	779	SH 973	COLLECTOR	1335	1	12	4	1700	40	3
1499	779	762	SW 128TH ST	COLLECTOR	5314	1	12	4	1750	40	3
1500	779	780	SW 128TH ST	COLLECTOR	1101	1	12	4	1750	40	3
1501	780	467	BUSWAY	LOCAL ROADWAY	1484	1	12	4	1700	45	3
1502	780	779	SW 128TH ST	COLLECTOR	1101	1	12	4	1700	40	3
1503	780	781	SW 128TH ST	COLLECTOR	220	2	12	4	1750	40	3
1504	781	453	US 1	MAJOR ARTERIAL	1468	3	12	3	1900	50	3
1505	781	777	US 1	MAJOR ARTERIAL	1836	3	12	3	1750	50	3
1506	781	780	SW 128TH ST	COLLECTOR	220	1	12	4	1750	40	3
1507	782	746	SW 144TH ST	COLLECTOR	2695	1	12	4	1750	40	3
1508	782	784	SW 77TH AVE	COLLECTOR	2680	1	12	4	1750	40	3
1509	782	787	SW 144TH ST	COLLECTOR	3032	1	12	4	1750	40	3
1510	783	775	SW 136TH ST	COLLECTOR	2635	1	12	4	1750	40	3
1511	783	784	SW 136TH ST	COLLECTOR	2682	1	12	4	1750	40	3
1512	784	783	SW 136TH ST	COLLECTOR	2682	1	12	4	1750	40	3
1513	784	785	SW 136TH ST	COLLECTOR	2653	1	12	4	1700	40	3
1514	785	784	SW 136TH ST	COLLECTOR	2653	1	12	4	1750	40	3
1515	785	799	SW 136TH ST	COLLECTOR	2122	1	12	4	1700	40	3
1516	786	463	OLD CULTER RD	COLLECTOR	3317	1	12	4	1700	45	3
1517	786	788	SW 67TH AVE	COLLECTOR	1725	1	12	4	1700	40	3
1518	786	799	OLD CULTER RD	COLLECTOR	513	1	12	4	1750	45	3

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1519	787	462	OLD CULTER RD	COLLECTOR	2907	1	12	4	1750	45	3
1520	787	782	SW 144TH ST	COLLECTOR	3032	1	12	4	1750	40	3
1521	787	799	OLD CULTER RD	COLLECTOR	3225	1	12	4	1700	40	3
1522	789	747	SW 144TH ST	COLLECTOR	210	2	12	4	1750	40	3
1523	789	774	BUSWAY	LOCAL ROADWAY	2984	1	12	4	1750	45	3
1524	790	791	SW 117TH AVE	MINOR ARTERIAL	2971	2	12	4	1900	30	2
1525	792	462	SR 992	COLLECTOR	2021	1	12	4	1750	40	3
1526	792	487	SR 992	COLLECTOR	2669	1	12	4	1750	40	3
1527	792	782	SW 77TH AVE	COLLECTOR	2714	1	12	4	1750	40	3
1528	793	789	SW 144TH ST	COLLECTOR	1227	1	12	4	1750	40	3
1529	793	794	SW 92ND AVE	COLLECTOR	1579	1	12	4	1700	40	3
1530	794	770	SW 92ND AVE	COLLECTOR	2301	1	12	4	1750	40	3
1531	795	793	SW 92ND AVE	COLLECTOR	1223	1	12	4	1750	40	3
1532	797	773	SCHOOL ENTRANCE	COLLECTOR	579	1	12	4	1750	30	3
1533	798	772	MALL ENTRANCE	COLLECTOR	345	1	12	4	1750	30	3
1534	799	785	SW 136TH ST	COLLECTOR	2122	1	12	4	1700	40	3
1535	799	786	OLD CULTER RD	COLLECTOR	513	1	12	4	1750	40	3
1536	799	787	OLD CULTER RD	COLLECTOR	3229	1	12	4	1750	45	3
1537	800	786	SW 67TH AVE	COLLECTOR	2648	1	12	4	1750	40	3
1538	801	792	SW 77TH AVE	COLLECTOR	1409	1	12	4	1750	40	3
1539	802	338	SW 157TH AVE	COLLECTOR	4174	1	12	4	1750	40	17
1540	802	341	SW 157TH AVE	COLLECTOR	677	1	12	4	1750	40	17
1541	803	802	SW 307TH AVE	COLLECTOR	605	1	12	4	1750	40	17
1542	804	368	WESTOVER AVE	COLLECTOR	1661	1	12	4	1700	40	13
1543	805	222	SW 127TH AVE	COLLECTOR	4537	1	12	4	1750	45	13
1544	806	184	US 1	MINOR ARTERIAL	827	2	12	3	1750	50	12

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
1545	806	187	US 1	MINOR ARTERIAL	2458	2	12	3	1750	50	12
1546	807	59	CAMPBELL DR	MINOR ARTERIAL	362	3	12	4	1750	40	17
1547	807	340	CAMPBELL DR	MINOR ARTERIAL	2463	2	12	4	1750	45	17
1548	808	807	NE 22ND TERRACE	COLLECTOR	365	2	12	4	1750	40	17
1549	809	340	NE 18TH AVE	COLLECTOR	1382	1	12	4	1750	40	17
1550	810	444	COLONIAL DR	COLLECTOR	2726	1	12	4	1750	40	7
1551	810	449	COLONIAL DR	COLLECTOR	2245	1	12	4	1700	40	7
1552	810	811	SW 102ND AVE	COLLECTOR	2726	1	12	4	1750	40	7
1553	811	125	SW 168TH ST	COLLECTOR	2711	1	12	4	1750	40	7
1554	811	419	SW 168TH ST	COLLECTOR	3005	1	12	4	1750	40	7
1555	811	810	SW 102ND AVE	COLLECTOR	2726	1	12	4	1750	40	7
1556	8010	476	DON SHULA EXPRESSWAY	FREEWAY	3120	3	12	4	2250	70	2
1559	8124	453	US 1	MINOR ARTERIAL	1166	3	12	3	1900	50	3
1560	8237	237	US 1	MINOR ARTERIAL	2856	2	12	4	1900	45	31
1561	8474	474	FLORIDA TURNPIKE	FREEWAY	1487	3	12	10	2250	70	2
Exit Link	237	8237	US 1	MINOR ARTERIAL	2856	2	12	4	1900	45	31
Exit Link	424	8076	SH 997	COLLECTOR	4027	1	12	4	1350	30	1
Exit Link	431	8129	SW 137TH AVE	MAJOR ARTERIAL	2752	3	12	4	1900	30	2
Exit Link	453	8124	US 1	MINOR ARTERIAL	1166	3	12	3	1900	30	3
Exit Link	463	8114	OLD CULTER RD	COLLECTOR	1162	1	12	4	1350	30	3
Exit Link	467	8419	BUSWAY	LOCAL ROADWAY	1174	1	12	4	1900	45	3

Link #	Up-Stream Node	Down-Stream Node	Roadway Name	Roadway Type	Length (ft.)	No. of Lanes	Lane Width (ft.)	Shoulder Width (ft.)	Saturation Flow Rate (pcphpl)	Free Flow Speed (mph)	Grid Map Number
Exit Link	474	8474	FLORIDA TURNPIKE	FREEWAY	1487	3	12	10	2250	30	2
Exit Link	476	8010	DON SHULA EXPRESSWAY	FREEWAY	3120	3	12	4	2250	70	2
Exit Link	779	8788	SH 973	COLLECTOR	2387	1	12	4	1700	40	3
Exit Link	788	8789	SW 67TH AVE	COLLECTOR	1090	1	12	4	1700	40	3
Exit Link	791	8458	SW 117TH AVE	MINOR ARTERIAL	1105	2	12	4	1900	30	2

Table K-2. Nodes in the Link-Node Analysis Network which are Controlled

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
1	828307	453210	Actuated	5
2	885928	346885	TCP - Uncontrolled[1]	26
3	867772	446037	TCP - Uncontrolled	9
5	862361	459987	TCP - Actuated	7
6	861839	459939	TCP - Actuated	7
7	863338	459107	TCP - Actuated	7
8	862837	458984	TCP - Actuated	7
12	865198	454453	TCP - Uncontrolled	9
15	865425	452395	TCP - Actuated	9
16	867843	452134	Actuated	9
17	865801	450835	TCP - Actuated	9
19	865752	452303	TCP - Actuated	9
21	866120	451026	TCP - Actuated	9
27	869793	448665	Actuated	9
28	866333	448594	TCP - Actuated	9
35	863181	436898	Yield	13
36	863188	435850	TCP - Actuated	13
38	863181	436682	Yield	13
42	849941	429069	TCP - Actuated	13
43	849963	426903	TCP - Uncontrolled	13
48	848181	424202	TCP - Actuated	13
49	848649	424214	TCP - Uncontrolled	13
50	849067	424247	TCP - Actuated	13
59	839615	416123	TCP - Actuated	17
61	840625	416157	Actuated	17
69	829653	401336	Stop	18
70	829753	400895	Yield	18
72	829853	400390	Stop	18
75	828211	458530	Actuated	5
77	838841	458908	Stop	5
78	833563	453268	Stop	5
79	822963	453114	Stop	4
81	836253	453350	Stop	5

[1] This TCP is located at the intersection of CR-905 and CR-905A (Card Sound Rd) in Monroe County. The TCP is only activated when Area 10 evacuates (Region R03 only). The intersection is modeled as an all-way stop sign for all other regions.

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
82	833668	447884	Stop	5
83	836325	447919	Stop	5
84	839051	447884	Stop	5
85	844167	459109	Actuated	5
86	844271	453605	Actuated	5
87	844402	448028	TCP - Actuated	5
88	849601	453646	Actuated	8
90	850897	459456	Actuated	6
92	854895	459615	Actuated	6
93	854951	453737	Actuated	8
94	841657	416170	TCP - Uncontrolled	17
96	857565	454987	Actuated	8
97	860253	457446	Actuated	8
98	857536	459750	Actuated	6
99	860175	459856	Actuated	6
100	857545	453758	Stop	8
101	860362	453786	TCP - Actuated	9
103	865587	459258	Actuated	7
104	865538	460124	Actuated	7
105	868585	459402	TCP - Actuated	7
106	870900	459373	Stop	7
107	870900	460338	Actuated	7
109	868936	460255	TCP - Actuated	7
110	866318	457412	Actuated	9
111	867212	456764	TCP - Actuated	9
112	876219	460494	TCP - Actuated	10
113	881424	460630	TCP - Actuated	10
114	883016	463592	Actuated	10
115	877389	460522	TCP - Actuated	10
117	876254	458523	Actuated	10
119	872757	455948	Actuated	10
120	875041	453105	Actuated	10
121	876303	453475	Actuated	10
123	870802	463107	Actuated	7
124	871466	465848	Actuated	7
125	865208	465565	Actuated	7
127	849519	459374	Actuated	6
128	849130	467534	Actuated	6
130	828408	442619	Actuated	12

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
131	828438	437250	Actuated	12
132	828500	431962	Actuated	12
133	828636	423965	TCP - Actuated	12
134	828620	421317	Actuated	12
135	828706	418654	Actuated	16
136	828740	415988	Actuated	16
137	828763	412868	Actuated	16
138	828781	410705	Actuated	16
139	828833	405360	Actuated	18
141	833706	442720	Stop	12
142	833804	437365	TCP - Actuated	12
143	833860	432022	TCP - Actuated	12
144	831334	423993	Stop	12
145	833685	418761	Actuated	16
146	825759	442573	Stop	12
147	825786	437234	Stop	12
148	825814	431913	Stop	12
149	825944	423943	Stop	12
150	826004	418608	Actuated	16
151	825993	415999	Actuated	16
152	826125	410661	Actuated	16
153	826133	405343	Actuated	18
154	831708	416051	Actuated	16
155	829493	410705	Actuated	16
158	829554	405386	Actuated	18
159	831397	421367	Stop	12
160	825975	421273	Stop	12
161	828728	413361	Actuated	16
162	829448	413238	Actuated	16
163	826064	413316	Actuated	16
164	834254	405399	Actuated	18
165	834222	410741	Actuated	16
166	830715	413405	Actuated	16
168	829937	413708	Actuated	16
169	834196	413466	Stop	16
170	832816	416025	Actuated	16
171	834135	416077	Actuated	16
173	832939	417378	Actuated	16
174	833300	417378	Actuated	16

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
175	834099	417405	Stop	16
176	834154	418757	Actuated	16
177	836723	418742	Stop	17
178	836509	421435	Actuated	12
179	838947	424112	Actuated	12
180	836752	421435	Actuated	12
181	838397	424096	Actuated	12
182	836086	421428	Actuated	12
183	839360	424113	Actuated	12
184	841341	426761	Actuated	12
185	839325	426779	Stop	12
186	841981	426787	Stop	12
187	843478	429251	Actuated	12
188	839194	429433	Stop	12
189	846010	432242	Actuated	12
190	849915	432285	Stop	13
192	846991	433603	Actuated	12
193	850487	437641	Actuated	13
195	851156	437646	Actuated	13
196	849893	433634	Stop	13
197	849851	436813	Actuated	13
198	852521	439833	Actuated	13
199	852439	443034	Stop	13
200	855105	442934	Actuated	13
202	844883	430917	Actuated	12
203	849974	430946	TCP - Actuated	13
204	855187	437726	Actuated	13
205	858950	447122	Actuated	8
206	860036	448449	Actuated	8
207	861772	450440	Actuated	9
208	862993	451871	Actuated	9
210	844890	416263	Actuated	17
211	863089	448520	Actuated	9
212	855023	448367	TCP - Uncontrolled	8
214	863078	450254	Actuated	9
215	864348	453353	TCP - Actuated	9
216	863461	453842	Actuated	9
220	863160	437924	Actuated	13
221	863289	431129	TCP - Actuated	13

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
222	855333	431031	TCP - Actuated	13
239	863117	305093	TCP - Actuated[2]	31
249	860667	349113	Stop	25
254	865865	437931	Stop	13
255	863119	447203	Actuated	9
259	851020	448346	TCP - Actuated	8
260	865971	448594	TCP - Actuated	9
261	863684	450244	Stop	9
262	872395	448595	Stop	9
264	876443	447707	Actuated	10
266	872389	451190	Actuated	9
268	865361	454665	Stop	9
269	871386	453836	Actuated	9
270	872141	452587	Stop	9
271	873667	452250	Actuated	10
274	876658	453671	Stop	10
275	876368	451343	Stop	10
276	844426	442920	TCP - Actuated	12
277	839009	442820	TCP - Actuated	12
278	836372	442791	Stop	12
279	836532	432100	Stop	12
280	839194	432128	Stop	12
281	844498	437556	Stop	12
282	839173	437444	TCP - Actuated	12
283	836446	437432	Stop	12
284	836560	429393	Stop	12
285	833875	429397	TCP - Actuated	12
286	828543	429269	TCP - Actuated	12
287	825825	429287	Stop	12
288	834016	424049	Actuated	12
289	833922	426660	Stop	12
290	836640	426731	Stop	12
291	839316	425169	Actuated	12
295	823496	405325	TCP - Actuated	18

[2] This TCP is located at the intersection of CR-905 and U.S. Highway 1 in Monroe County. The TCP is only activated when Area 10 evacuates (Region R03 only). The intersection is modeled as a stop sign for CR-905 only for all other regions.

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
296	820827	405294	Stop	15
297	820840	402632	Stop	15
298	823528	402651	TCP - Actuated	18
299	826177	402717	Stop	18
301	823561	400035	TCP - Uncontrolled	18
302	820866	399983	Stop	15
309	823057	442549	Stop	11
310	823079	437225	Stop	11
311	823146	431937	Stop	11
312	823174	429259	Stop	11
313	823249	423923	TCP - Actuated	11
314	823312	421291	TCP - Actuated	11
315	823338	418608	TCP - Actuated	15
316	823372	415941	TCP - Actuated	15
317	823400	413299	TCP - Actuated	16
318	823444	410653	TCP - Actuated	16
319	807614	405164	Stop	15
322	807177	442387	Stop	11
323	807245	437089	Stop	11
329	807439	415832	Stop	15
330	820780	413272	Stop	15
331	820824	410547	Stop	15
332	854734	443034	Actuated	13
336	834134	419234	Stop	16
337	839350	424582	Actuated	12
338	839360	421455	Actuated	12
340	836789	416117	Actuated	17
341	839401	416605	Actuated	17
345	843105	429501	Actuated	12
346	840764	426761	Actuated	12
347	842009	424154	Actuated	12
348	842019	421496	Actuated	12
349	844679	421517	Stop	12
350	844634	424202	Actuated	12
355	836920	410757	Actuated	17
358	834058	421399	Stop	12
359	836669	424083	Stop	12
361	831557	418684	Yield	16
362	831330	416042	Actuated	16

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
364	846010	424207	Actuated	12
367	850029	424261	TCP - Actuated	13
368	853345	424294	Stop	13
370	850129	416238	TCP - Actuated	20
372	855357	424335	Stop	13
376	878052	450062	Stop	10
377	878005	451296	Actuated	10
378	876397	449904	Actuated	10
383	849952	429582	TCP - Actuated	13
386	847825	427432	Stop	12
388	850239	410884	TCP - Actuated	20
389	850277	408243	Stop	20
390	847611	408179	Stop	19
391	847701	406770	Stop	19
392	842265	410769	Actuated	17
395	847675	405487	Stop	19
396	842929	406036	Stop	19
397	843286	407695	Stop	19
398	843107	410782	Stop	17
399	842252	416176	Actuated	17
401	847598	410833	Stop	17
404	860825	411013	Actuated	20
409	845764	432247	Actuated	12
410	846734	433610	Actuated	12
411	850273	437630	Actuated	13
412	859699	448469	Actuated	8
413	861588	450583	Actuated	9
414	862908	452070	Actuated	9
415	864156	453523	Actuated	9
416	867014	456927	Actuated	9
417	868330	459402	Actuated	7
418	868702	460248	Actuated	7
419	870916	465848	Actuated	7
420	852501	440347	Actuated	13
423	865900	431172	Stop	13
426	838625	467127	Stop	5
427	838559	469823	Actuated	5
428	843975	467325	Actuated	5
429	843825	469949	Actuated	1

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
430	847786	470147	Actuated	1
432	859947	465297	Actuated	6
433	859686	470585	Actuated	2
434	855587	470419	Actuated	2
435	860366	470674	TCP - Actuated	2
436	860751	470723	TCP - Actuated	2
437	859671	471813	TCP - Actuated	2
443	862402	468109	Actuated	7
444	865084	468254	Actuated	7
445	862505	465379	Actuated	7
448	867635	471067	Actuated	2
450	871720	467684	Actuated	7
451	876127	466068	Yield	10
452	873267	471280	Actuated	3
454	862279	470798	Actuated	2
457	859609	473259	Actuated	2
460	878613	466127	Actuated	10
461	883265	466278	Actuated	10
465	871337	467838	Actuated	7
466	872992	471280	Actuated	3
477	859644	471401	TCP - Actuated	2
479	841201	469895	Actuated	5
480	849104	470207	Actuated	2
482	876006	463921	Stop	10
483	871091	463777	Actuated	7
484	871218	465855	Actuated	7
487	878325	471345	Actuated	3
489	863073	451168	Stop	9
490	863054	450758	Actuated	9
491	864496	450332	Actuated	9
492	865390	450665	Actuated	9
493	863263	452190	Stop	9
494	863972	452963	Stop	9
495	864652	453119	Actuated	9
496	865120	452607	Stop	9
506	863582	452552	Actuated	9
507	830855	405395	Stop	18
509	827241	410680	Actuated	16
510	827277	411322	Actuated	16

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
511	829211	413370	Actuated	16
512	833941	418761	Actuated	16
513	831471	416060	Actuated	16
514	836286	421432	Actuated	12
515	838734	424103	Actuated	12
516	839334	424863	Actuated	12
517	841044	426753	Actuated	12
518	843313	429399	Actuated	12
519	828288	405351	Actuated	18
521	860915	405553	Stop	20
527	850238	405462	Stop	20
529	849052	405513	TCP - Actuated	20
602	807483	413178	Stop	15
605	823233	426528	Stop	11
606	823176	434582	Stop	11
607	825877	426562	Stop	12
611	837813	406623	Actuated	19
612	831524	410688	Actuated	16
613	831532	413431	Stop	16
614	825802	434630	Stop	12
615	822993	450496	Stop	4
623	828365	450460	Stop	5
624	828494	434630	Stop	12
625	828544	426574	TCP - Actuated	12
629	873760	449866	Stop	10
631	863144	445892	Actuated	9
632	857690	445748	Actuated	8
633	857204	445748	Actuated	8
635	858371	447081	Actuated	8
636	851099	443006	Stop	13
637	869637	452694	Actuated	9
639	861632	453836	Actuated	9
645	860992	458069	Actuated	7
646	860849	459904	Actuated	7
650	862925	460021	Actuated	7
652	868089	460234	Actuated	7
653	867754	459379	Actuated	7
655	849344	436283	Actuated	13
656	851491	438701	Actuated	13

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
657	851277	438853	Actuated	13
660	866610	456019	Actuated	9
661	870455	462449	Actuated	7
662	869905	462662	Actuated	7
663	872312	469162	Actuated	7
665	872304	471266	Actuated	2
667	868199	471108	Actuated	2
669	864988	470950	Actuated	2
673	829518	408006	Actuated	18
674	828824	408015	Actuated	18
675	827532	411330	Actuated	16
676	828753	412508	Actuated	16
677	828719	413695	Actuated	16
678	828728	414029	Actuated	16
681	857698	448418	Stop	8
683	863175	443207	Actuated	13
686	852703	430990	TCP - Actuated	13
687	852363	431013	TCP - Actuated	13
690	850043	425312	Actuated	13
692	850069	421619	Actuated	13
694	834955	405619	Stop	18
696	834928	405358	Stop	18
698	818949	455762	Stop	4
699	828253	455858	Stop	5
700	815091	442468	Stop	11
701	812442	442422	Stop	11
704	807291	426378	Stop	11
705	815234	426470	Stop	11
706	815555	405242	Stop	15
707	815444	413237	Stop	15
708	818125	413238	Stop	15
709	818090	415917	Stop	15
710	827418	413343	Actuated	16
711	829563	413850	Actuated	16
712	849789	437010	Stop	13
713	841816	437506	Stop	12
715	875668	471363	Actuated	3
717	857118	470494	Actuated	2
720	854117	470357	Actuated	2

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
722	856038	470432	Actuated	2
725	852104	470264	Actuated	2
728	846420	470105	Actuated	1
730	844131	464638	Stop	5
731	838726	464502	Stop	5
735	869611	405708	Actuated	20
736	841243	467223	Stop	5
737	874587	457870	Actuated	10
740	831447	418581	Yield	16
741	831433	418814	Yield	16
742	831327	418687	Yield	16
743	832631	417361	Actuated	16
744	832412	417352	Actuated	16
745	875468	474010	Stop	3
746	878183	474124	Actuated	3
747	874319	473969	Actuated	3
748	841747	442905	Stop	12
753	875981	465856	Yield	10
754	875863	466082	Yield	10
756	831427	420036	Stop	16
759	861972	478804	Stop	2
760	864604	478929	Stop	2
762	870006	479203	Actuated	2
763	864713	476296	Stop	2
765	867433	476429	Actuated	2
767	870269	473887	Stop	2
769	870102	476552	Actuated	2
770	872598	477587	Actuated	2
772	874182	477724	Actuated	3
773	874752	477131	Actuated	3
774	875263	476720	Actuated	3
775	875491	476680	Actuated	3
776	875747	477847	Actuated	3
777	875916	477765	Actuated	3
778	875404	478044	Actuated	3
780	876417	479440	Actuated	3
781	876637	479454	Actuated	3
782	880875	474247	Actuated	3
783	878124	476793	Actuated	3

Node	X Coordinate (ft)	Y Coordinate (ft)	Control Type	Grid Map Number
784	880802	476926	Actuated	3
786	886087	477112	Actuated	3
787	883906	474343	Actuated	3
789	874108	473969	Actuated	3
790	859396	478176	Actuated	2
792	880988	471536	Actuated	3
793	872881	473946	Actuated	3
799	885575	477071	Stop	3
802	839401	417282	Actuated	17
806	841929	427342	Actuated	12
807	839253	416137	Actuated	17
810	867807	468378	Actuated	7
811	867917	465654	Actuated	7

[1]Coordinates are in the North American Datum of 1983 Florida East State Plane Zone

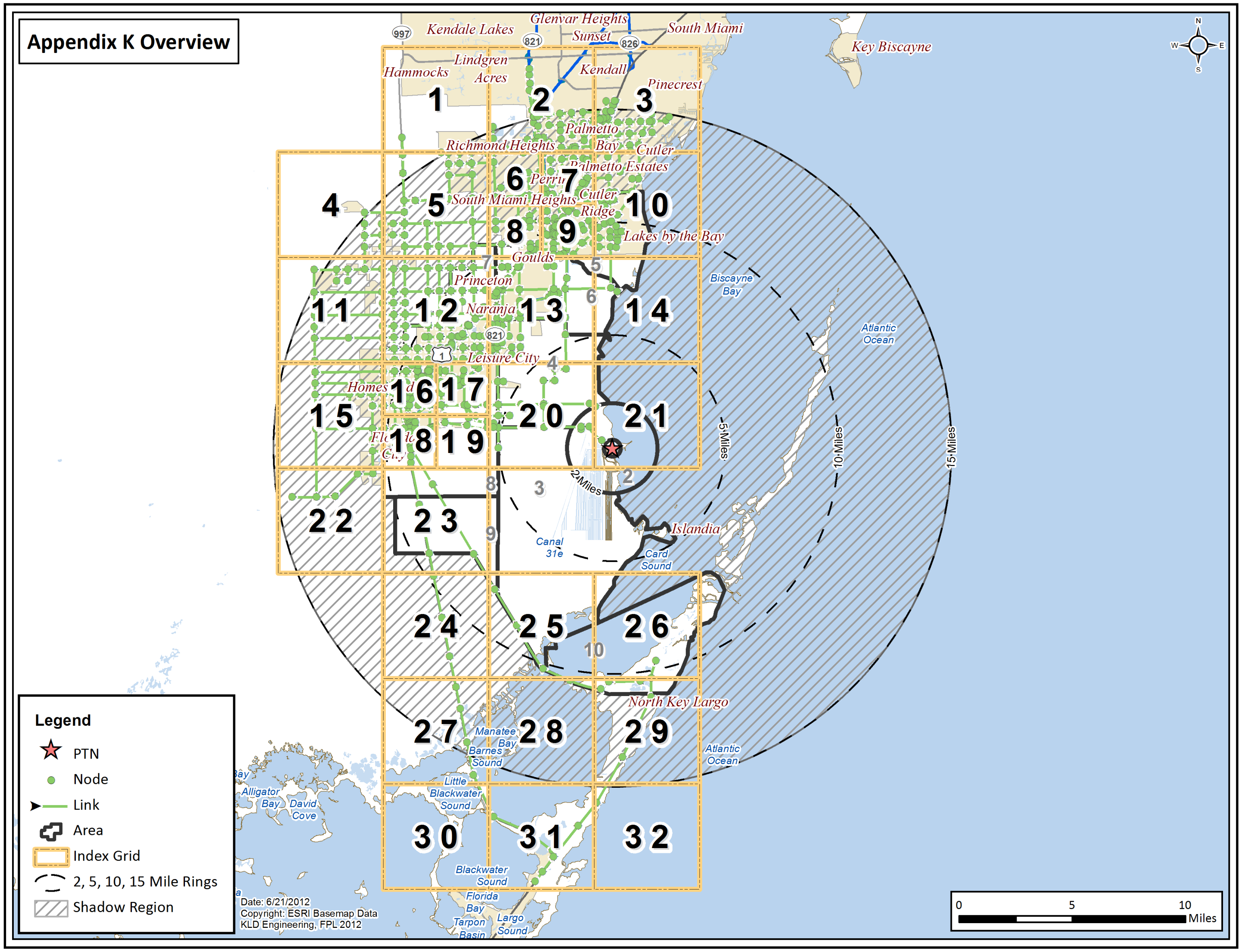


Figure K-1. Turkey Point Link-Node Analysis Network

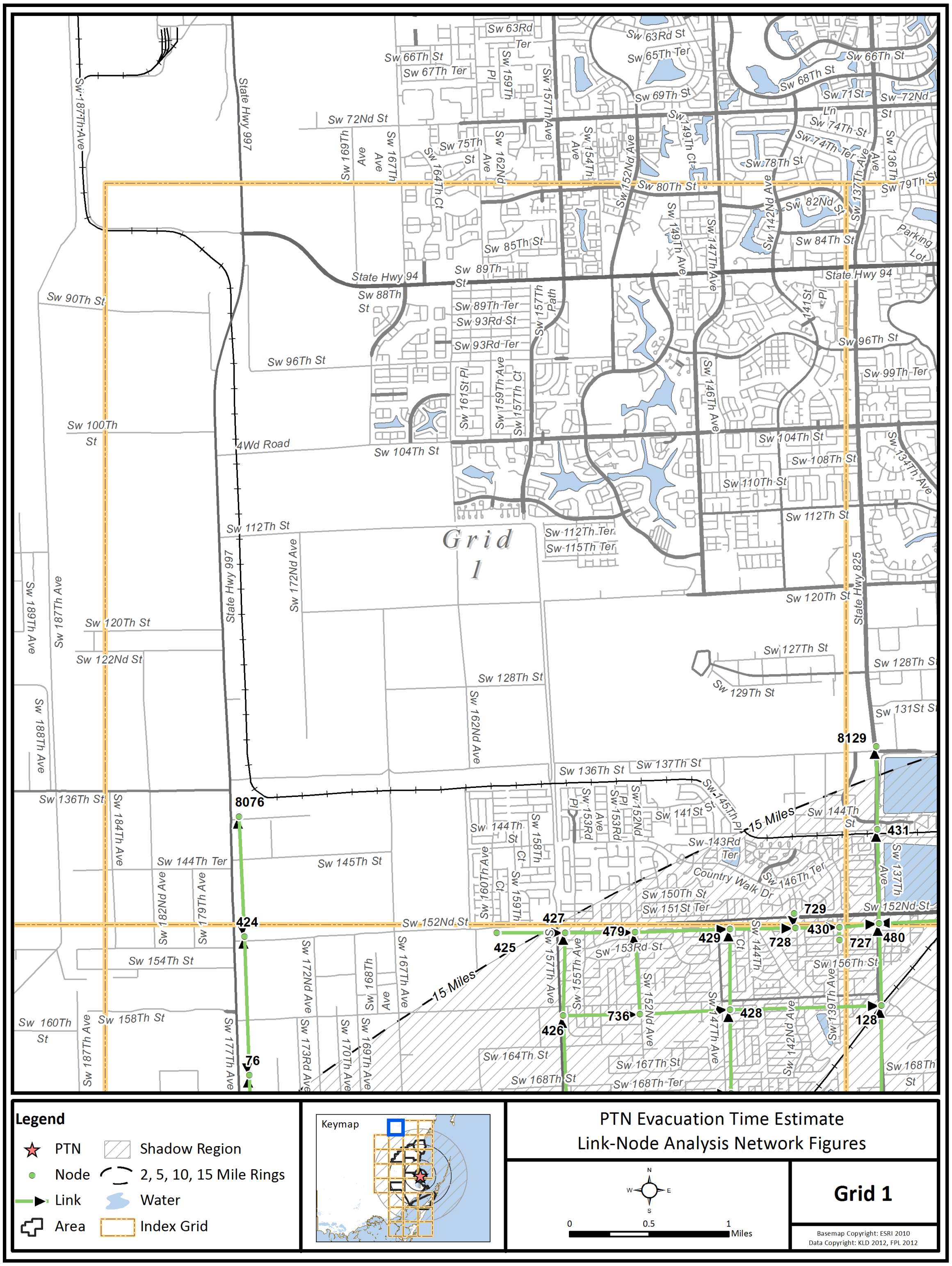


Figure K-2. Link-Node Analysis Network – Grid 1

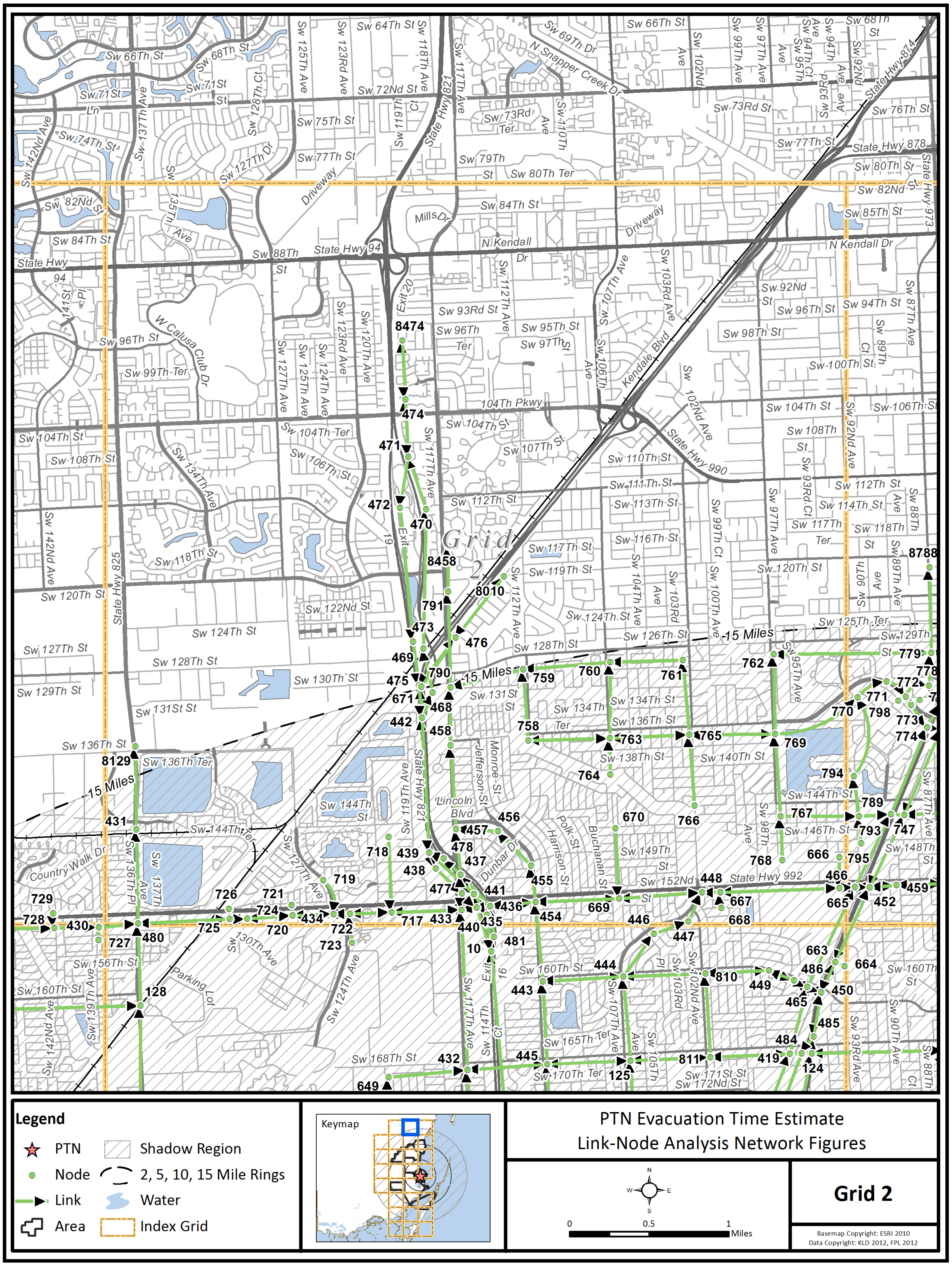


Figure K-3. Link-Node Analysis Network - Grid 2

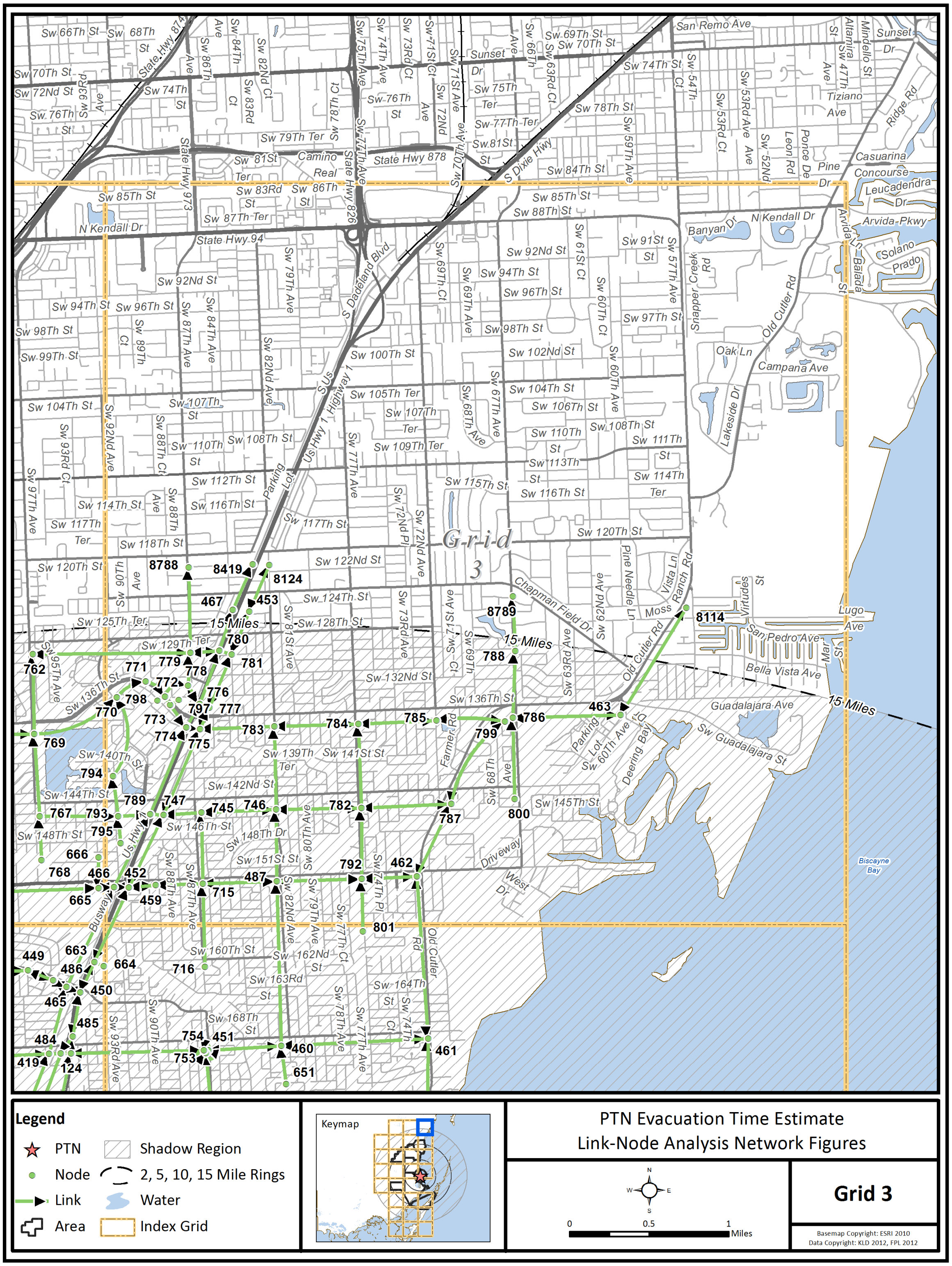


Figure K-4. Link-Node Analysis Network - Grid 3

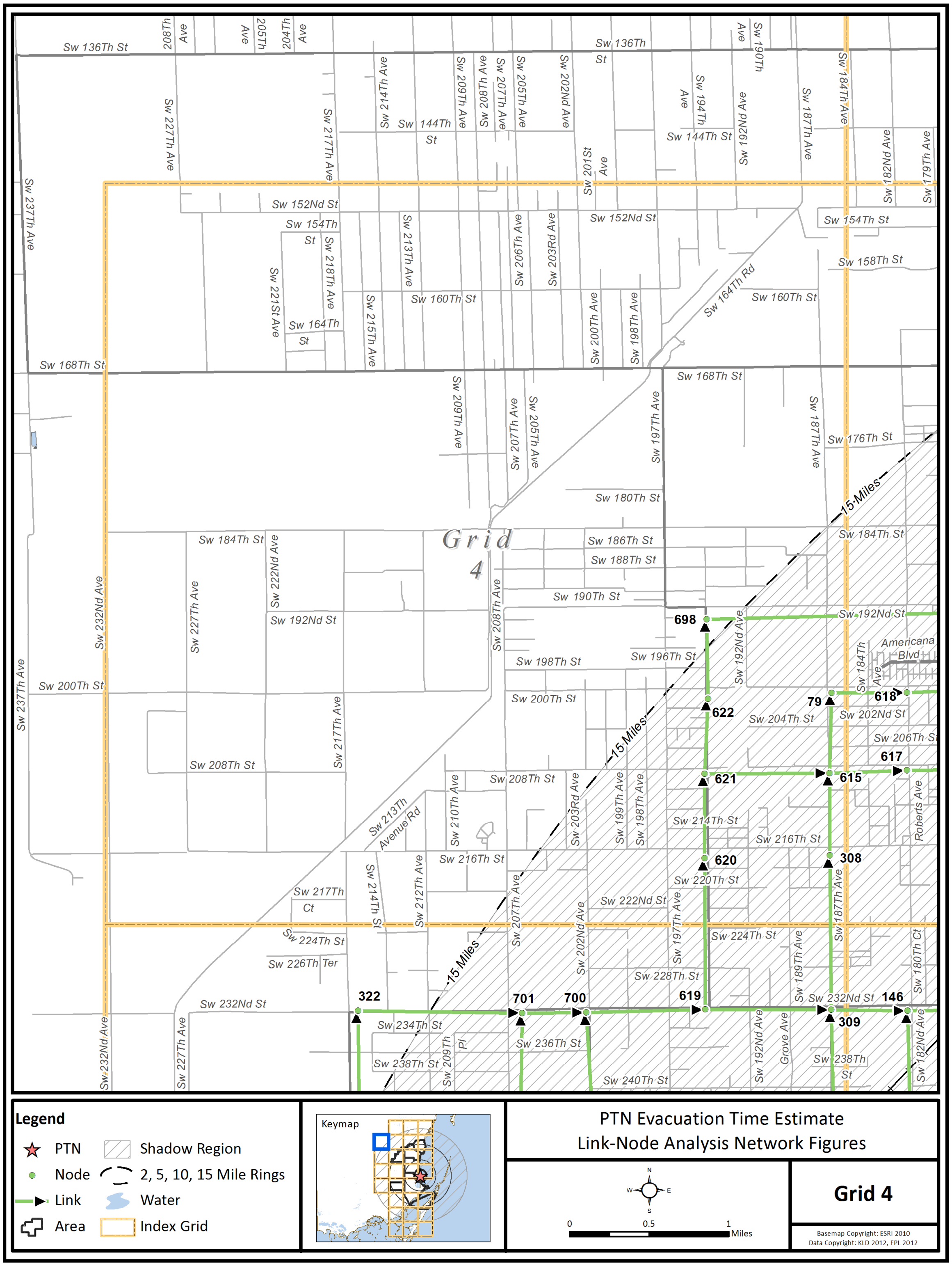


Figure K-5. Link-Node Analysis Network - Grid 4

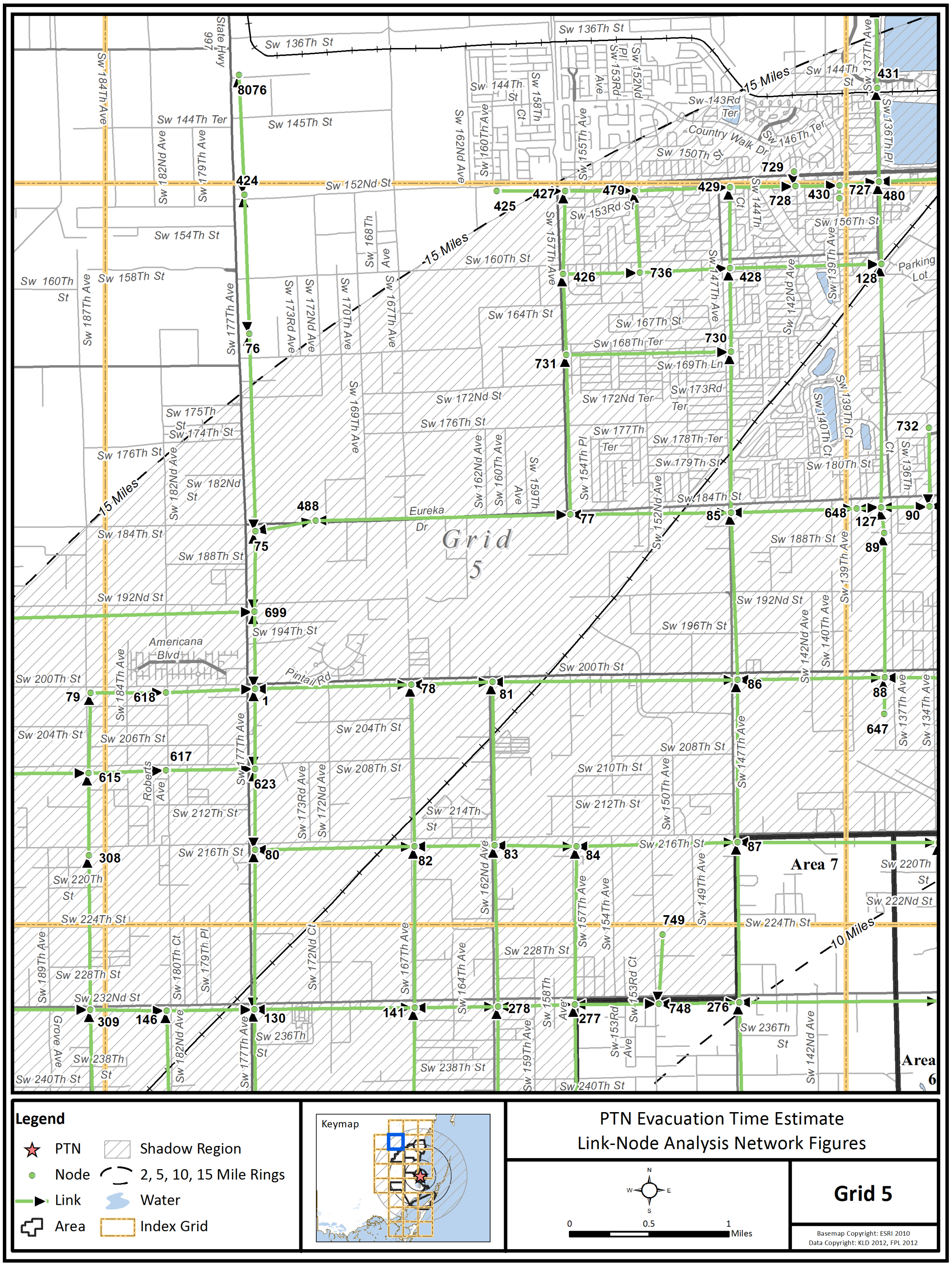


Figure K-6. Link-Node Analysis Network - Grid 5

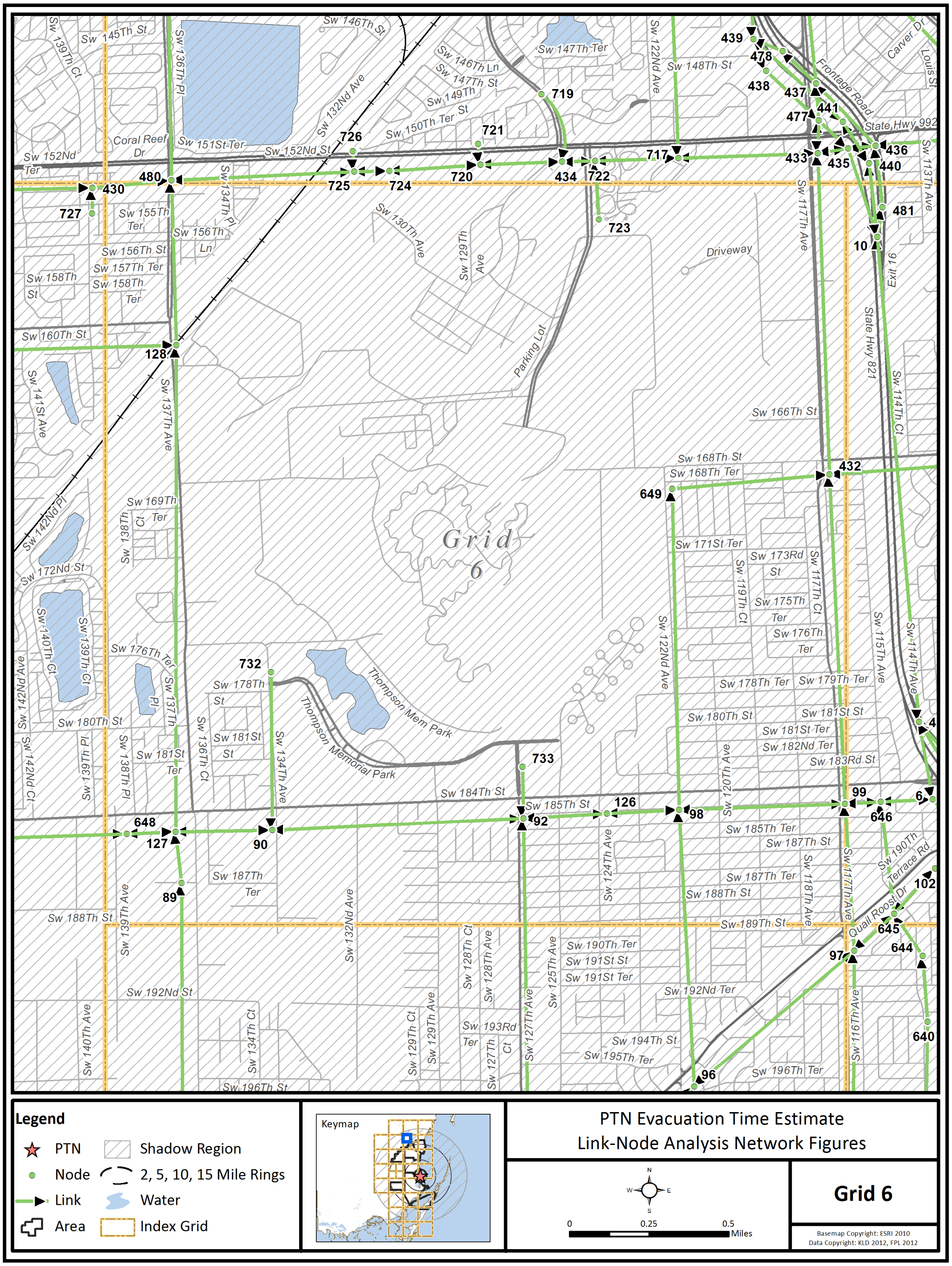


Figure K-7. Link-Node Analysis Network - Grid 6

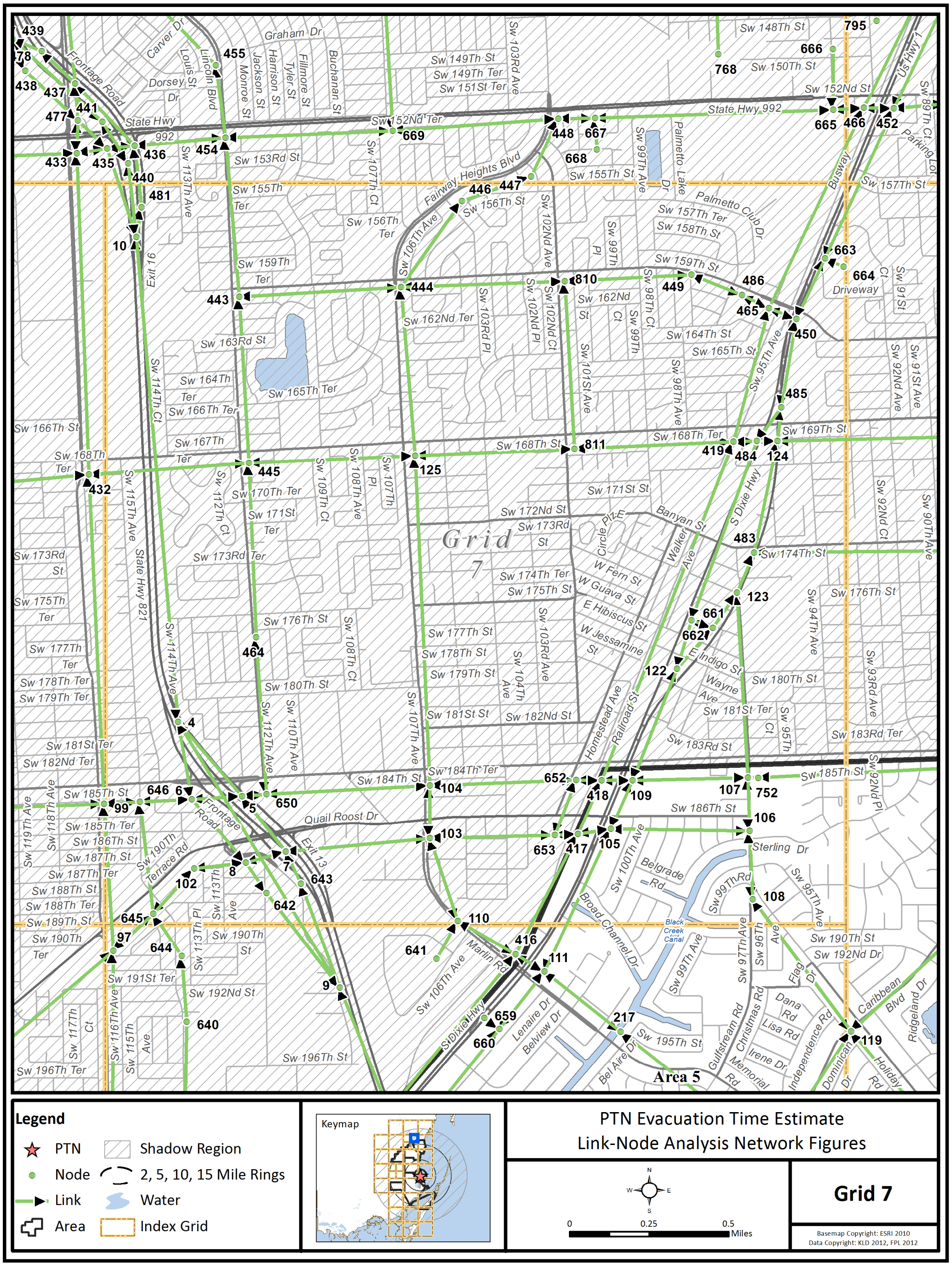


Figure K-8. Link-Node Analysis Network - Grid 7

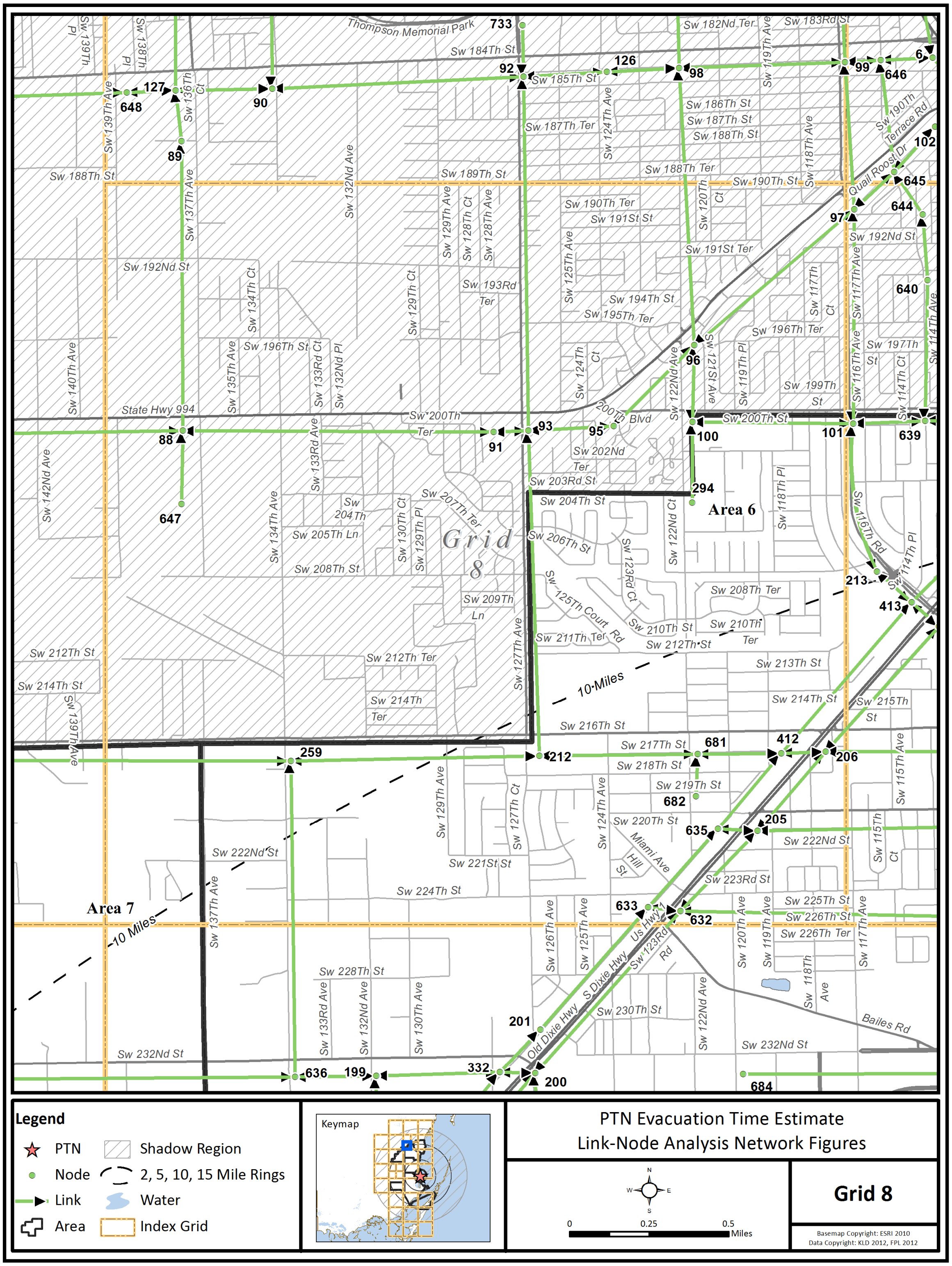


Figure K-9. Link-Node Analysis Network - Grid 8

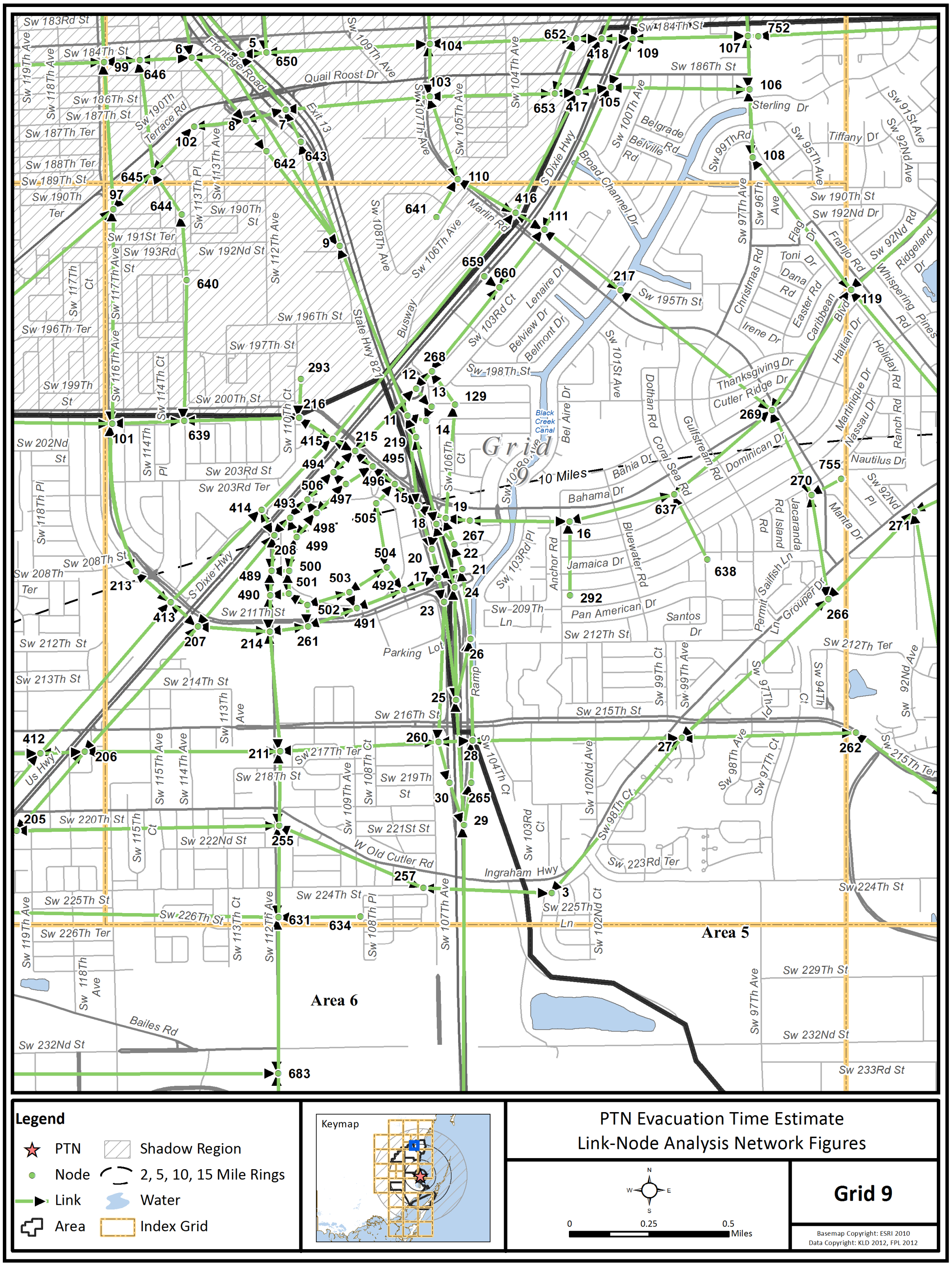


Figure K-10. Link-Node Analysis Network - Grid 9

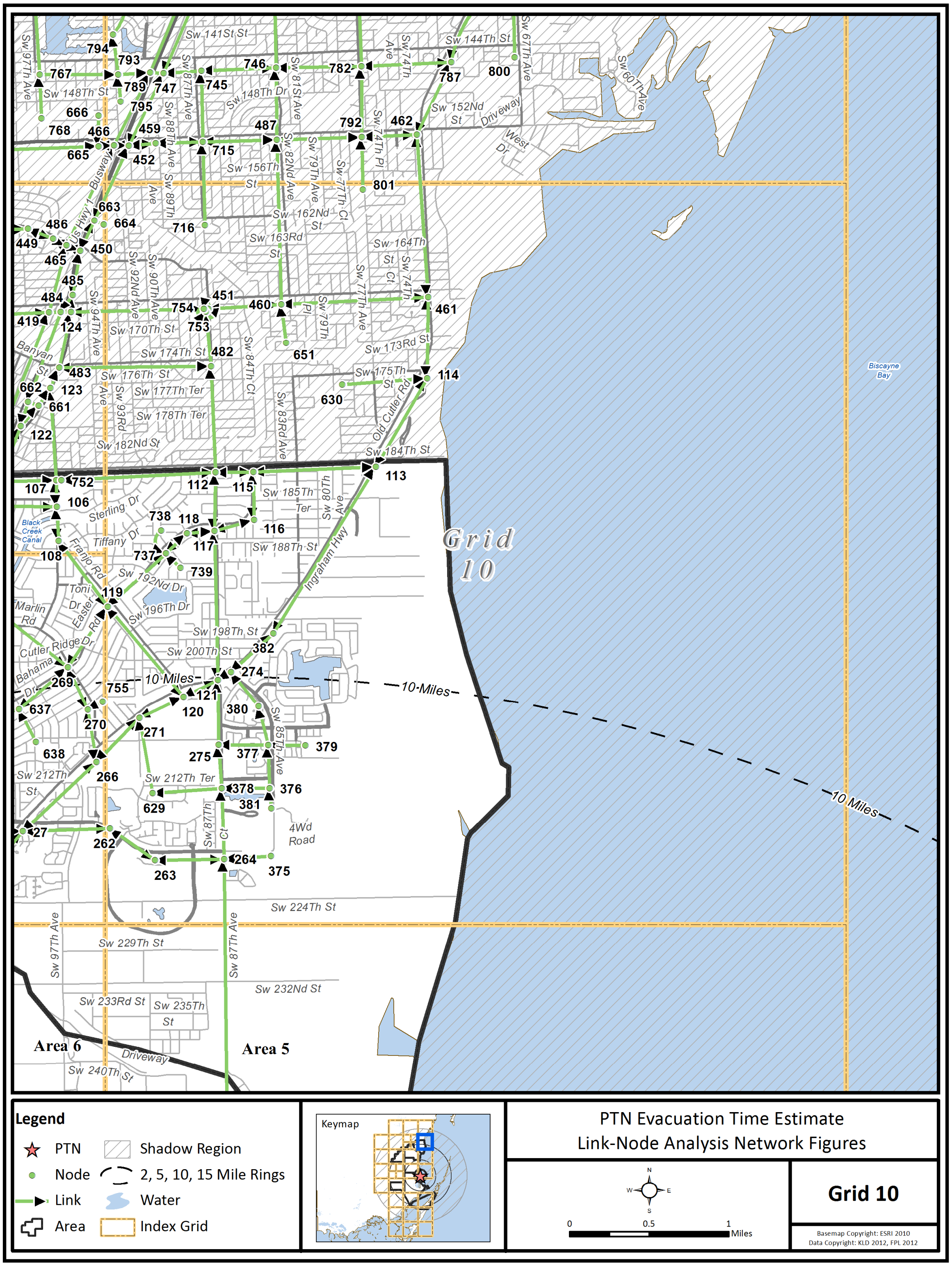


Figure K-11. Link-Node Analysis Network - Grid 10

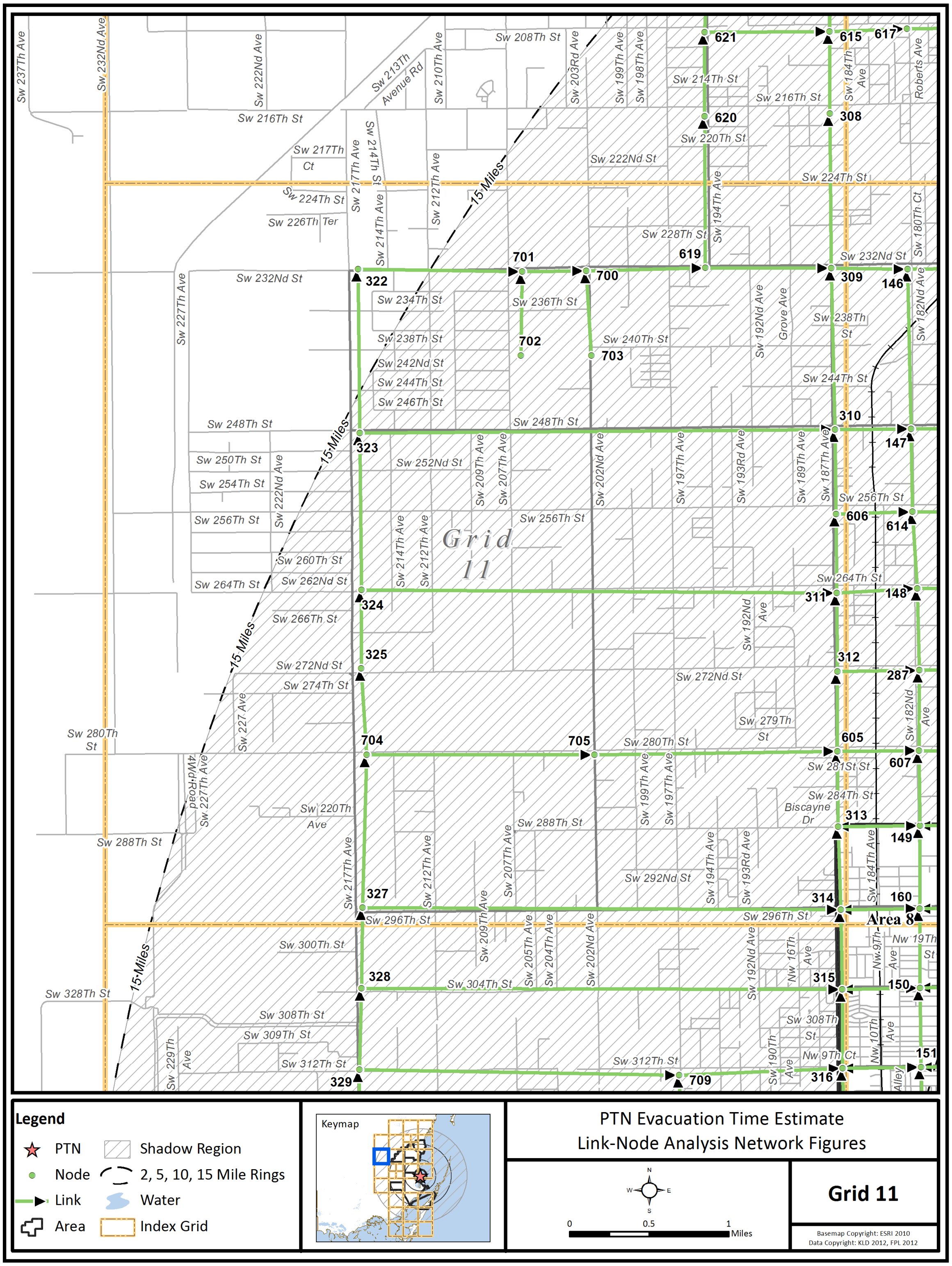


Figure K-12. Link-Node Analysis Network - Grid 11

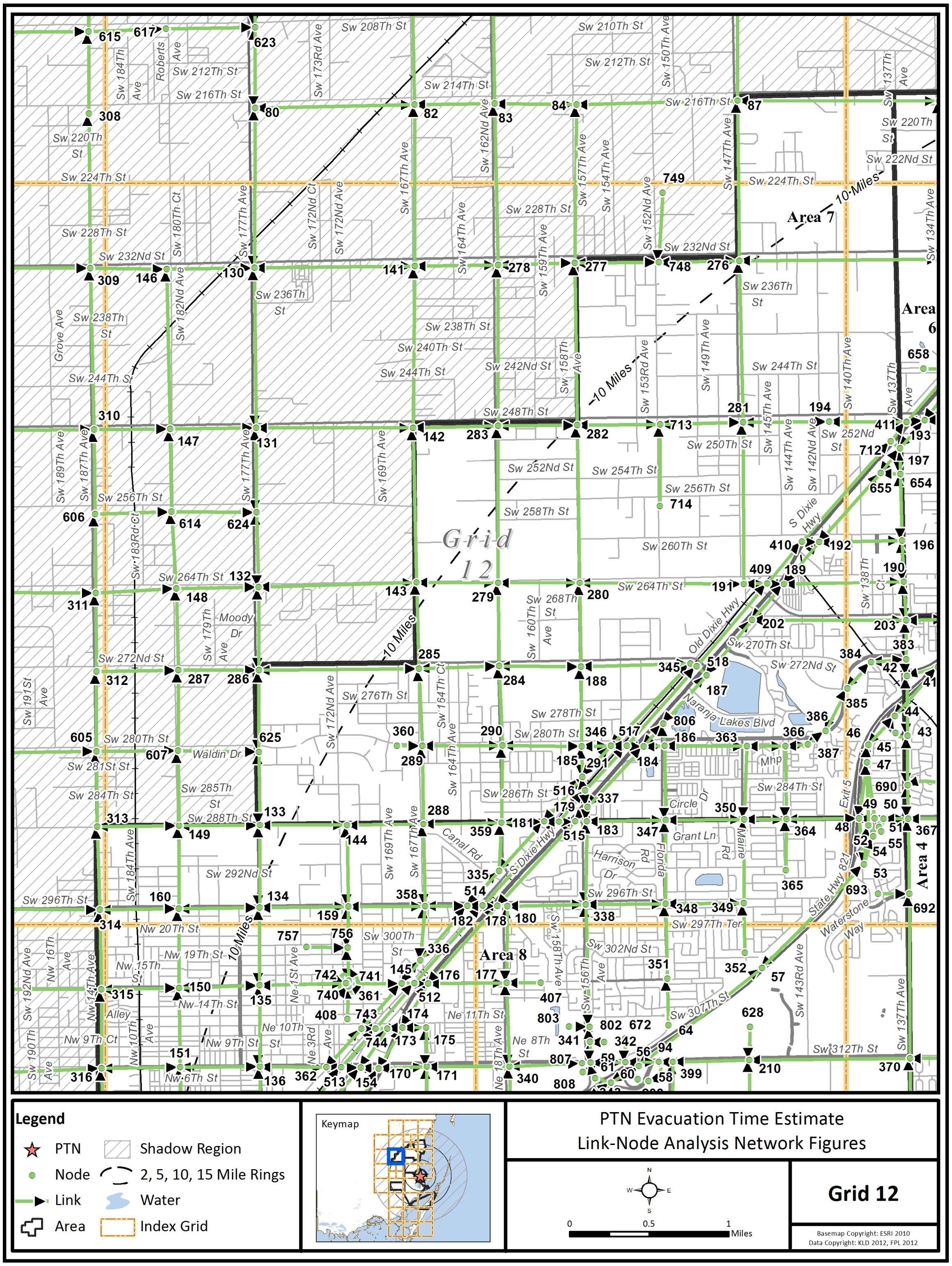


Figure K-13. Link-Node Analysis Network - Grid 12

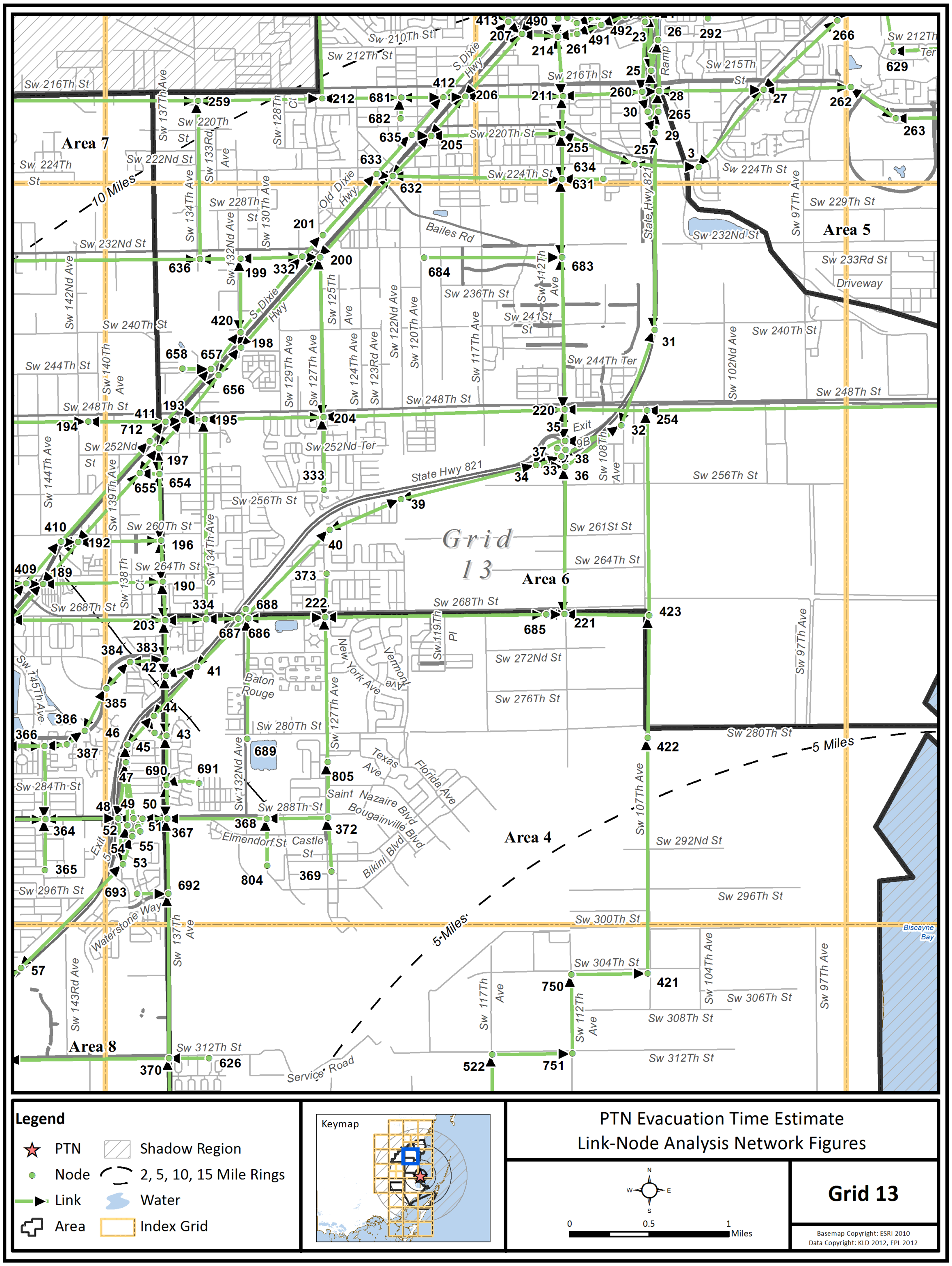


Figure K-14. Link-Node Analysis Network - Grid 13

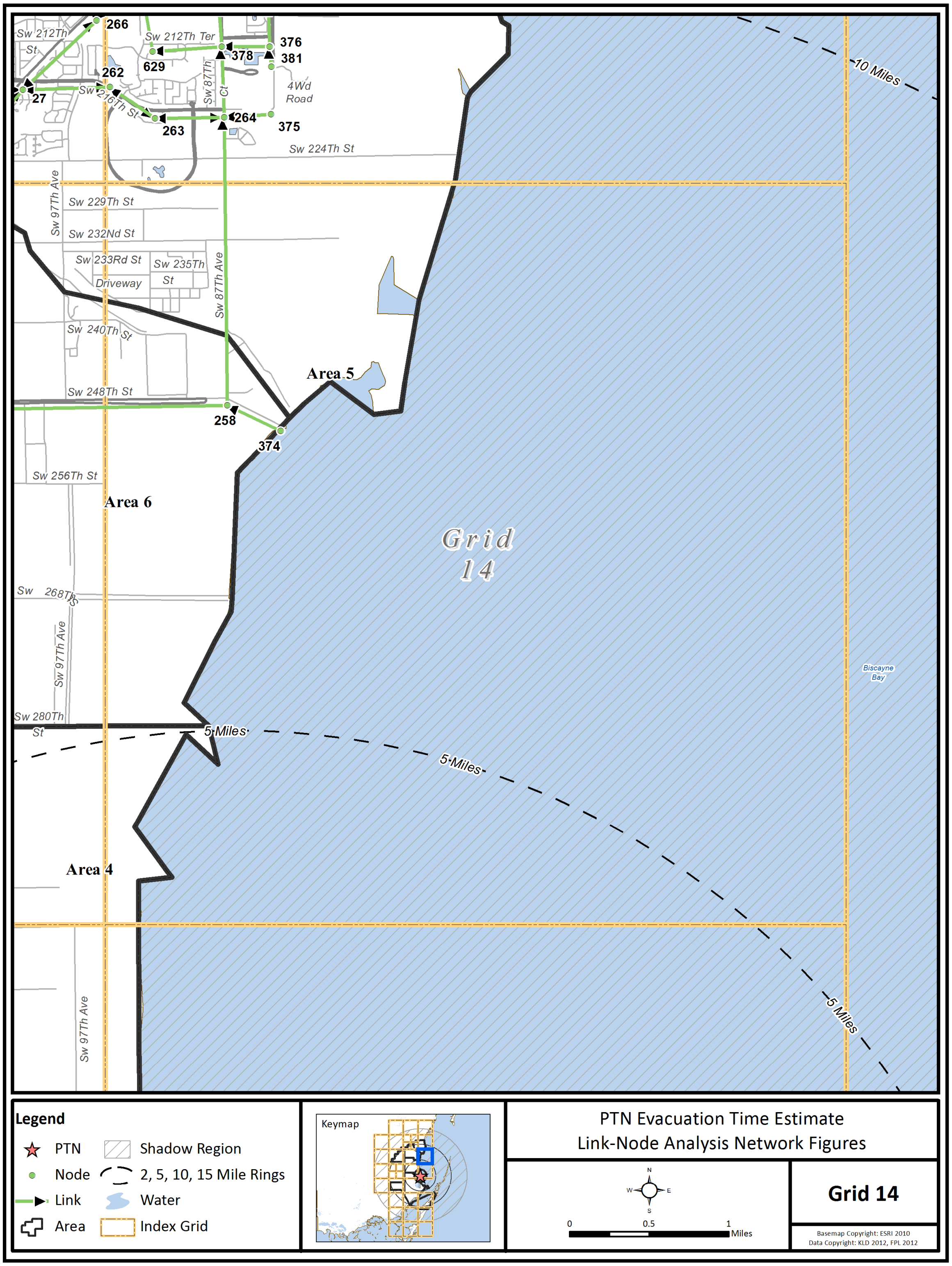


Figure K-15. Link-Node Analysis Network - Grid 14

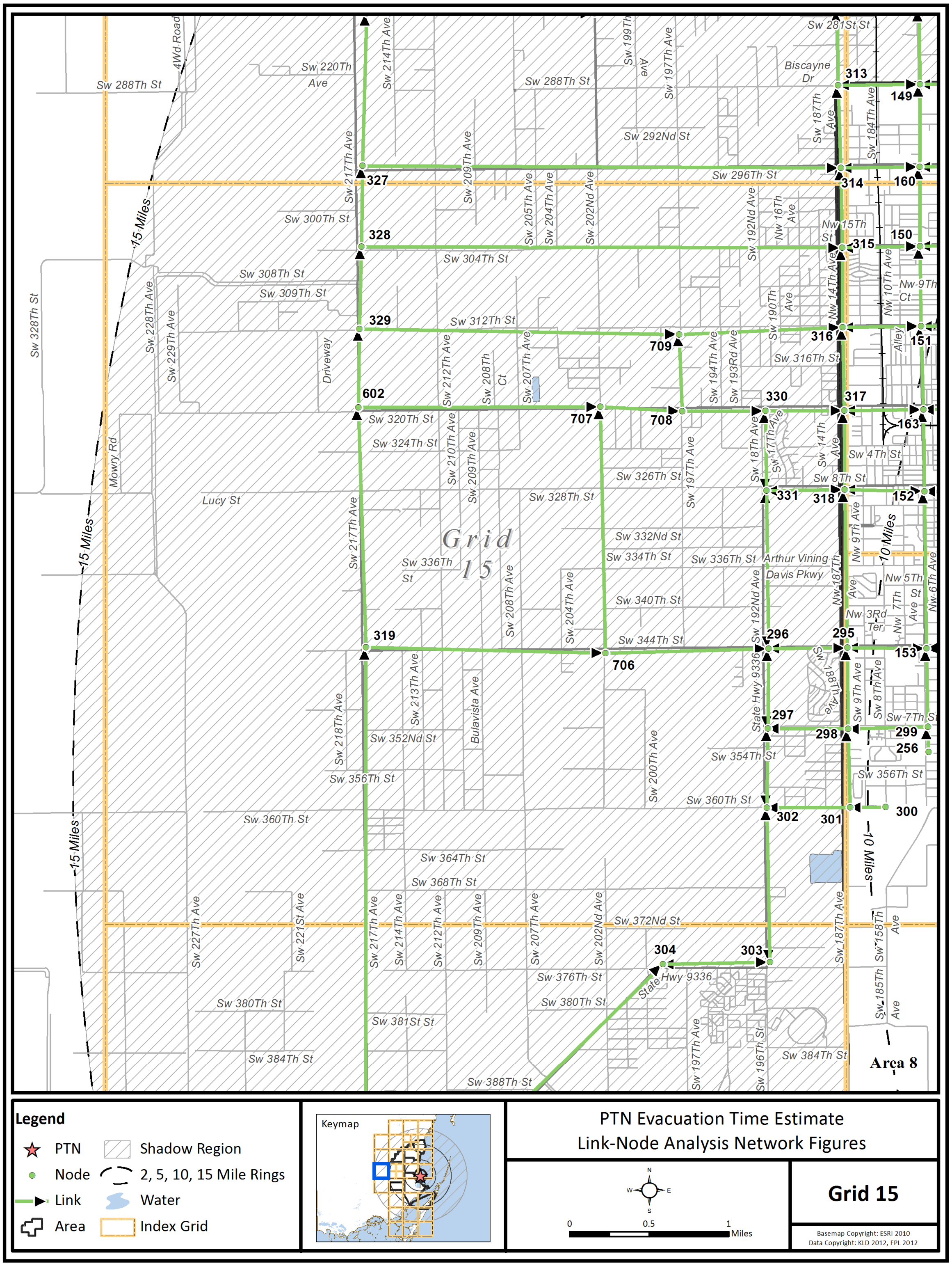


Figure K-16. Link-Node Analysis Network - Grid 15

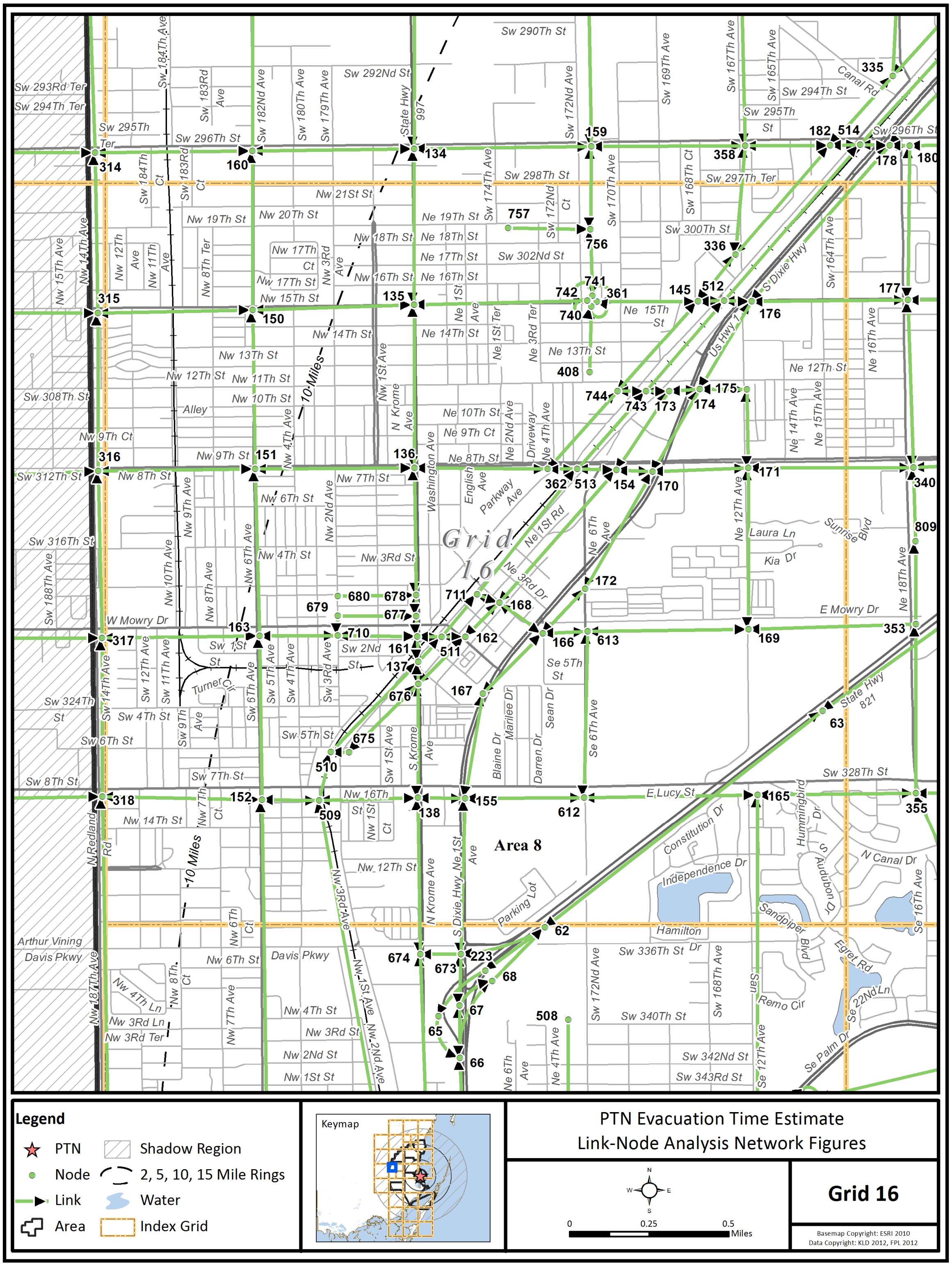


Figure K-17. Link-Node Analysis Network - Grid 16

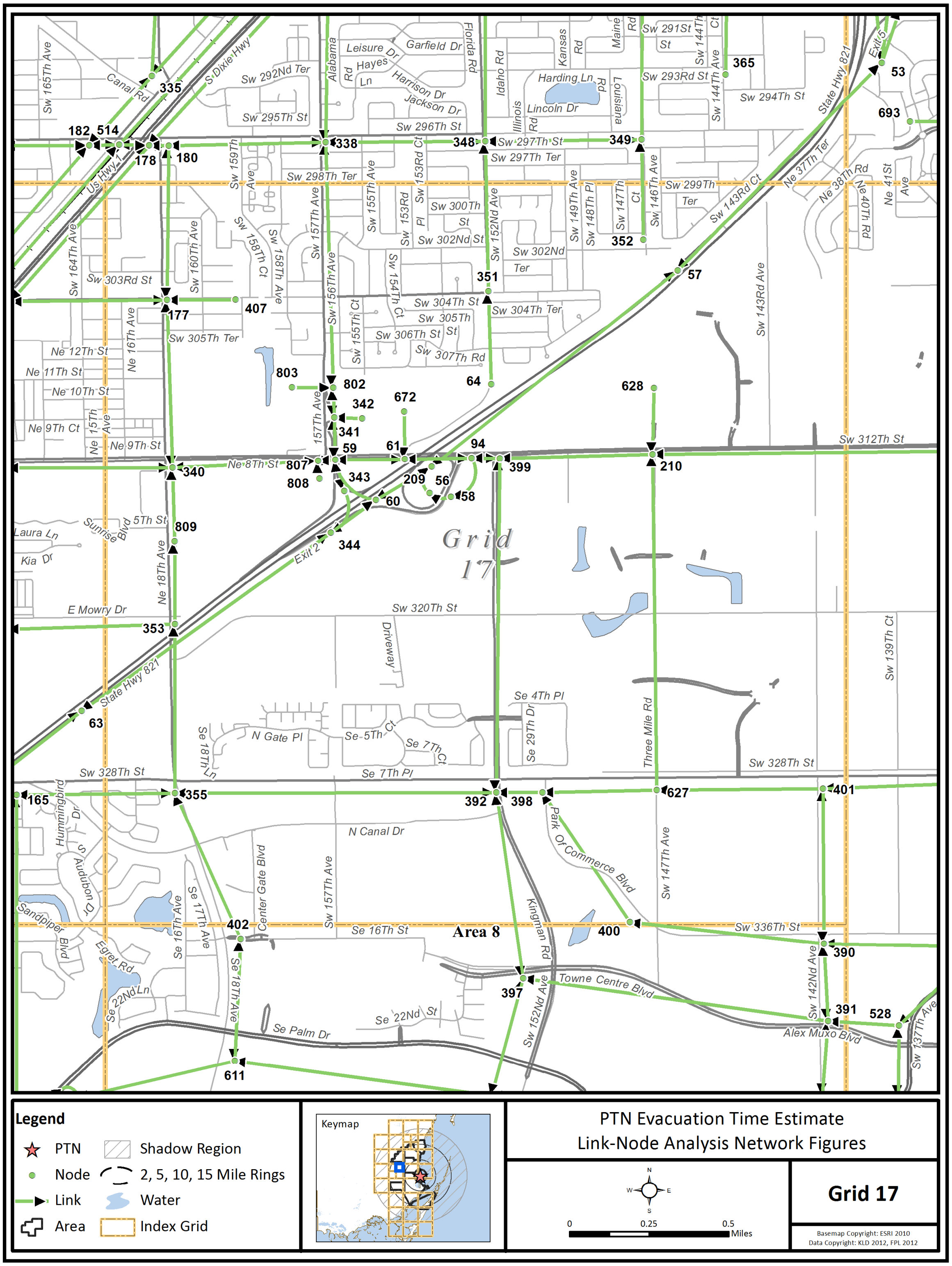


Figure K-18. Link-Node Analysis Network - Grid 17

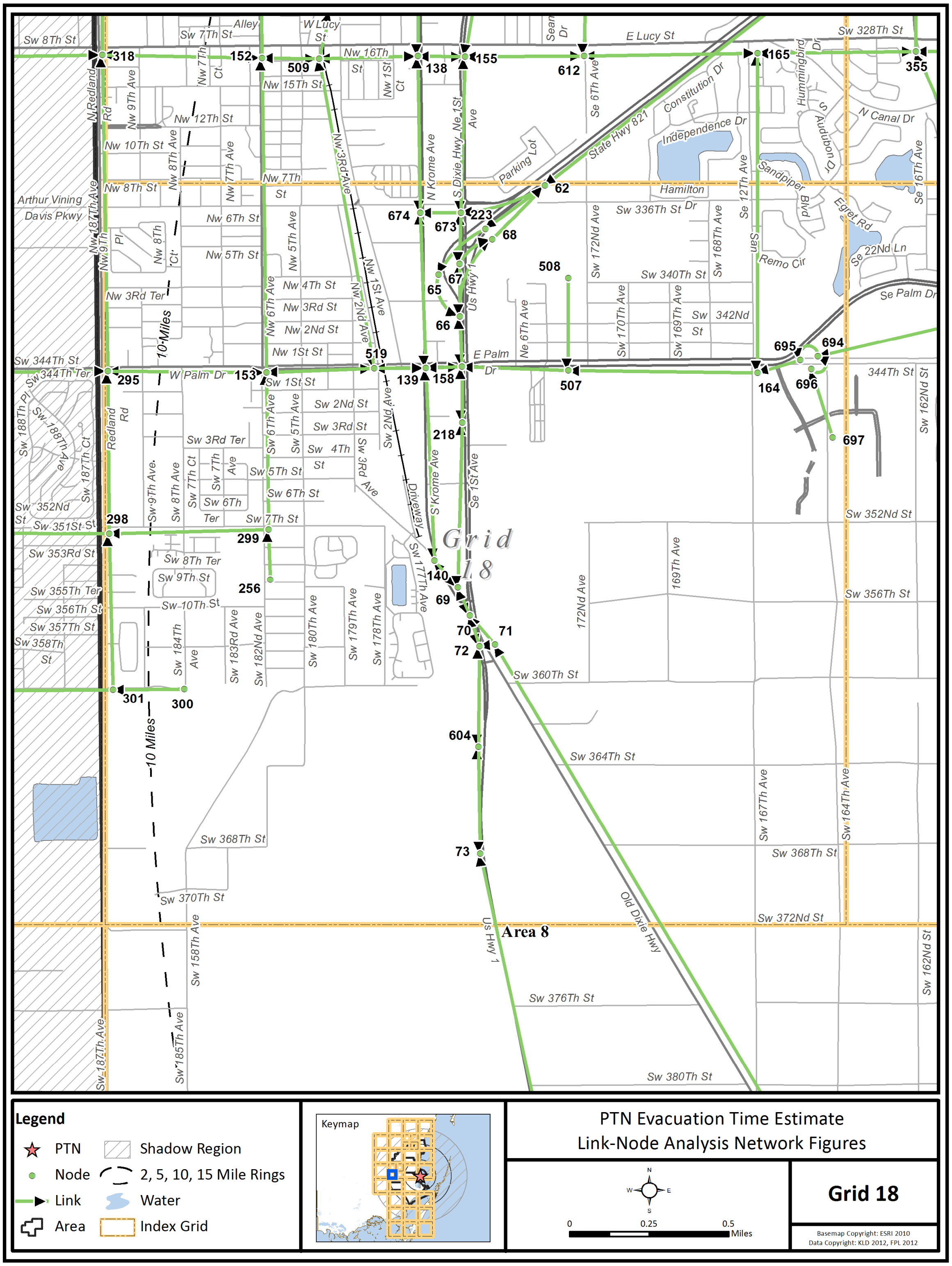


Figure K-19. Link-Node Analysis Network - Grid 18

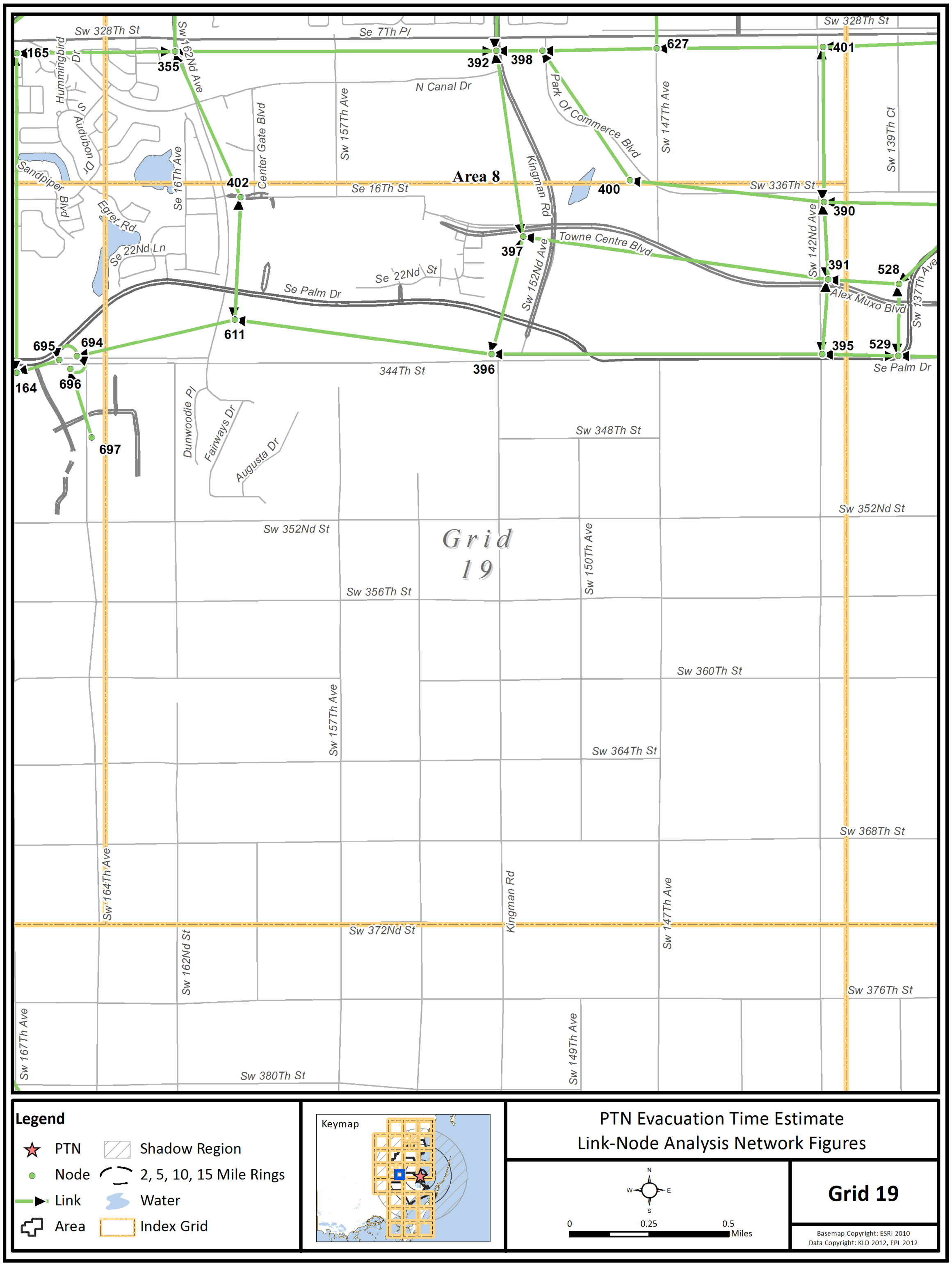


Figure K-20. Link-Node Analysis Network - Grid 19

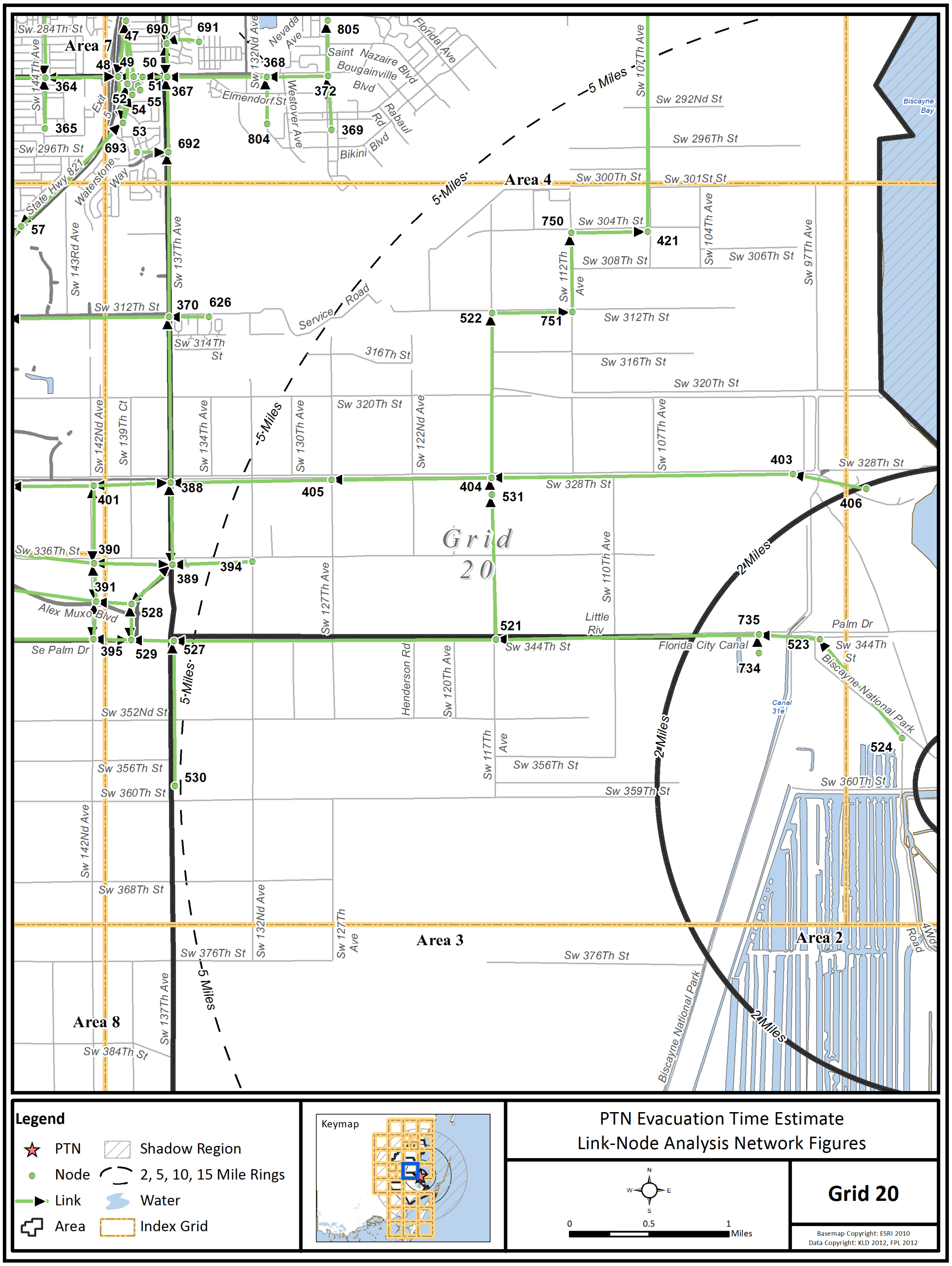


Figure K-21. Link-Node Analysis Network - Grid 20

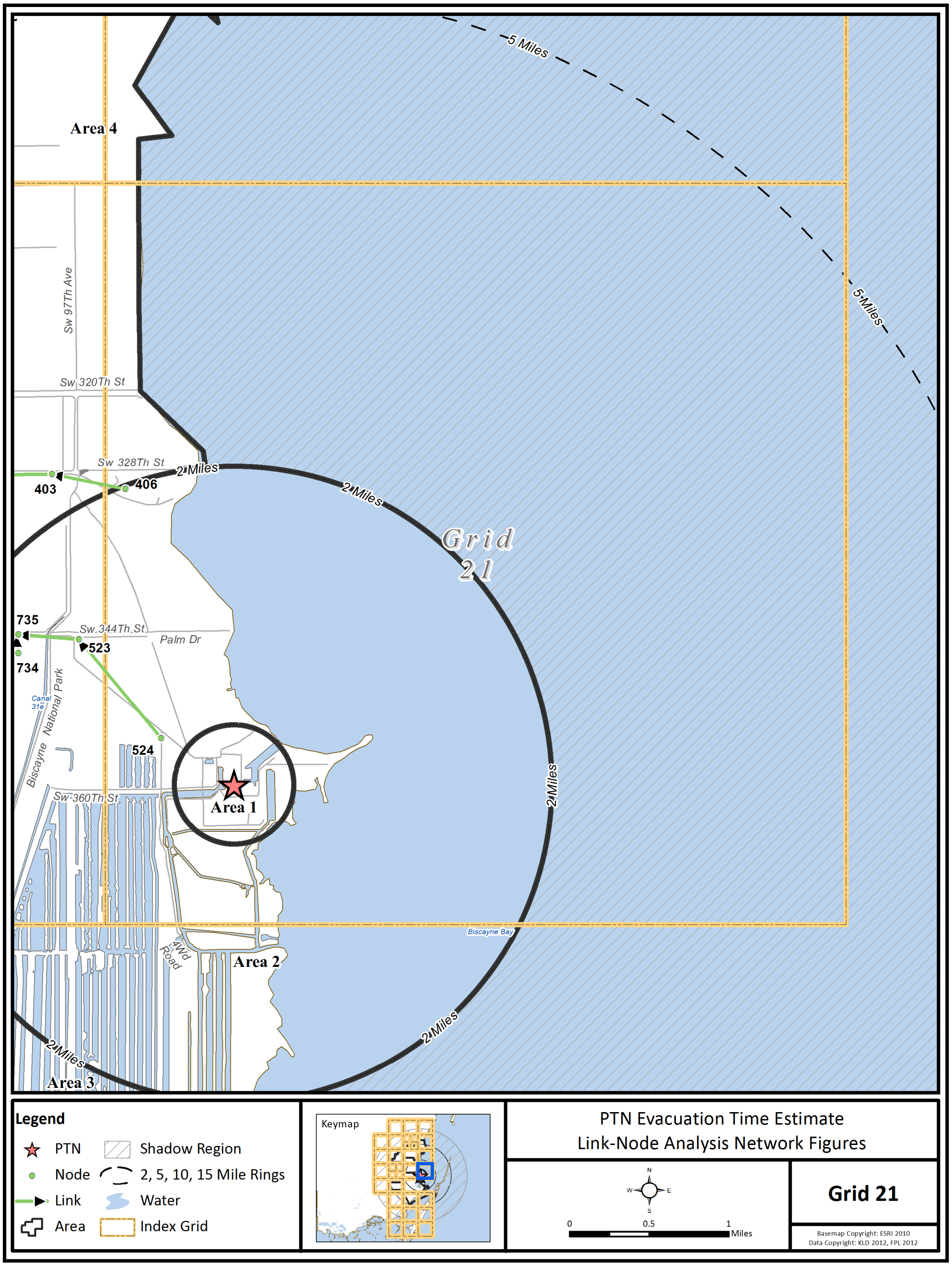


Figure K-22. Link-Node Analysis Network - Grid 21

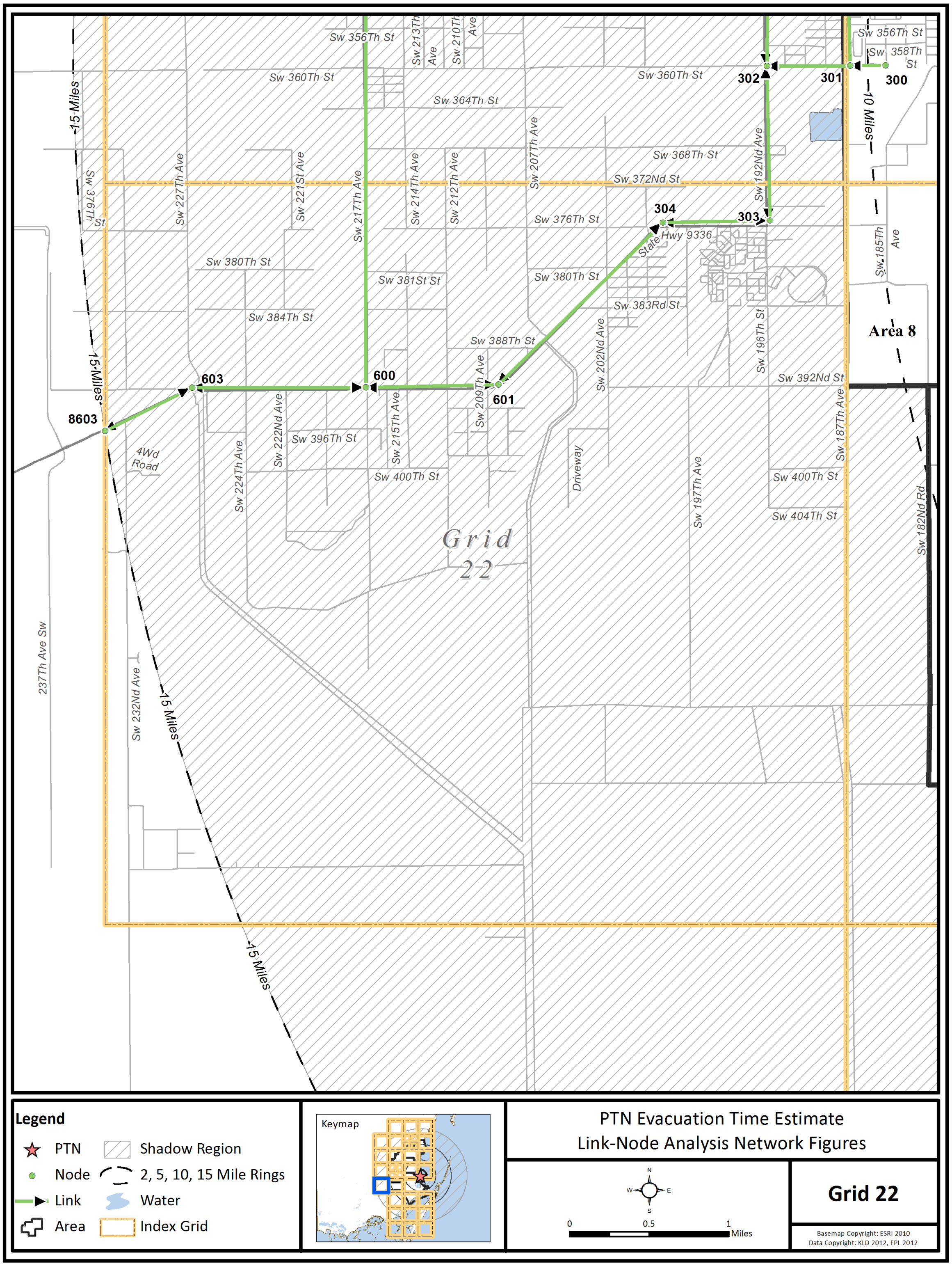


Figure K-23. Link-Node Analysis Network - Grid 22

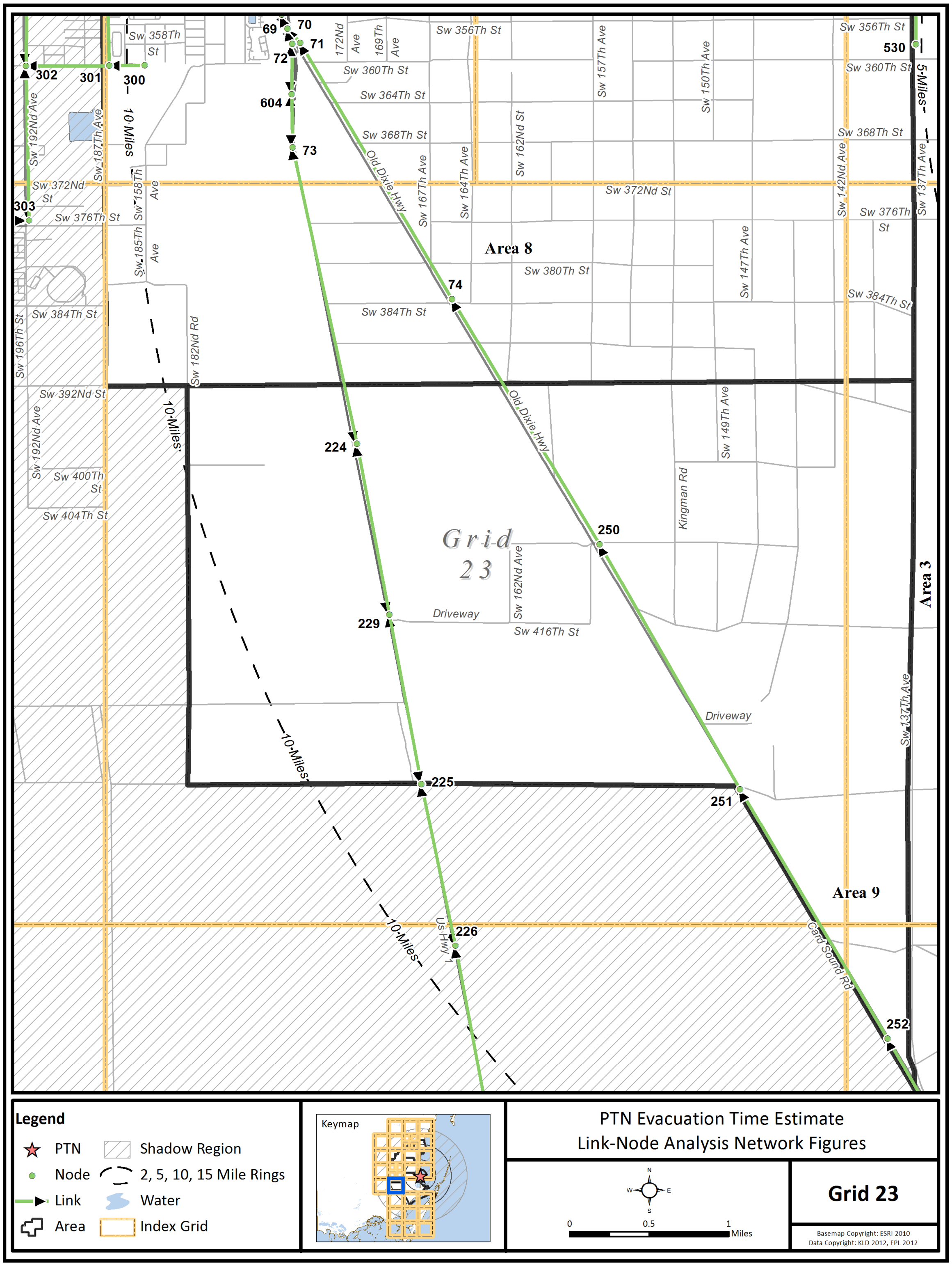


Figure K-24. Link-Node Analysis Network - Grid 23

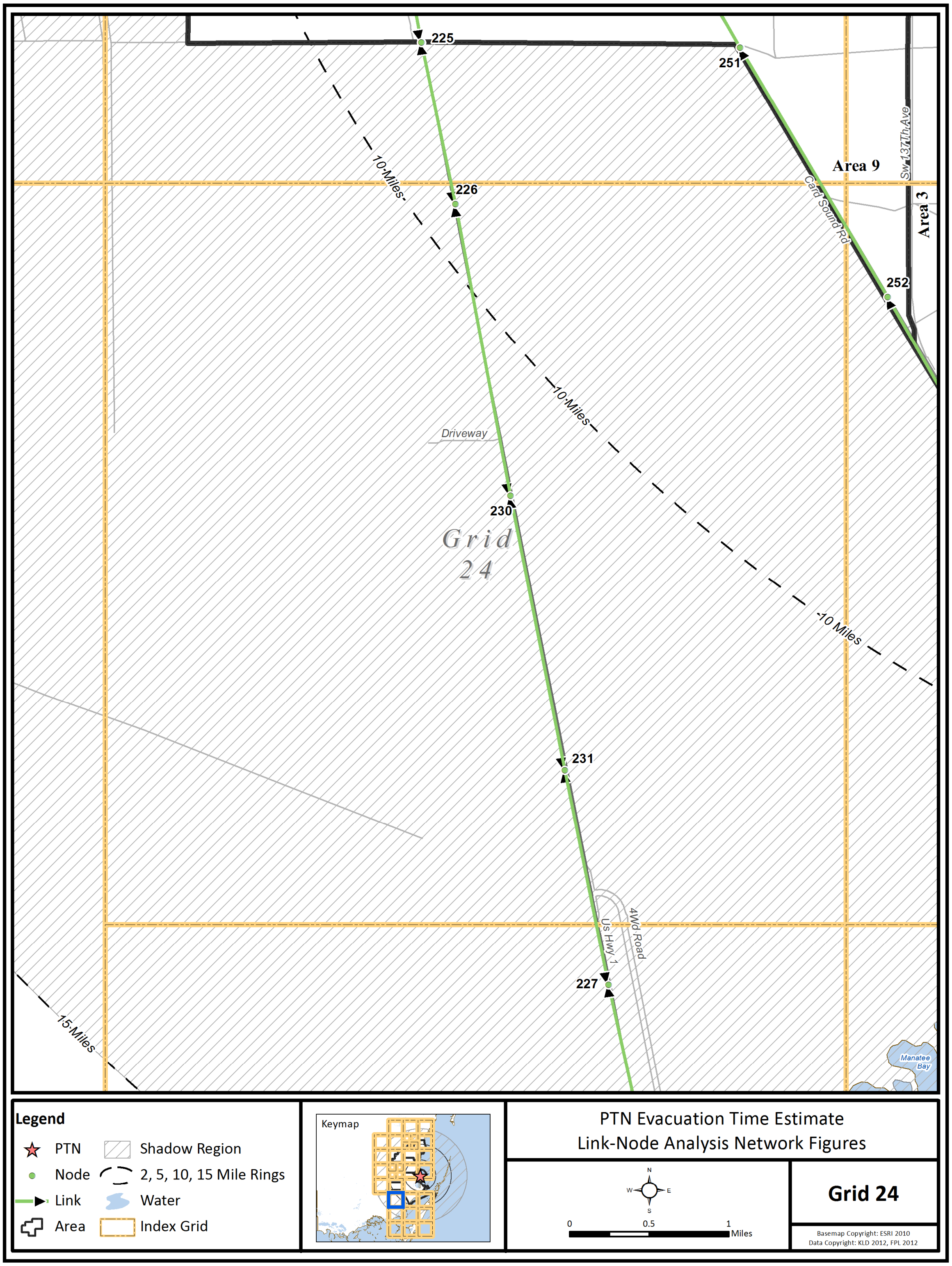


Figure K-25. Link-Node Analysis Network - Grid 24

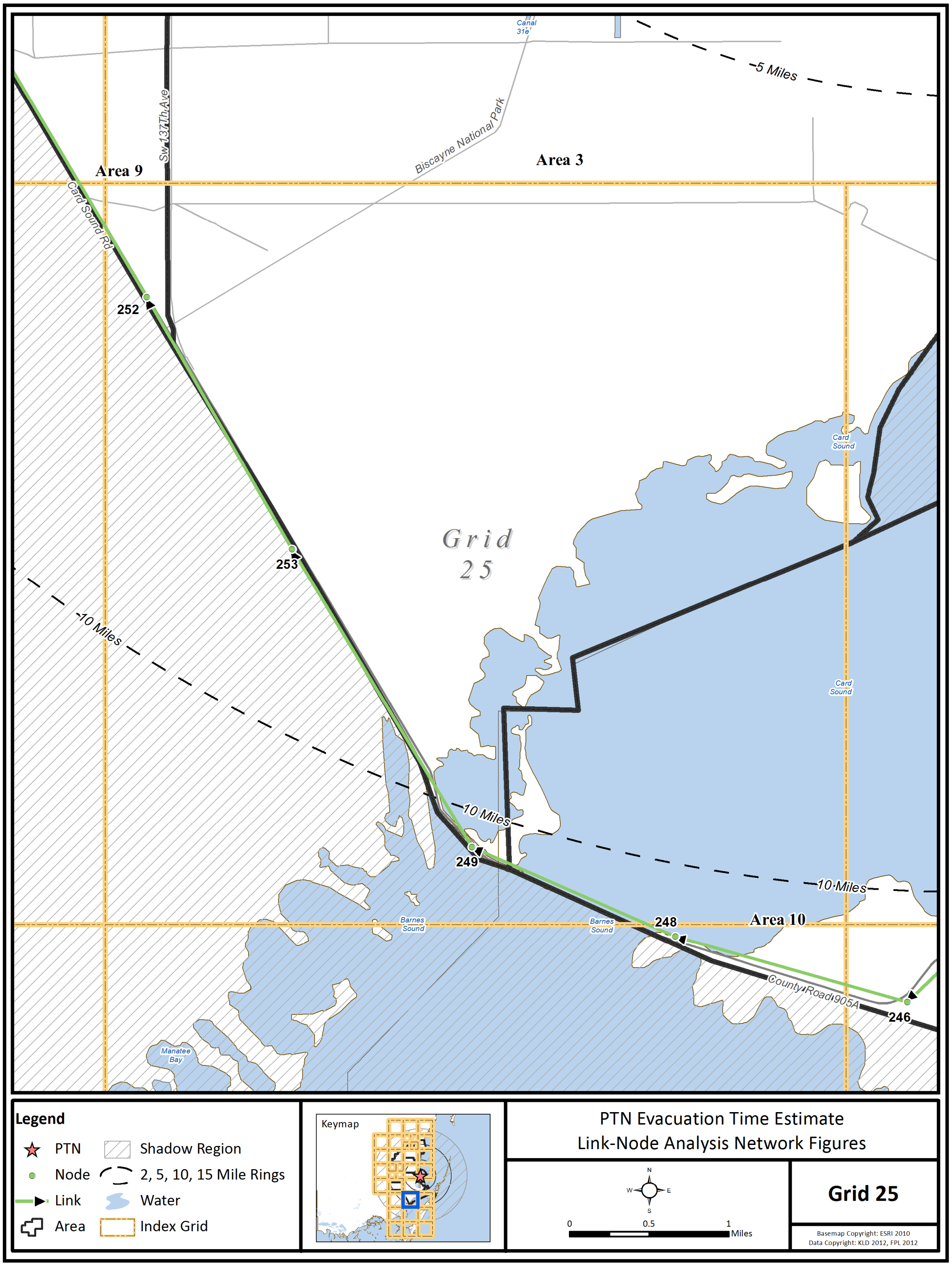


Figure K-26. Link-Node Analysis Network - Grid 25

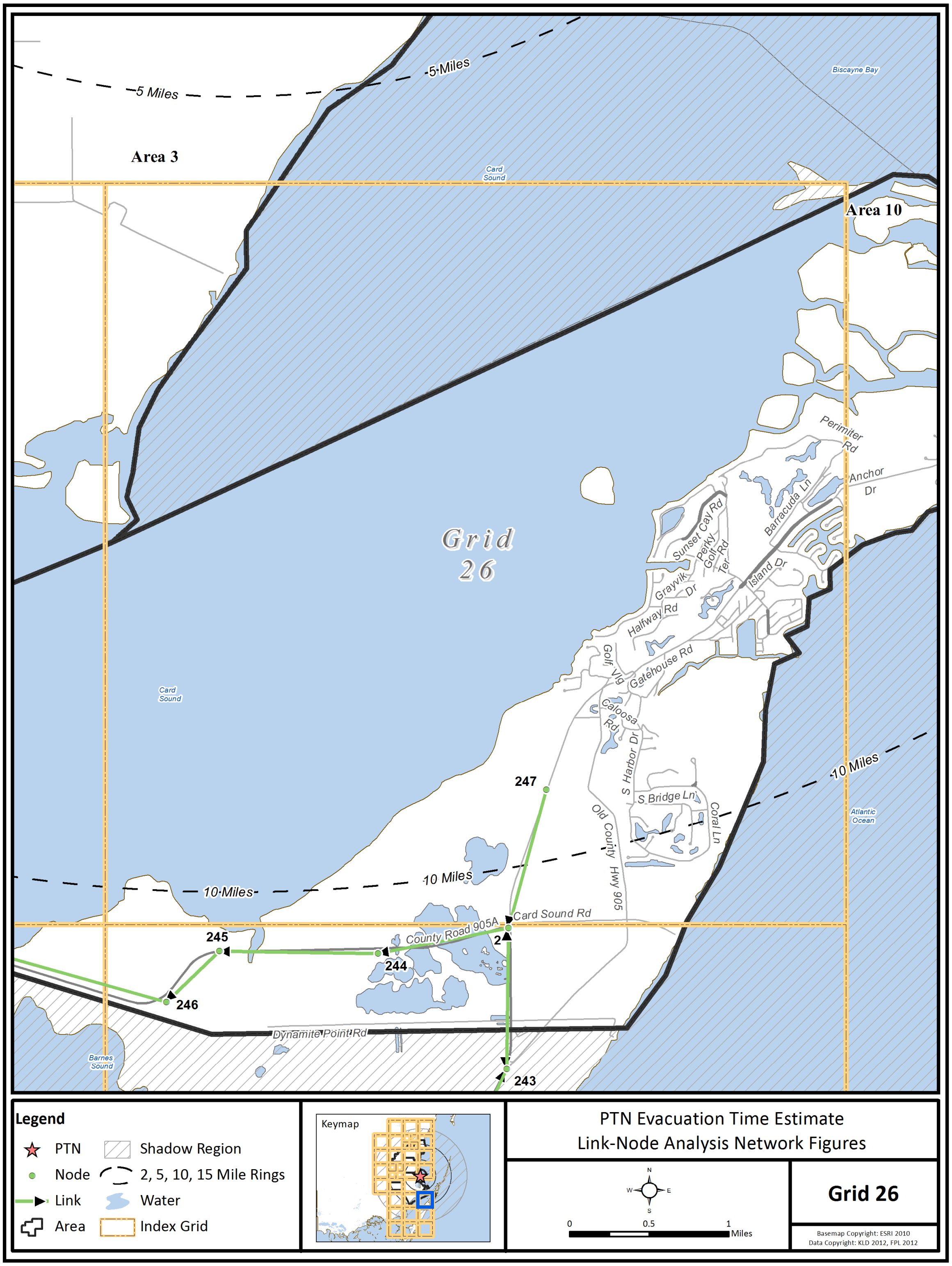


Figure K-27. Link-Node Analysis Network - Grid 26

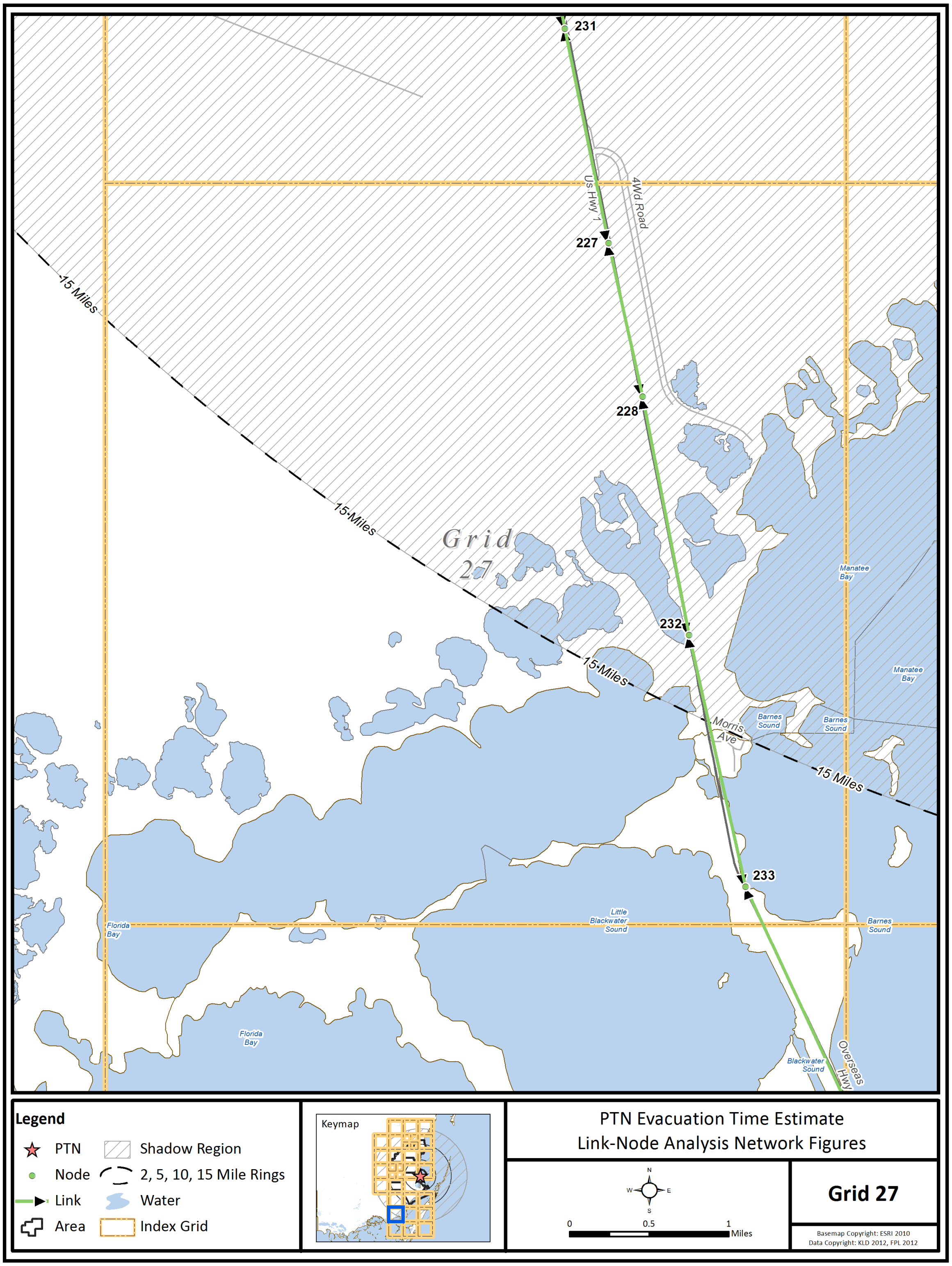


Figure K-28. Link-Node Analysis Network - Grid 27

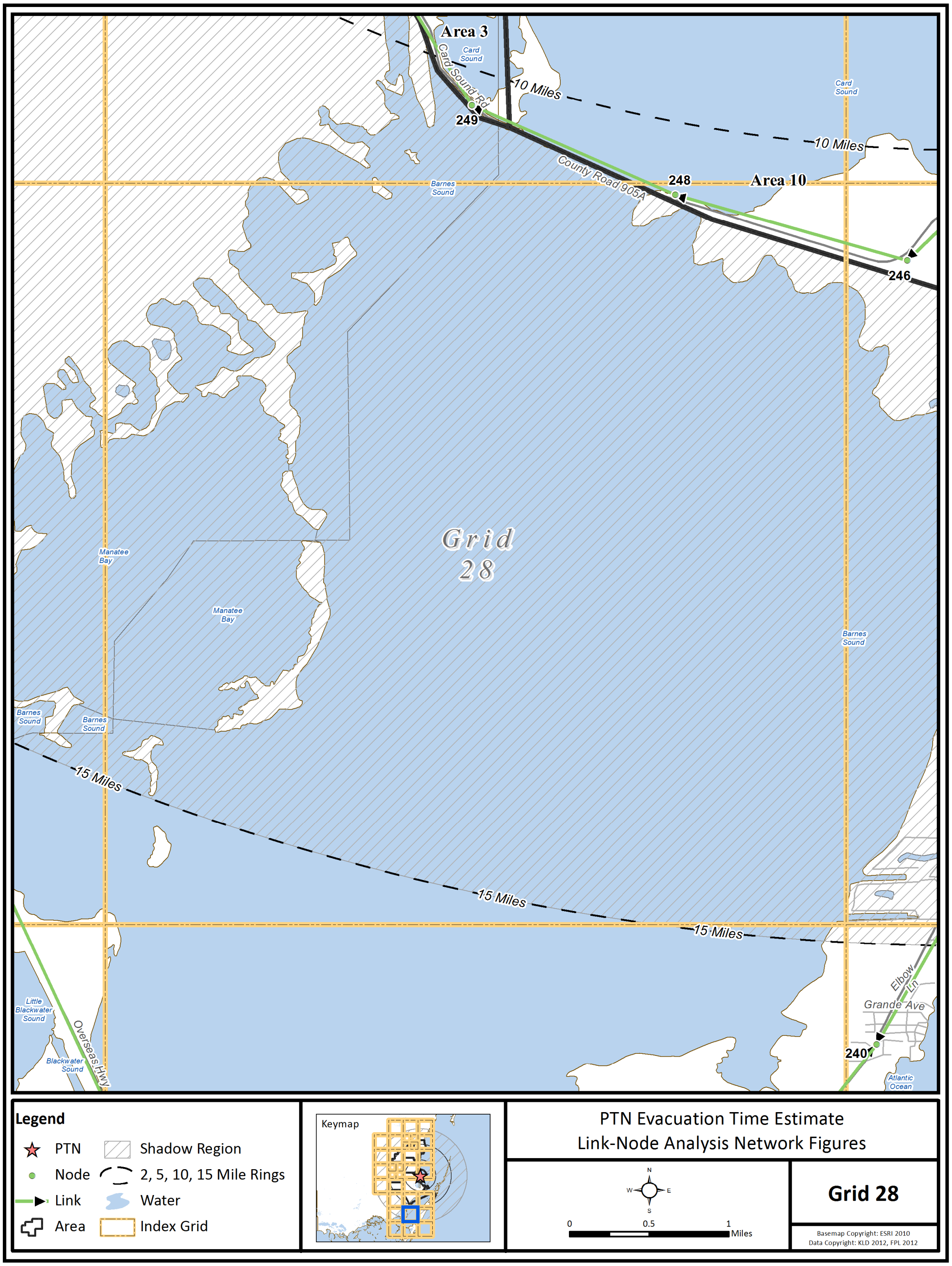


Figure K-29. Link-Node Analysis Network - Grid 28

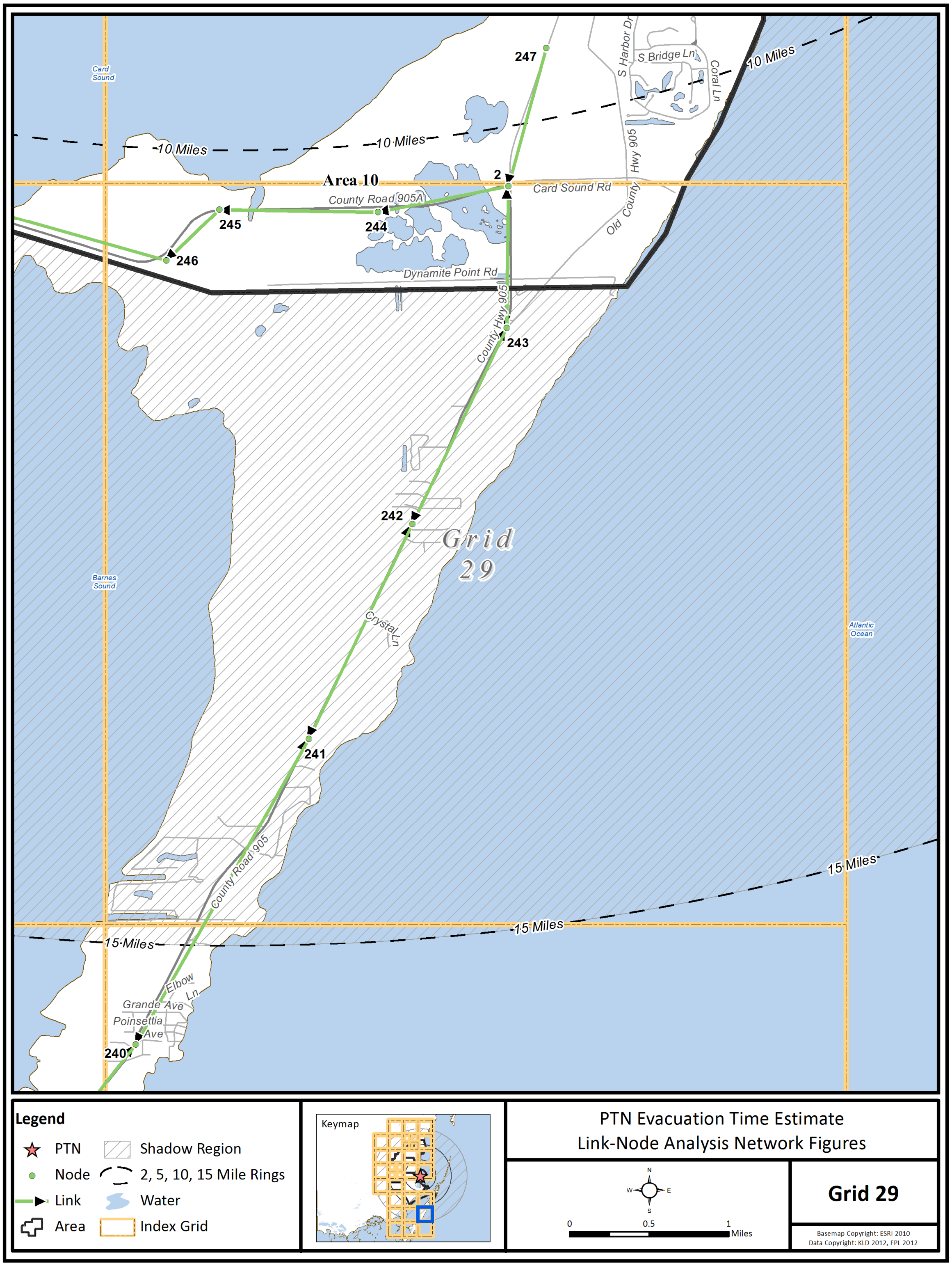


Figure K-30. Link-Node Analysis Network - Grid 29

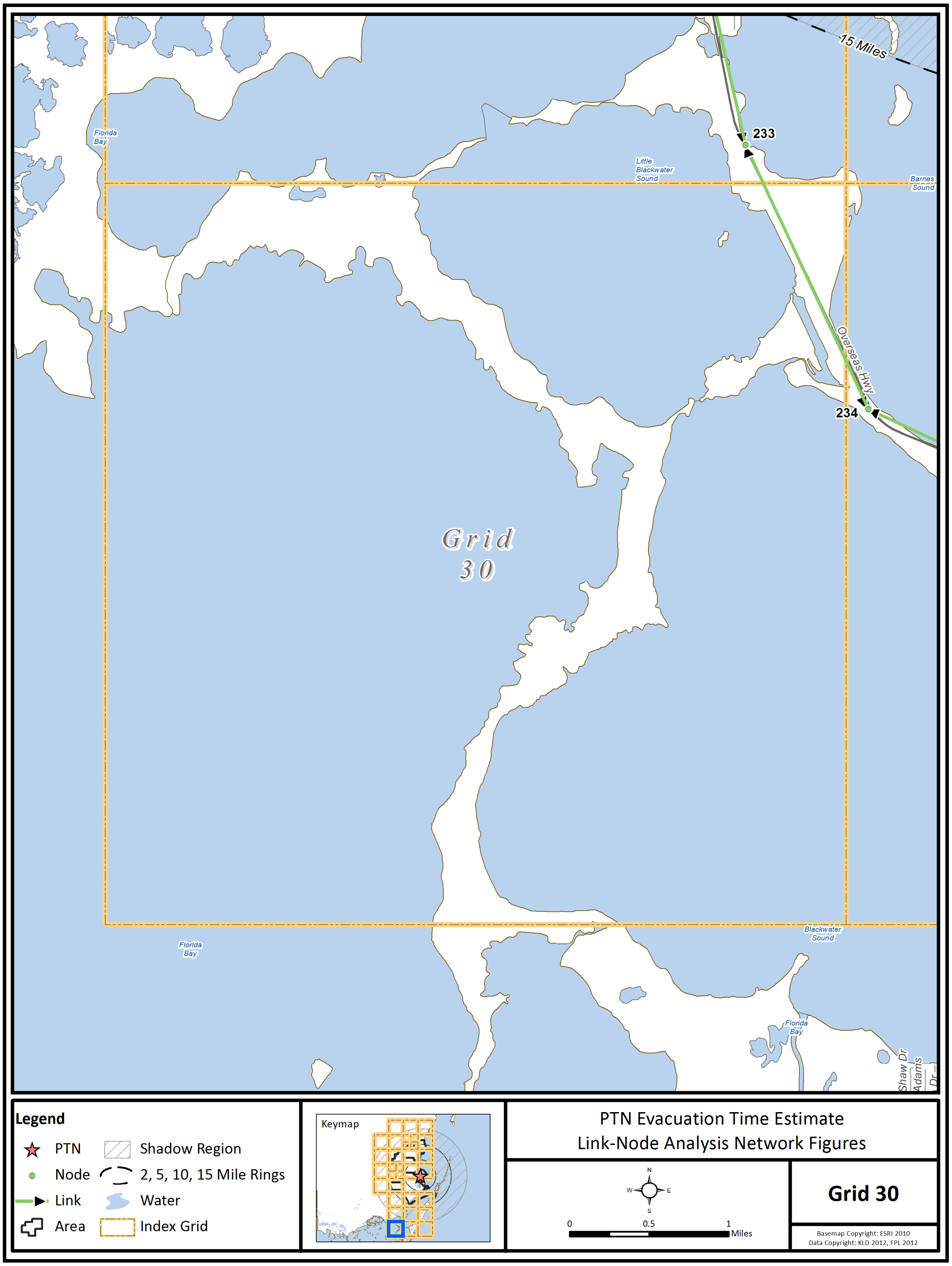


Figure K-31. Link-Node Analysis Network - Grid 30

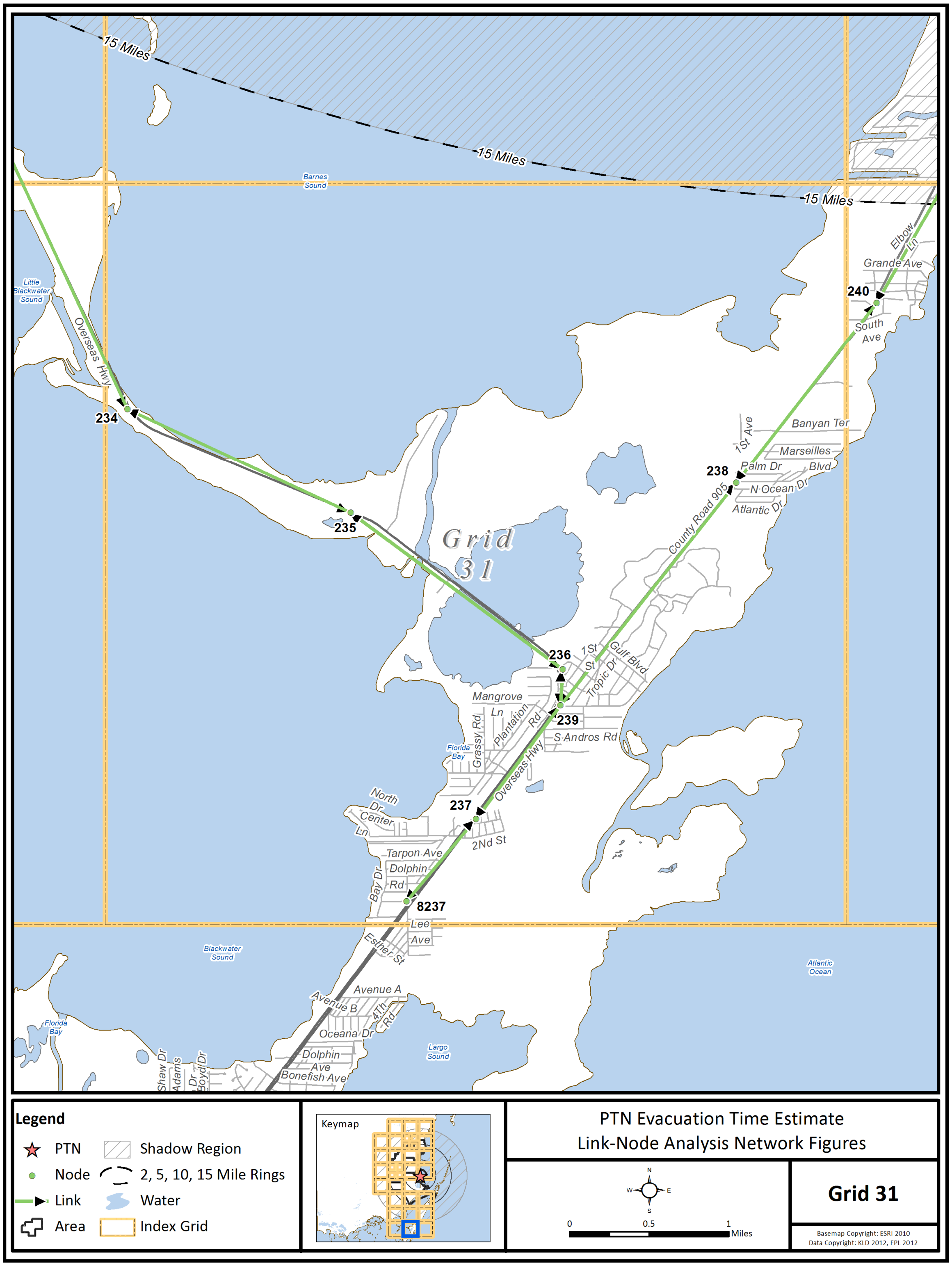


Figure K-32. Link-Node Analysis Network - Grid 31

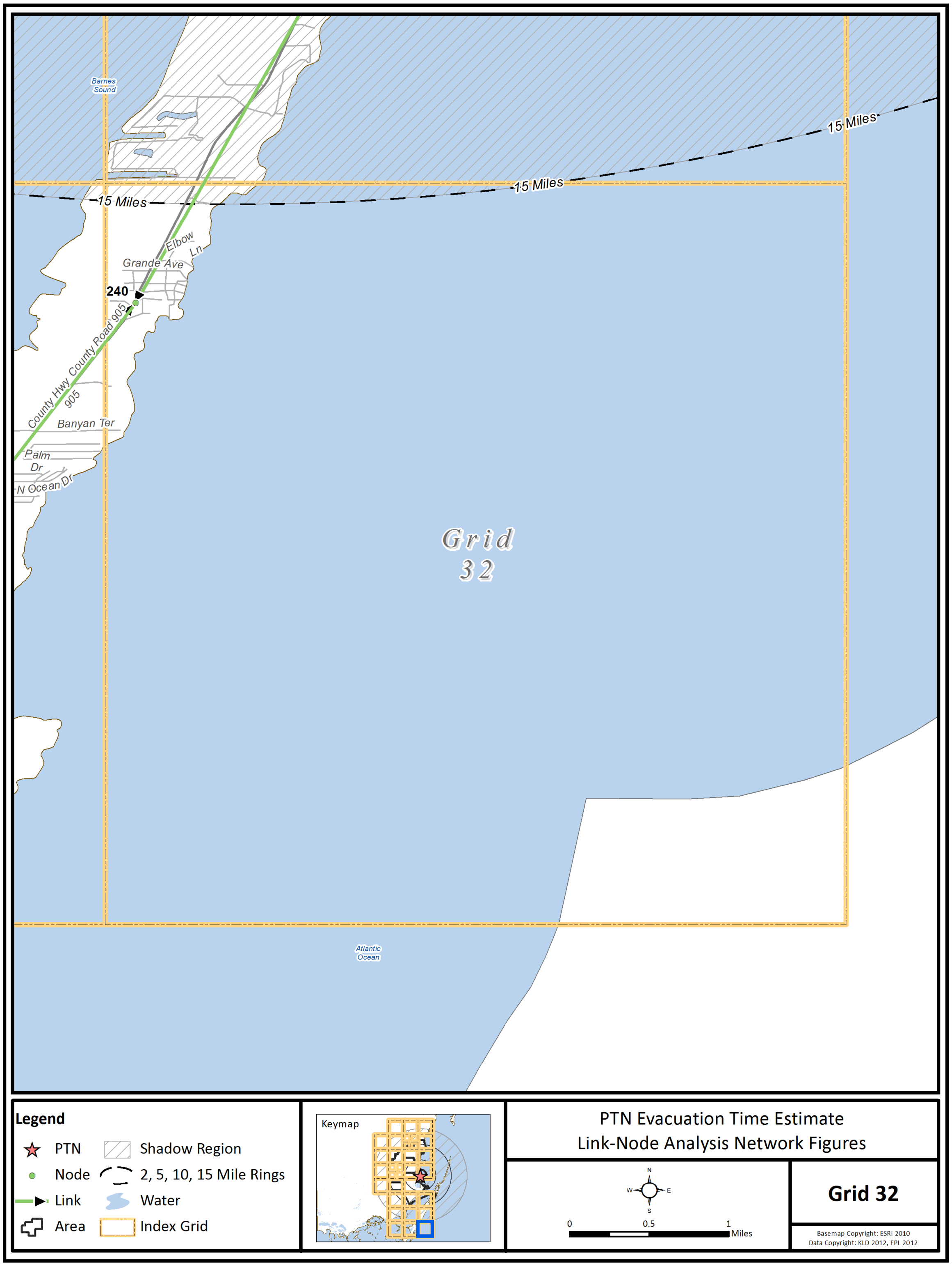


Figure K-33. Link-Node Analysis Network - Grid 32

APPENDIX L

Area Boundaries

L. AREA BOUNDARIES

Area 1 County: Miami-Dade

Turkey Point Units 3 & 4.

Area 2 County: Miami-Dade

Defined as the area within the following boundary: An annular ring with a radius of 2 miles centered at the Turkey Point Units 3 & 4.

Area 3 County: Miami-Dade

Defined as the area within the following boundary: Palm Drive (SW 344th Street) west from the border of area 2 to SW 137th Avenue.137th Avenue south to Card Sound Road. Card Sound Road south to Card Sound. North on the coast to the border of area 2.

Area 4 County: Miami-Dade

Defined as the area within the following boundary: SW 280th Street west from the coast to SW 107th Avenue. SW 107th Avenue north to SW 268th Street (Hainlin Mill Drive). SW 268th Street west to SW 137th Avenue. SW 137th Avenue south to Palm Drive (SW 344th Street). SW 344th Street east to the area 2 boundary. Follows area 2 boundary to the shore and follows the shore north to SW 280th Street.

Area 5 County: Miami-Dade

Defined as the area within the following boundary: Eureka Drive (SW 184th Street) west from the coast to S Dixie Highway (U.S. Highway 1). U.S. Highway 1 south to the Florida Turnpike. Florida Turnpike south to Black Creek Canal. Follows Black Creek Canal south to the shore. Follows the shoreline north to Eureka Drive.

Area 6 County: Miami-Dade

Defined as the area within the following boundary: West on Caribbean Boulevard (SW 200th Street) from the intersection with U.S. Highway 1 and the Florida Turnpike to SW 122nd Avenue. South on SW 122nd Avenue to SW 204th Street. West on SW 204th Street to SW 127th Avenue. South on SW 127th Avenue to Hainlin Mill Drive (SW 216th Street.). West on SW 216th Street to SW 137th Avenue. South on SW 137th Avenue to Moody Drive (SW 268th Street). East on Moody Drive to SW 107th Avenue. South on SW 107th Avenue to SW 280th Street. East on SW 280th Street to the shore. Follows the shoreline north to Black Creek Canal. Follows Black Creek Canal north to the Florida Turnpike. Florida Turnpike north to the intersection with U.S. Highway 1 just north of Caribbean Boulevard.

Area 7 County: Miami-Dade

Defined as the area within the following boundary: Hainlin Mill Drive (SW 216th Street) west from the intersection with SW 137th Avenue to Naranja Road (SW 147th Avenue). Naranja Road south to Silver Palm Drive (SW 232nd Street). Silver Palm Drive west to Newton Road (SW 157th Avenue). Newton Road south to Coconut Palm Drive (SW 248th Street). Coconut Palm Drive west to Tennessee Road (SW 167th Avenue). Tennessee Road south to Epmore Drive (SW 272nd Street). Epmore Drive west to Krome Avenue (SW 177th Street). Krome Avenue south to Biscayne Drive (SW 288th Street). Biscayne Drive east to SW 137th Avenue. 137th Avenue north to intersection with Hainlin Mill Drive.

Area 8 County: Miami-Dade

Defined as the area within the following boundary: Biscayne Drive (SW 288th Street) west from the intersection with SW 137th Avenue to Redland Road (SW 187th Avenue). Redland Road south to SW 392nd Street. SW 392nd Street east to SW 137th Avenue. SW 137th Avenue north to intersection with Biscayne Drive.

Area 9 County: Miami-Dade

Defined as the area within the following boundary: SW 392nd Street west from the intersection with SW 137th Avenue to SW 182nd Avenue. SW 182nd Avenue south to Dade County Work Camp Road. Work Camp Road east to Card Sound Road (road physically ends at U.S. Highway 1). Card Sound Road south to SW 137th Avenue. SW 137th Avenue north to intersection with SW 392nd Street.

Area 10 County: Monroe

Ocean Reef Community.

APPENDIX M

Evacuation Sensitivity Studies

M. EVACUATION SENSITIVITY STUDIES

This appendix presents the results of a series of sensitivity analyses. These analyses are designed to identify the sensitivity of the ETE to changes in some base evacuation conditions.

M.1 Effect of Changes in Trip Generation Times

A sensitivity study was performed to determine whether changes in the estimated trip generation time have an effect on the ETE for the entire EPZ. Specifically, if the tail of the mobilization distribution were truncated (i.e., if those who responded most slowly to the ATE, could be persuaded to respond much more rapidly), how would the ETE be affected? The case considered was scenario 1, region 3; a summer, midweek, midday, good weather evacuation of the entire EPZ. Table M-1 presents the results of this study.

As discussed in Section 7.3, traffic congestion persists within the EPZ for about 10 hours. As such, the ETE for the 100th percentile is not significantly affected by the trip generation time, but by the time needed to clear the congestion within the EPZ. The 90th percentile ETE are also not sensitive to truncating the tail of the mobilization time distribution.

M.2 Effect of Changes in the Number of People in the Shadow Region Who Relocate

A sensitivity study was conducted to determine the effect on ETE of changes in the percentage of people who decide to relocate from the shadow region. The case considered was scenario 1, region 3; a summer, midweek, midday, good weather evacuation for the entire EPZ. The movement of people in the shadow region has the potential to impede vehicles evacuating from an evacuation region within the EPZ. Refer to Sections 3.2 and 7.1 for additional information on population within the Shadow Region.

Table M-2 presents the evacuation time estimates for each of the cases considered. The results show that the 90th and 100th percentile ETE are not materially impacted by a reduction in the shadow evacuation from 20% to 0%, as ETE only decreases by 10 minutes at the 90th percentile and 20 minutes at the 100th percentile. Tripling the shadow percentage increases the ETE by 55 minutes and 1 hour and 40 minutes for the 90th and 100th percentiles, respectively – a significant change.

M.3 Effect of Changes in EPZ Resident Population

A sensitivity study was conducted to determine the effect on ETE of changes in the resident population within the EPZ. As population in the EPZ changes over time, the time required to evacuate the public may increase, decrease, or remain the same. Since the ETE is related to the demand to capacity ratio present within the EPZ, changes in population will cause the demand side of the equation to change.

As per the NRC's response to the Emergency Planning Frequently Asked Question (EPFAQ) 2013-001, the ETE population sensitivity study must be conducted to determine what percentage increase in permanent resident population causes an increase in the 90th percentile ETE of 25 percent or 30 minutes, whichever is less. The sensitivity study must use the scenario with the longest 90th percentile ETE (excluding the roadway impact scenario and the special event scenario if it is a 1 day per year special event).

Thus, the sensitivity study was conducted using the following planning assumptions:

1. The population within the EPZ was increased by up to 7%. Changes in population were applied to permanent residents only (as per federal guidance), in both the EPZ area and the shadow region.
2. The transportation infrastructure remained fixed; the presence of new roads or highway capacity improvements was not considered.
3. The study was performed for the 2-mile region (R01), the 5-mile region (R02) and the entire EPZ (R03).
4. The scenario (excluding roadway impact and special event) with the highest 90th percentile ETE Values was selected as the case to be considered in this sensitivity study (Scenario 7 – winter, midweek, midday, rain)

Table M-3 presents the results of the sensitivity study. Section IV of Appendix E to 10 CFR Part 50, and NUREG/CR-7002, Section 5.4, require licensees to provide an updated ETE analysis to the NRC when a population increase within the EPZ causes ETE values (for the 2-Mile region, 5-Mile region or entire EPZ) to increase by 25 percent or 30 minutes, whichever is less. Note that all of the base ETE values except the 2-mile region, which has no permanent resident population, are greater than 2 hours; 25 percent of the base ETE is always greater than 30 minutes. Therefore, 30 minutes is the lesser and is the criterion for updating. Twenty five percent of the 90th percentile ETE for the 2-mile region (1:35) is 24 minutes, which is less than 30 minutes.

Those percent population changes which result in 90th percentile ETE changes greater than 30 minutes, or 24 minutes for the 2-mile region, are highlighted in - population increases of 6% or more would require a full ETE update. FPL will have to estimate the EPZ population on an annual basis to see if it has increased by at least 6%.

M.4 Effect of Construction of Units 6 & 7

A sensitivity analysis representing a typical winter, midweek, and midday (Scenario 6) with workers at the Turkey Point site constructing the new units (Units 6 & 7) when an emergency occurs at the operational units (Units 3 & 4) was conducted. Based on discussions with Bechtel, the peak construction will be in 2019 with target dates of operation of 2022 and 2023 for Units 6 & 7, respectively. During the peak, 3950 construction workers will be present and 33 operations personnel for a total workforce of 3983 people. As stated in the *Turkey Point Power Plant Peak Construction Analysis*[1], the workforce will be split amongst two shifts: Shift 1 from 6:00 AM to 4:30 PM will account for 70% of the workforce and Shift 2 from 5:00 PM to 3:00 AM will account for the remaining 30% of the workforce. A conservative vehicle occupancy of 1.0 worker per vehicle is assumed to estimate the additional vehicle demand servicing construction workers. In addition, there will be a maximum of 36 trucks per hour entering and exiting the construction site. The ETE analysis models trucks as two passenger car equivalents to account for their larger size and more sluggish operating characteristics. Thus, there are 3,983 workers x 70% ÷ 1.0 workers per vehicle + 36 trucks x 2.0 vehicles per truck = 2,860 additional vehicles evacuating for the peak construction scenario.

There are plans to build a parking lot for construction workers on 359th Street and transport the workers to the site via shuttle bus. It is assumed that the time to transport the workers to their vehicles is included in the trip generation (Table 5-8) as the majority of employees in the EPZ require 30 minutes or more to mobilize. It is also assumed that 359th Street will be paved between the construction site and 137th Avenue and that 117th Avenue will be paved between 359th Street and 344th Street; these changes have been modeled in the link-node analysis network used for the ETE analysis (see Figure 1-2). The roadway and intersection improvements identified in Figure 2 and in Figures 5 through 10 of the *Turkey Point Power Plant Peak Construction* Analysis have also been modeled in the link-node analysis network. Permanent resident population and shadow population are extrapolated to 2019 for this scenario assuming the same population growth rates used to extrapolate from 2000 to 2010. Table M-4 summarizes the results.

The ETE for the 2-mile region is shorter for the 90th and 100th percentile ETE and the 5-mile region is shorter for the 90th percentile ETE because of the increased capacities due to the aforementioned traffic treatments in the immediate vicinity of the plant. The 90th and 100th percentile ETE for the full EPZ increase by 3:10 and 3:40, respectively, because of the significant increase in permanent resident and shadow populations due to the extrapolation to year 2019.

[1] *Turkey Point Power Plant Peak Construction Analysis*, TrafTech Engineering, Inc., June 2009

M.5 Effects of Contraflowing the Most Congested Roadways in the Study Area

Sensitivity studies were conducted to determine the effect on ETE of implementing contraflow along the most congested and heavily utilized roadways in the study area.

The sensitivity studies were conducted using the following planning assumptions and methodology:

1. The study area was expanded northbound to US Route 41 (SW 8th St).
2. The link-node analysis network (computerized representation of the physical roadway system – see Figure 1-2 and Appendix K) was updated to include additional links and nodes to model roadways in the expanded study area. Figure M-1 shows the nodes and links added in the expanded study area.
3. The DYNEV II model input streams were updated with the new links and nodes.
4. The good weather scenario with the highest ETE – Scenario 6 (winter, midweek, midday, good weather) – was used for the sensitivity studies.
5. ETE were computed for the 2-mile region (R01), 5-mile region (R02) and full EPZ (R03).
6. The manpower and equipment needed for contraflow were assumed to be in place at the time the advisory to evacuate is given.
7. External traffic (see Section 3.6) was not considered in the analysis as the contraflow of major evacuation routes would not allow for the flow of traffic into the study area.
8. It is assumed that 20% of the permanent resident population within the expanded study area will voluntarily evacuate (shadow evacuation). Figure M-1 shows the expanded shadow region.
9. The use of contraflow in these sensitivity studies is purely for analytical purposes to provide the Miami-Dade County Office of Emergency Management with data for planning purposes. These sensitivity studies do not imply nor require that the county will implement contraflow during evacuation due to an incident at PTN.

M.5.1 Contraflow Miami-Dade Busway

The Miami-Dade Busway is a 2-lane transit route (only Miami-Dade buses are permitted to use the roadway) which parallels US Route 1 from Florida City to Miami. The first sensitivity study conducted was to determine the effect on ETE if the Miami-Dade Busway were utilized as an additional evacuation road and to contraflow the southbound lane so that both the northbound and southbound lanes would be used for evacuating traffic. The contraflow of the Miami-Dade Busway considered in this analysis begins at the intersection with Palm Avenue in Florida City and terminates at the intersection with SW 104th Street, where US-1 and State Route (SR) 826 can be accessed.

Table M-5 presents the results of the sensitivity study for the 90th and 100th percentiles. The 90th and 100th percentile ETE remained the same for the 2-mile and 5-mile regions. The 90th and 100th percentile ETE for the full EPZ was reduced by 55 minutes and 1 hour and 5 minutes, respectfully.

M.5.2 Contraflow Krome Avenue

A sensitivity study was conducted to determine the effect on ETE if the southbound lane on Krome Avenue is contraflowed so that both the northbound and southbound lanes will be used by evacuating traffic. The contraflow of Krome Avenue considered in this analysis begins at the intersection with US-1 in Florida City and terminates at the intersection with SW 8th Street/US-41 in Miami.

Table M-5 presents the results of the sensitivity study for the 90th and 100th percentiles. The 90th and 100th percentile ETE remained the same for the 2-mile and 5-mile regions. The 90th and 100th percentile ETE for the full EPZ was reduced by 20 minutes and 1 hour and 30 minutes, respectfully.

M.5.3 Contraflow Florida Turnpike

A sensitivity study was conducted to determine the effect on ETE if the southbound lanes on the Florida Turnpike are contraflowed so that both the northbound and southbound lanes will be used for evacuating traffic. The contraflow of the Florida Turnpike considered in this analysis begins at the southbound off-ramp to US-1 northbound and NE 7th Street (Exit 1). At one point, there are 4 lanes being used in the contraflow; forcing all 4 of these lanes to exit at the end of the contraflow would cause a major bottleneck. As such, the left-most lane will be forced off at the interchange with SR-94 (Exit 20). The next left-most lane will be forced off farther north at the interchange with SR-976 (Exit 23). The 2 remaining lanes will be forced off at the interchange with SW 8th Street/US-41 (Exit 25). The southbound off-ramps between Exit 1 and SR-94 (Exit 20) will serve as on-ramps for the contraflowed section. To prevent vehicles from accessing the turnpike southbound, the traffic on the Don Shula Expressway southbound will need to be diverted at the interchange with the Palmetto Expressway (SR-826).

Table M-5 presents the results of the sensitivity study for the 90th and 100th percentiles. The 90th and 100th percentile ETE remained the same for the 2-mile and 5-mile regions. The 90th and 100th percentile ETE for the full EPZ was reduced by 1 hour and 10 minutes and 1 hour and 5 minutes, respectfully.

M.5.4 Contraflow Miami-Dade Busway, Krome Avenue and Florida Turnpike

A sensitivity study was conducted to determine the effect on ETE if the southbound lanes on the Miami-Dade Busway, Krome Avenue and Florida Turnpike were contraflowed (as per M.5.1, M.5.2, and M.5.3) while also utilizing the northbound lane on the Miami-Dade Busway.

Table M-5 presents the results of the sensitivity study for the 90th and 100th percentiles. The 90th and 100th percentile ETE remained the same for the 2-mile and 5-mile regions. The 90th and 100th percentile ETE for the full EPZ was reduced by 1 hour and 55 minutes and 1 hour and 30 minutes, respectfully.

M.5.5 Results and Conclusions

As shown in Figures 7-3 through 7-7, the traffic congestion within the EPZ is concentrated within Areas 5 through 8, all of which are beyond the 5-mile radius of the plant. Furthermore, Krome Ave, the Miami-Dade Busway and the Florida Turnpike are all located further than 5 miles from the plant. This explains why the ETE is not impacted for the 2-mile or 5-mile regions when implementing contraflow. As discussed in NUREG-0654, Supplement 3, initial Protective Action Recommendations (PAR) are suggested by the NRC for the 2-mile radius and downwind to 5-miles. Thus, implementing contraflow along these major evacuation routes would not impact initial PAR.

As expected, the 90th and 100th percentile ETE decrease the most when implementing contraflow on all 3 major evacuation routes – Krome Ave, the Miami-Dade Busway and the Florida Turnpike. Note that contraflow on Krome Ave alone results in the same reduction (1 hour and 30 minutes) in the 100th percentile ETE as contraflow on all 3 routes. As discussed in Section 7.3 and shown in Figure 7-7, Krome Avenue is the last roadway in the study area to exhibit traffic congestion. Krome Ave, US-1, the Busway and the Florida Turnpike are all very close together within Homestead and Florida City. As evacuees proceed northbound out of the EPZ, US-1, the Busway and the Florida Turnpike become quite distant from Krome Ave. Also, as proceeding northbound out of Homestead, all of the area surrounding Krome Ave is agricultural with little permanent resident population. Most of the EPZ population lives closer to US-1, the Busway and the Florida Turnpike. As such, most of the vehicles using Krome Ave northbound are evacuees from Homestead and Florida City who are trying to avoid traffic congestion along US-1 and the Florida Turnpike within these densely populated areas. Once they are on Krome Avenue, most vehicles remain on Krome Ave because it is so distant from US-1 and the Florida Turnpike. Krome Avenue is a lower capacity road (normally a single lane with many traffic signals) than US-1 (three or more lanes) and the Florida Turnpike (three or more lanes, limited access highway). Due to the lower capacity of Krome Ave and the bottlenecks shown in Figures 7-3 through 7-7, it is the last road to clear of congestion, which explains why the 100th percentile ETE is significantly impacted when increasing the capacity of Krome Ave via contraflow. However, the 90th percentile is not as significantly impacted when contraflowing Krome Ave as this route only services 11% of the evacuees from within the EPZ (see Table J-5).

US-1 northbound and the Florida Turnpike (splits into the Don Shula Expressway) northbound service more than half of the evacuees from within the EPZ (see Table J-5). As such, contraflow along the Miami-Dade Busway (parallels US-1) or the Florida Turnpike has a much more pronounced impact on 90th percentile ETE than contraflow along Krome Ave. As discussed above, Krome Ave is the last road to clear in the study area. Contraflow along the Miami-Dade Busway or the Florida Turnpike does reduce the 100th percentile ETE as more evacuees from Homestead and Florida City choose these routes over Krome Ave; however the reduction in 100th percentile ETE is not as significant as contraflow along Krome Ave.

There are two important criteria to consider when discussing contraflow:

1. Manpower/Equipment – Implementing contraflow requires a great deal of manpower and equipment. In order to avoid head-on collisions, all access points to the contraflowed roadway must be either barricaded or manned by police officers.
2. Evacuation Benefits – The NRC recommends the use of the 90th percentile ETE in protective action decision making. Thus, the evacuation benefit of contraflow can best be quantified using the reduction in 90th percentile ETE.

Table M-6 ranks each of the contraflow options in terms of these criteria, with 1 being the best and 4 being the worst. The ranking in terms of manpower/equipment is as follows:

- The Florida Turnpike is a limited access highway. Each of the interchanges/ramp systems to access the turnpike must be manned/equipped for contraflow. There are significantly less interchanges on the Florida Turnpike than there are intersections along the Busway and Krome Ave.
- The Busway has many more intersections than Krome Ave which require manpower/equipment.
- The contraflow of all 3 routes obviously requires the most manpower/equipment.

The ranking in terms of evacuation benefits is taken from the 90th percentile ETE results shown in Table M-5. Finally, the overall ranking is determined by summing the manpower/equipment ranking and the evacuation benefits ranking. The option with the lowest sum is the best. Note that the Miami-Dade Busway and Krome Ave have the same sum of rankings – 6. The Miami-Dade Busway has been assigned the higher overall ranking because the evacuation benefit is more significant.

Based on this ranking system, contraflowing the Florida Turnpike is the best overall option as it requires the least manpower and results in the second best reduction in 90th percentile ETE.

Table M-1. Evacuation Time Estimates for Trip Generation Sensitivity Study

Trip Generation Period	Evacuation Time Estimate for Entire EPZ	
	90th Percentile	100th Percentile
6 Hours	6:40	9:40
7 Hours	6:40	9:40
8 Hours (Base)	6:40	9:40

Table M-2. Evacuation Time Estimates for Shadow Sensitivity Study

Percent Shadow Evacuation	Evacuating Shadow Vehicles	Evacuation Time Estimate for Entire EPZ	
		90th Percentile	100th Percentile
0	0	6:30	9:20
15	13,735	6:40	9:35
20 (Base)	18,314	6:40	9:40
60	54,942	7:35	11:20

Table M-3. ETE Variation with Population Change

Resident Population	Base	Population Change		
		5%	6%	7%
	206,329	216,645	218,709	220,772
Region	Base	Population Change		
		5%	6%	7%
2-MILE	1:35	1:40	1:40	1:40
5-MILE	3:05	3:05	3:05	3:05
FULL EPZ	7:25	7:45	8:00	8:00
Region	Base	Population Change		
		5%	6%	7%
2-MILE	2:10	2:10	2:10	2:10
5-MILE	8:05	8:05	8:05	8:05
FULL EPZ	11:00	11:50	12:05	12:05

Table M-4. Evacuation Time Estimates for Construction Case

Region	No Construction (Base)		Construction	
	90th Percentile	100th Percentile	90th Percentile	100th Percentile
2-MILE	1:35	2:10	1:20	2:05
5-MILE	3:05	8:05	2:55	8:05
FULL EPZ	6:45	9:40	9:55	13:20

Table M-5. Evacuation Time Estimates Contraflow Comparison

Region	Base	Contraflowed Roadway			
		Miami-Dade Busway	Krome Ave	Florida Turnpike	Miami-Dade Busway, Krome Avenue and Florida Turnpike
	90th Percentile				
2-MILE	1:35	1:35	1:35	1:35	1:35
5-MILE	3:05	3:05	3:05	3:05	3:05
FULL EPZ	6:45	5:50	6:25	5:35	4:50
Region	100th Percentile				
2-MILE	2:10	2:10	2:10	2:10	2:10
5-MILE	8:05	8:05	8:05	8:05	8:05
FULL EPZ	9:40	8:35	8:10	8:35	8:10

Table M-6. Ranking of Contraflow Options

Contraflowed Roadway	Ranking		
	Manpower/Equipment	Evacuation Benefits	Overall[2]
Miami-Dade Busway	3	3	3
Krome Avenue	2	4	4
Florida Turnpike	1	2	1
Miami-Dade Busway, Krome Avenue and Florida Turnpike	4	1	2

[2] Overall ranking is determined by summing the manpower/equipment ranking and the evacuation benefits ranking. The option with the lowest sum is the best. Miami-Dade Busway and Krome Ave have the same sum of rankings – 6. The Miami-Dade Busway has been assigned the higher overall ranking because the evacuation benefit is more significant.

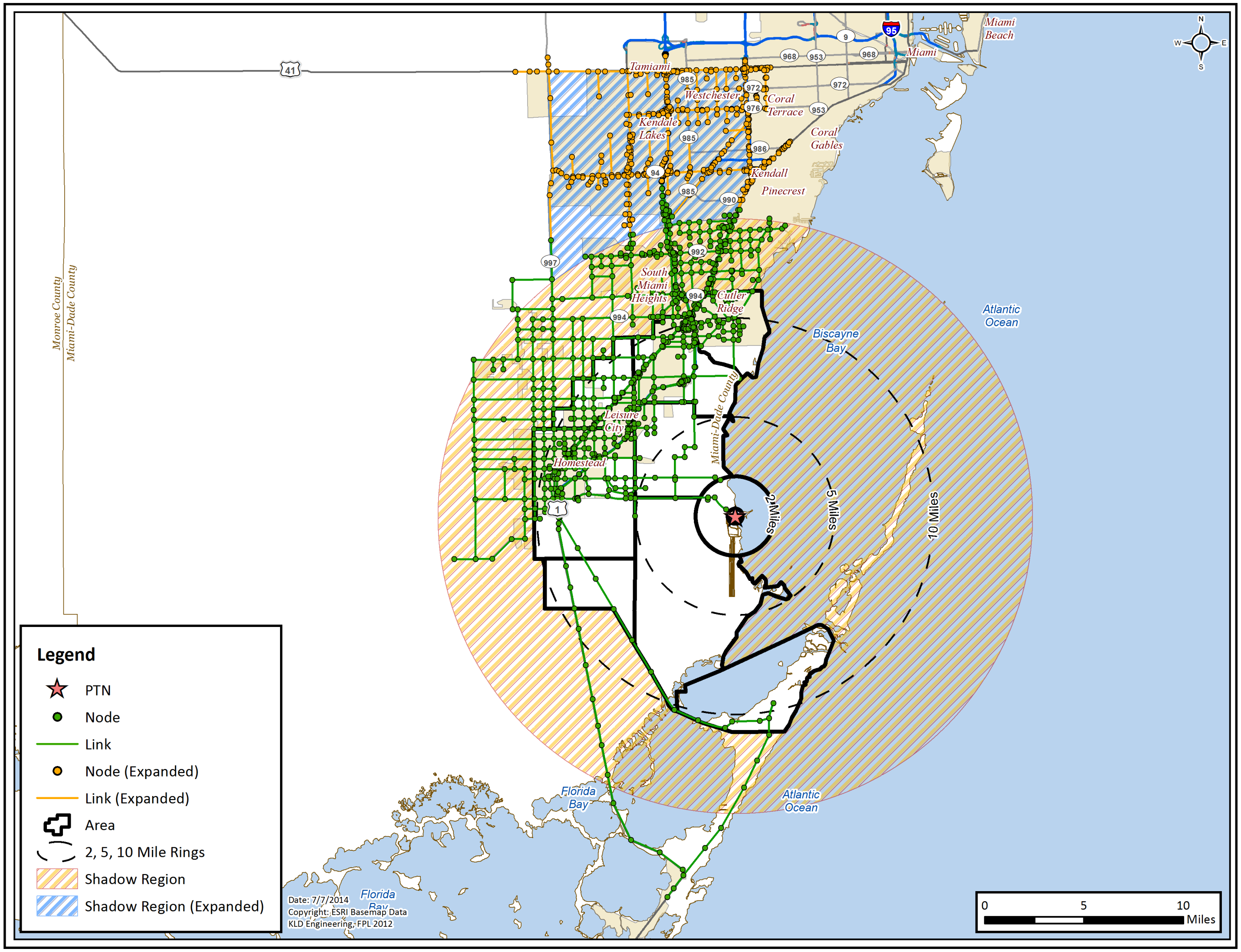


Figure M-1. Expanded Study Area

APPENDIX N

ETE Criteria Checklist

N. ETE CRITERIA CHECKLIST

Table N-1. ETE Review Criteria Checklist

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
1.0 Introduction		
a. The emergency planning zone (EPZ) and surrounding area should be described.	Yes	Section 1
b. A map should be included that identifies primary features of the site, including major roadways, significant topographical features, boundaries of counties, and population centers within the EPZ.	Yes	Figure 1-1
c. A comparison of the current and previous ETE should be provided and includes similar information as identified in Table 1-1, "ETE Comparison," of NUREG/CR-7002.	Yes	Table 1-3
1.1 Approach		
a. A discussion of the approach and level of detail obtained during the field survey of the roadway network should be provided.	Yes	Section 1.3
b. Sources of demographic data for schools, special facilities, large employers, and special events should be identified.	Yes	Section 2.1 Section 3
c. Discussion should be presented on use of traffic control plans in the analysis.	Yes	Section 1.1, Section 2.3, Section 9, Appendix G
d. Traffic simulation models used for the analyses should be identified by name and version.	Yes	Section 1.3, Table 1-3, Appendix B, Appendix C

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
e. Methods used to address data uncertainties should be described.	Yes	Section 3 – avoid double counting Section 5, Appendix F – 4.15% sampling error at 95% confidence interval for telephone survey
1.2 Assumptions		
a. The planning basis for the ETE includes the assumption that the evacuation should be ordered promptly and no early protective actions have been implemented.	Yes	Section 2.3 – Assumption 1 Section 5.1
b. Assumptions consistent with Table 1-2, “General Assumptions,” of NUREG/CR-7002 should be provided and include the basis to support their use.	Yes	Sections 2.2, 2.3
1.3 Scenario Development		
a. The ten scenarios in Table 1-3, Evacuation Scenarios, should be developed for the ETE analysis, or a reason should be provided for use of other scenarios.	Yes	Tables 2-1, 6-2
1.3.1 Staged Evacuation		
a. A discussion should be provided on the approach used in development of a staged evacuation.	Yes	Sections 5.4.2, 7.2
1.4 Evacuation Planning Areas		
a. A map of EPZ with emergency response planning areas (ERPAs) should be included.	Yes	Figure 6-1
b. A table should be provided identifying the ERPAs considered for each ETE calculation by downwind direction in each sector.	Yes	Table 6-1

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
c. A table similar to Table 1-4, "Evacuation Areas for a Staged Evacuation Keyhole," of NUREG/CR-7002 should be provided and includes the complete evacuation of the 2, 5, and 10 mile areas and for the 2 mile area/5 mile keyhole evacuations.	Yes	Table 7-5
2.0 Demand Estimation		
a. Demand estimation should be developed for the four population groups, including permanent residents of the EPZ, transients, special facilities, and schools.	Yes	Permanent residents, employees, transients – Section 3, Appendix E Special facilities, schools – Section 8, Appendix E
2.1 Permanent Residents and Transient Population		
a. The US Census should be the source of the population values, or another credible source should be provided.	Yes	Section 3.1
b. Population values should be adjusted as necessary for growth to reflect population estimates to the year of the ETE.	Yes	2010 used as the base year for analysis. No growth of population necessary.
c. A sector diagram should be included, similar to Figure 2-1, "Population by Sector," of NUREG/CR-7002, showing the population distribution for permanent residents.	Yes	Figure 3-2
2.1.1 Permanent Residents with Vehicles		
a. The persons per vehicle value should be between 1 and 2 or justification should be provided for other values.	Yes	2.28 persons per vehicle – Table 1-3
b. Major employers should be listed.	Yes	Appendix E – Table E-3
2.1.2 Transient Population		

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
a. A list of facilities which attract transient populations should be included, and peak and average attendance for these facilities should be listed. The source of information used to develop attendance values should be provided.	Yes	Sections 3.3, 3.4, Appendix E
b. The average population during the season should be used, itemized and totaled for each scenario.	Yes	Tables 3-4, 3-5, 3-6 and Appendix E itemize the transient population and employee estimates. These estimates are multiplied by the scenario specific percentages provided in Table 6-3 to estimate transient population by scenario.
c. The percent of permanent residents assumed to be at facilities should be estimated.	Yes	Sections 3.3, 3.4
d. The number of people per vehicle should be provided. Numbers may vary by scenario, and if so, discussion on why values vary should be provided.	Yes	Sections 3.3, 3.4
e. A sector diagram should be included, similar to Figure 2-1 of NUREG/CR-7002, showing the population distribution for the transient population.	Yes	Figure 3-6 – transients Figure 3-8 – employees
2.2 Transit Dependent Permanent Residents		
a. The methodology used to determine the number of transit dependent residents should be discussed.	Yes	Section 8.1, Table 8-1
b. Transportation resources needed to evacuate this group should be quantified.	Yes	Section 8.1, Tables 8-5, 8-9
c. The county/local evacuation plans for transit dependent residents should be used in the analysis.	Yes	Sections 8.1, 8.4

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
d. The methodology used to determine the number of people with disabilities and those with access and functional needs who may need assistance and do not reside in special facilities should be provided. Data from local/county registration programs should be used in the estimate, but should not be the only set of data.	Yes	Section 8.5
e. Capacities should be provided for all types of transportation resources. Bus seating capacity of 50% should be used or justification should be provided for higher values.	Yes	Section 2.3 – Assumption 10 Sections 3.5, 8.1, 8.2, 8.3
f. An estimate of this population should be provided and information should be provided that the existing registration programs were used in developing the estimate.	Yes	Table 8-1 – transit dependents Section 8.5 – special needs
g. A summary table of the total number of buses, ambulances, or other transport needed to support evacuation should be provided and the quantification of resources should be detailed enough to assure double counting has not occurred.	Yes	Section 8.4 – page 8-6 Table 8-5
2.3 Special Facility Residents		
a. A list of special facilities, including the type of facility, location, and average population should be provided. Special facility staff should be included in the total special facility population.	Yes	Table E-2 – list medical facilities, location, and population Table E-6 – list correctional facilities, location, and population

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
b. A discussion should be provided on how special facility data was obtained.	Yes	Section 3.5, Sections 8.3
c. The number of wheelchair and bed-bound individuals should be provided.	Yes	Table 8-4, Table E-2
d. An estimate of the number and capacity of vehicles needed to support the evacuation of the facility should be provided.	Yes	Section 3.5, Section 8.3, Section 8.6 Tables 8-4, 8-5
e. The logistics for mobilizing specially trained staff (e.g., medical support or security support for prisons, jails, and other correctional facilities) should be discussed when appropriate.	Yes	Section 3.5, 8.4, 8.6
2.4 Schools		
a. A list of schools including name, location, student population, and transportation resources required to support the evacuation, should be provided. The source of this information should be provided.	Yes	Table 8-2, E-1 Section 8.2
b. Transportation resources for elementary and middle schools should be based on 100% of the school capacity.	Yes	Table 8-2
c. The estimate of high school students who will use their personal vehicle to evacuate should be provided and a basis for the values used should be discussed.	Yes	Section 8.2
d. The need for return trips should be identified if necessary.	Yes	Section 8.4 – page 8-9
2.5.1 Special Events		
a. A complete list of special events should be provided and includes information on the population, estimated duration, and season of the event.	Yes	Section 3.7

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
b. The special event that encompasses the peak transient population should be analyzed in the ETE.	Yes	Section 3.7
c. The percent of permanent residents attending the event should be estimated.	Yes	Section 3.7
2.5.2 Shadow Evacuation		
a. A shadow evacuation of 20 percent should be included for areas outside the evacuation area extending to 15 miles from the NPP.	Yes	Section 2.2 – Assumption 5 Figure 2-1 Section 3.2
b. Population estimates for the shadow evacuation in the 10 to 15 mile area beyond the EPZ are provided by sector.	Yes	Section 3.2 Figure 3-4 Table 3-3
c. The loading of the shadow evacuation onto the roadway network should be consistent with the trip generation time generated for the permanent resident population.	Yes	Section 5 – Table 5-8
2.5.3 Background and Pass Through Traffic		
a. The volume of background traffic and pass through traffic is based on the average daytime traffic. Values may be reduced for nighttime scenarios.	Yes	Section 3.8 Table 3-7 Section 6 Table 6-3
b. Pass through traffic is assumed to have stopped entering the EPZ about two hours after the initial notification.	Yes	Section 2.3 – Assumption 5 Section 3.6
2.6 Summary of Demand Estimation		

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
a. A summary table should be provided that identifies the total populations and total vehicles used in analysis for permanent residents, transients, transit dependent residents, special facilities, schools, shadow population, and pass-through demand used in each scenario.	Yes	Tables 3-9, 3-10
3.0 Roadway Capacity		
a. The method(s) used to assess roadway capacity should be discussed.	Yes	Section 4
3.1 Roadway Characteristics		
a. A field survey of key routes within the EPZ has been conducted.	Yes	Section 1.3
b. Information should be provided describing the extent of the survey, and types of information gathered and used in the analysis.	Yes	Section 1.3
c. A table similar to that in Appendix A, "Roadway Characteristics," of NUREG/CR-7002 should be provided.	Yes	Appendix K, Table K-1
d. Calculations for a representative roadway segment should be provided.	Yes	Section 4
e. A legible map of the roadway system that identifies node numbers and segments used to develop the ETE should be provided and should be similar to Figure 3-1, "Roadway Network Identifying Nodes and Segments," of NUREG/CR-7002.	Yes	Appendix K, Figures K-1 through K-33 present the entire link-node analysis network at a scale suitable to identify all links and nodes
3.2 Capacity Analysis		

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
a. The approach used to calculate the roadway capacity for the transportation network should be described in detail and identifies factors that should be expressly used in the modeling.	Yes	Section 4
b. The capacity analysis identifies where field information should be used in the ETE calculation.	Yes	Section 1.3, Section 4
3.3 Intersection Control		
a. A list of intersections should be provided that includes the total number of intersections modeled that are unsignalized, signalized, or manned by response personnel.	Yes	Appendix K, Table K-2
b. Characteristics for the 10 highest volume intersections within the EPZ are provided including the location, signal cycle length, and turn lane queue capacity.	Yes	Table J-1
c. Discussion should be provided on how signal cycle time is used in the calculations.	Yes	Section 4.1, Appendix C.
3.4 Adverse Weather		
a. The adverse weather condition should be identified and the effects of adverse weather on mobilization time should be considered.	Yes	Table 2-1, 2-2, Section 2.3 – Assumption 9 Mobilization time – none
b. The speed and capacity reduction factors identified in Table 3-1, "Weather Capacity Factors," of NUREG/CR-7002 should be used or a basis should be provided for other values.	Yes	Table 2-2 – based on HCM 2010. The factors provided in Table 3-1 of NUREG/CR-7002 are from HCM 2000.
c. The study identifies assumptions for snow removal on streets and driveways, when applicable.	N/A	N/A

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
4.0 Development of Evacuation Times		
4.1 Trip Generation Time		
a. The process used to develop trip generation times should be identified.	Yes	Section 5
b. When telephone surveys are used, the scope of the survey, area of survey, number of participants, and statistical relevance should be provided.	Yes	Appendix F
c. Data obtained from telephone surveys should be summarized.	Yes	Appendix F
d. The trip generation time for each population group should be developed from site specific information.	Yes	Section 5, Appendix F
4.1.1 Permanent Residents and Transient Population		
a. Permanent residents are assumed to evacuate from their homes but are not assumed to be at home at all times. Trip generation time includes the assumption that a percentage of residents will need to return home prior to evacuating.	Yes	Section 5 discusses trip generation for households with and without returning commuters. Table 6-3 presents the percentage of households with returning commuters and the percentage of households either without returning commuters or with no commuters. Appendix F presents the percent households who will await the return of commuters.

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
b. Discussion should be provided on the time and method used to notify transients. The trip generation time discusses any difficulties notifying persons in hard to reach areas such as on lakes or in campgrounds.	Yes	Section 5.4.3
c. The trip generation time accounts for transients potentially returning to hotels prior to evacuating.	Yes	Section 5, Figure 5-1
d. Effect of public transportation resources used during special events where a large number of transients should be expected should be considered.	Yes	Section 3.7
e. The trip generation time for the transient population should be integrated and loaded onto the transportation network with the general public.	Yes	Section 5, Table 5-8
4.1.2 Transit Dependent Residents		
a. If available, existing plans and bus routes should be used in the ETE analysis. If new plans should be developed with the ETE, they have been agreed upon by the responsible authorities.	Yes	Section 8.4 – page 8-7 Figure 8-2, Table 8-9
b. Discussion should be included on the means of evacuating ambulatory and non-ambulatory residents.	Yes	Section 8.4, Section 8.5
c. The number, location, and availability of buses, and other resources needed to support the demand estimation should be provided.	Yes	Table 8-5
d. Logistical details, such as the time to obtain buses, brief drivers, and initiate the bus route should be provided.	Yes	Section 8.4, Figure 8-1

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
e. Discussion should identify the time estimated for transit dependent residents to prepare and travel to a bus pickup point, and describes the expected means of travel to the pickup point.	Yes	Section 8.4
f. The number of bus stops and time needed to load passengers should be discussed.	Yes	Section 8.4
g. A map of bus routes should be included.	Yes	Figure 8-2
h. The trip generation time for non-ambulatory persons includes the time to mobilize ambulances or special vehicles, time to drive to the home of residents, loading time, and time to drive out of the EPZ should be provided.	Yes	Section 8.4
i. Information should be provided to supports analysis of return trips, if necessary.	Yes	Sections 8.4, 8.5 Figure 8-1 Tables 8-10 through 8-11
4.1.3 Special Facilities		
a. Information on evacuation logistics and mobilization times should be provided.	Yes	Section 8.3, 8.6
b. Discussion should be provided on the inbound and outbound speeds.	Yes	Section 8.4, Section 8.6
c. The number of wheelchair and bed-bounds individuals should be provided, and the logistics of evacuating these residents should be discussed.	Yes	Section 8.3, Tables 8-4
d. Time for loading of residents should be provided	Yes	Section 8.4

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
e. Information should be provided that indicates whether the evacuation can be completed in a single trip or if additional trips should be needed.	Yes	Section 8.4, Table 8-4
f. If return trips should be needed, the destination of vehicles should be provided.	Yes	Section 8.4, 8.6
g. Discussion should be provided on whether special facility residents are expected to pass through the reception center prior to being evacuated to their final destination.	Yes	Section 8.4, 8.6
h. Supporting information should be provided to quantify the time elements for the return trips.	Yes	Section 8.4, 8.6
4.1.4 Schools		
a. Information on evacuation logistics and mobilization time should be provided.	Yes	Section 8.4
b. Discussion should be provided on the inbound and outbound speeds.	Yes	School bus routes are presented in Table 8-6 School bus speeds are presented in Tables 8-7 (good weather), and 8-8 (rain). Outbound speeds are defined as the minimum of the evacuation route speed and the State school bus speed limit.
c. Time for loading of students should be provided.	Yes	Tables 8-6 through 8-7, Discussion in Section 8.4
d. Information should be provided that indicates whether the evacuation can be completed in a single trip or if additional trips are needed.	Yes	Section 8.4 – page 8-6

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
e. If return trips are needed, the destination of school buses should be provided.	Yes	Section 8.4, Table 8-3
f. If used, reception centers should be identified. Discussion should be provided on whether students are expected to pass through the reception center prior to being evacuated to their final destination.	Yes	Table 8-3. Students are evacuated to School Reception Centers where they will be picked up by parents or guardians.
g. Supporting information should be provided to quantify the time elements for the return trips.	Yes	Section 8.4 – page 8-9
4.2 ETE Modeling		
a. General information about the model should be provided and demonstrates its use in ETE studies.	Yes	DYNEV II (Ver. 4.0.19.2). Section 1.3, Table 1-3, Appendix B, Appendix C.
b. If a traffic simulation model is not used to conduct the ETE calculation, sufficient detail should be provided to validate the analytical approach used. All criteria elements should have been met, as appropriate.	No	Not applicable as a traffic simulation model was used.
4.2.1 Traffic Simulation Model Input		
a. Traffic simulation model assumptions and a representative set of model inputs should be provided.	Yes	Appendices B and C describe the simulation model assumptions and algorithms Table J-2
b. A glossary of terms should be provided for the key performance measures and parameters used in the analysis.	Yes	Appendix A Tables C-1, C-2

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
4.2.2 Traffic Simulation Model Output		
a. A discussion regarding whether the traffic simulation model used must be in equilibration prior to calculating the ETE should be provided.	Yes	Appendix B
b. The minimum following model outputs should be provided to support review: 1. Total volume and percent by hour at each EPZ exit node. 2. Network wide average travel time. 3. Longest queue length for the 10 intersections with the highest traffic volume. 4. Total vehicles exiting the network. 5. A plot that provides both the mobilization curve and evacuation curve identifying the cumulative percentage of evacuees who have mobilized and exited the EPZ. 6. Average speed for each major evacuation route that exits the EPZ.	Yes	1. Table J-5. 2. Table J-3. 3. Table J-1. 4. Table J-3. 5. Figures J-1 through J-12 (one plot for each scenario considered). 6. Table J-4. Network wide average speed also provided in Table J-3.
c. Color coded roadway maps should be provided for various times (i.e., at 2, 4, 6 hrs., etc.) during a full EPZ evacuation scenario, identifying areas where long queues exist including level of service (LOS) "E" and LOS "F" conditions, if they occur.	Yes	Figures 7-3 through 7-7
4.3 Evacuation Time Estimates for the General Public		
a. The ETE should include the time to evacuate 90% and 100% of the total permanent resident and transient population	Yes	Tables 7-1, 7-2

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
b. The ETE for 100% of the general public should include all members of the general public. Any reductions or truncated data should be explained.	Yes	Section 5.4 – truncating survey data to eliminate statistical outliers Table 7-2 – 100th percentile ETE for general public
c. Tables should be provided for the 90 and 100 percent ETEs similar to Table 4-3, "ETEs for Staged Evacuation Keyhole," of NUREG/CR-7002.	Yes	Tables 7-3, 7-4
d. ETEs should be provided for the 100 percent evacuation of special facilities, transit dependent, and school populations.	Yes	Section 8.4, 8.6 – special facilities Tables 8-7 and 8-8 - schools Tables 8-10 and 8-11 – transit-dependent
5.0 Other Considerations		
5.1 Development of Traffic Control Plans		
a. Information that responsible authorities have approved the traffic control plan used in the analysis should be provided.	Yes	Section 9, Appendix G
b. A discussion of adjustments or additions to the traffic control plan that affect the ETE should be provided.	Yes	Appendix G
5.2 Enhancements in Evacuation Time		
a. The results of assessments for improvement of evacuation time should be provided.	Yes	Section 13, Appendix M
b. A statement or discussion regarding presentation of enhancements to local authorities should be provided.	Yes	Results of the ETE study were formally presented to local authorities at the final project meeting. Recommended enhancements were discussed.

NRC Review Criteria	Criterion Addressed in ETE Analysis	Comments
5.3 State and Local Review		
a. A list of agencies contacted and the extent of interaction with these agencies should be discussed.	Yes	Table 1-1
b. Information should be provided on any unresolved issues that may affect the ETE.	Yes	No issues were determined after review with the offsite agencies
5.4 Reviews and Updates		
a. A discussion of when an updated ETE analysis is required to be performed and submitted to the NRC.	Yes	Appendix M, Section M.3
5.5 Reception Centers and Congregate Care Center		
a. A map of congregate care centers and reception centers should be provided.	Yes	Figure 10-1 – reception centers Figure 10-2 – host schools
b. If return trips are required, assumptions used to estimate return times for buses should be provided.	Yes	Sections 8.4 and 8.5 discuss a multi-wave evacuation procedure. Figure 8-1
c. It should be clearly stated if it is assumed that passengers are left at the reception center and are taken by separate buses to the congregate care center.	Yes	Section 2.3 – Assumption 7h Section 10

Technical Reviewer ________________________________ Date __________________________

Supervisory Review ________________________________ Date __________________________