NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
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FROM: CATHY IZYK - EMERGENCY PLANNING DEPARTMENT

SUBJECT: EMERGENCY PLAN AND IMPLEMENTING PROCEDURES

Enclosed are revisions to your assigned copy of the JAFNPP Emergency Plan and Implementing Procedures. Please remove and **DISCARD** the old pages. Insert the attached, initial and date this routing sheet and return the completed routing sheet to ***Cathy Izyk in the Emergency Planning Department within 15 days.*** If this transmittal is not returned within 15 days, your name will be removed from the controlled list.

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APPENDIX K	REPLACE ALL	5	
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	N/A		

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EMERGENCY PLAN / VOLUME 1
UPDATE LIST

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Date of Issue: March 6, 2000

Procedure Number	Procedure Title	Revision Number	Date of Last Review
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NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

EMERGENCY PLAN VOLUME 1

PROCEDURE NO.: APPENDIX K

TITLE: EVACUATION TRAVEL TIME ESTIMATES AND POPULATION DISTRIBUTION FOR THE JAF/NINE MILE POINT EMERGENCY PLANNING ZONE*

PORC REVIEW: Meeting No. N/A Date N/A

APPROVED BY:
Emergency Planning Coordinator

EFFECTIVE DATE: March 6, 2000

PERIODIC REVIEW DUE DATE: March 2001

Rev. No.: 5

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I. INTRODUCTION

In 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; hereafter referred to as NUREG-0654), the U.S. Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA) called upon power plant licensees as well as state and local agencies to prepare evacuation time estimates for the population within a 10-mile radius plume exposure pathway referred to as the Emergency Planning Zone (EPZ). The approach for preparing the evacuation time estimates is documented in Appendix 4 of NUREG-0654.

This report is prepared in response to Appendix 4 and presents estimates of the evacuation travel time for the 10-mile EPZ surrounding the James A. FitzPatrick/Nine Mile Point site in Oswego County, New York. This report is an update of an evacuation time estimate report prepared in May 1984 for the same nuclear power facilities. Since the May 1984 evacuation travel time estimates were prepared, four significant factors affecting evacuation time have changed, including:

1. Availability of 1990 Census Data - The earlier travel time estimates were primarily based on two sources of demographic data -- the 1980 Census projections of 1984 population, and Oswego County Planning Department projections. More accurate and detailed 1990 Census data is now available to update 1991 population data, however, the 1990 Census does not contain employment statistics and estimates of vehicles per household at this time. As described later in this report, other sources of data were used to update employment information.

2. On-Site Construction - Construction at the Nine Mile Point Unit 2 Power Plant has been completed. Up to 6,000 construction workers were employed during the mid-1980's. This sizable segment of employment is no longer considered during evacuation scenarios; however, some on-site personnel are included in the evacuation estimates as determined by the New York Power Authority (NYPA) and Niagara Mohawk Power Corporation (NMPC).

3. Changes to the Oswego County Radiological Emergency Preparedness Plan (REPP) - Reception center assignments have been modified. All special facilities are now evacuated to facilities in the greater Syracuse area. Different bus companies are now participating in the plan, and some bus routes have been modified. These revisions are considered in this update of the evacuation travel time estimates.

4. Harborfest and Classic Weekend evacuation scenarios are included in this report. The "worst case" scenario to be evacuated during Harborfest would occur during the fireworks display which is estimated to be the peak period of attendance. Peak attendance during the Classic Weekend is anticipated to occur during a Sunday afternoon.

The report dated February, 1992 has been revised to reflect new 1991 permanent resident population estimates in the EPZ. The original estimates contained in the February, 1992 report were in error because the computerized map system used to obtain information from the 1990 Census was digitized incorrectly. As such, revisions to the February, 1992 report are noted by a revision date in the lower right hand corner of the page and a revision bar in the right hand margin indicating the change.

The evacuation travel time estimates included herein are based on the emergency response implementation procedures in the REPP. The population data, special facility information, evacuation routes, vehicle inventories, and other parameters necessary to determine evacuation time are consistent with the most recent version (April, 1991) of the plan. As such, this report is an integral component of the Oswego County REPP, and provides valuable information to be used by decision makers in the event of an incident at the James A. FitzPatrick/Nine Mile Point site.

A. Site Location

The James A. FitzPatrick/Nine Mile Point nuclear power site is located on the shore of Lake Ontario in the Town of Scriba, Oswego County, New York. The site consists of the James A. FitzPatrick Nuclear Power Plant (JAFNPP) and the Nine Mile Point Nuclear Stations (NMPNS), Units 1 and 2. The JAFNPP is located adjacent to and east of the NMPNS. The site is located approximately 7 miles northeast of the City of Oswego, 36 miles northwest of Syracuse, 55 miles east of Rochester, and 135 miles east of Buffalo. Throughout this report, the acronym JAF/NMP refers to the site of all three nuclear facilities, not to a particular power plant. The location of JAF/NMP is shown in Figure 1.

B. General Assumptions and Methodology

The general assumptions and methodologies used to prepare these evacuation travel time estimates are detailed in the various sections of this report or in its appendices. For example, population information is summarized in Section II. Roadway capacity information and vehicle availability are summarized in Section III. The actual evacuation travel times are presented in two formats and summarized in two different report locations:

1. By Sector, for the longest and shortest evacuation time scenarios, in Section IV.

2. By Emergency Response Planning Area (ERPA), for eight different evacuation scenarios, in Appendix G. These scenarios are for a full EPZ evacuation and include:

- School-in-Session
- School-not-in-Session
- Summer/Holiday Weekend
- Winter/Holiday Weekend
- Evening
- Nighttime
- Classic Weekend
- Harborfest

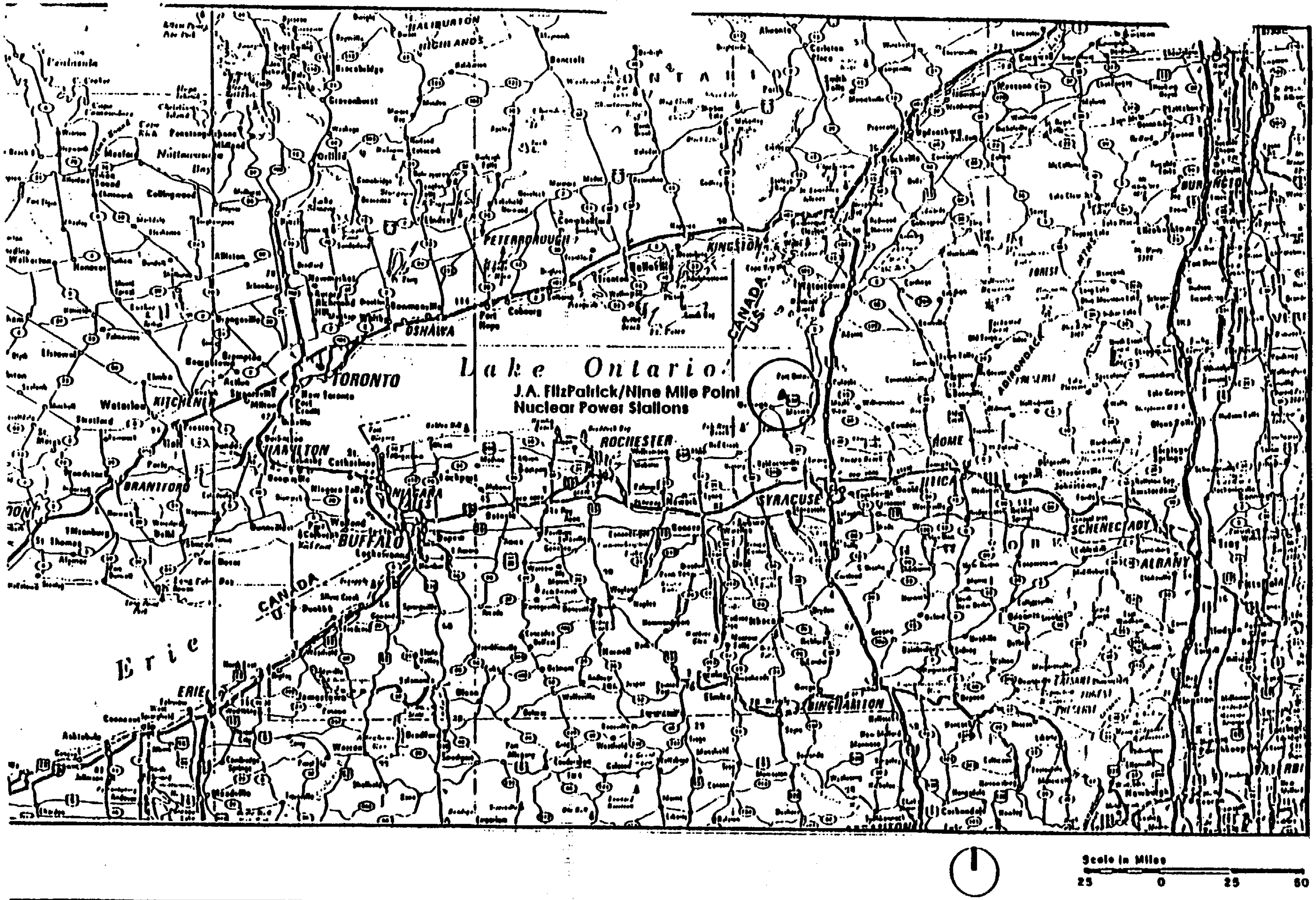

Fig. 1 Location Map

Parsons Brinckerhoff

I-3

J.A. FitzPatrick/
Nine Mile Point
Nuclear Power Stations

II. DEMAND ESTIMATION

This section of the report discusses the demographic analysis performed for the JAF/NMP EPZ. The basic objective of the analysis is to determine the number, location, and temporal characteristics of the population to be evacuated. Three population categories have been considered: permanent residents, transients, and persons in special facilities, as specified in NUREG-0654. The population categories have been analyzed for various geographic areas as discussed below.

A. Emergency Planning Zone, Sectors, Segments, and Subareas

Emergency Planning Zone

As shown in Figure 2, the plume exposure pathway EPZ is defined by an irregularly shaped boundary located approximately 10 miles or further from the JAF/NMP site. The perimeter of the EPZ follows physical and/or political boundaries as much as practical to facilitate recognition of the boundary by the public. The EPZ encompasses, where reasonable, entire political subdivisions to minimize the segregation that would occur if a true 10-mile radius boundary were used to define the EPZ. Figure 2 shows both the actual 10-mile radius EPZ and the approximate 10-mile radius EPZ (included in the Oswego County REPP and used in calculating the evacuation travel time estimates), superimposed on a reduced composite New York State Department of Transportation planimetric map of the region. The map shows major political boundaries, transportation networks, and topographical features.

Sectors

The EPZ was subdivided into areas with approximate two-, five-, and 10- mile radii from the JAP/NMP site, as specified in Appendix 4 of NUREG-0654. The two-, five, and 10-mile radii areas were further subdivided into approximate 90° quadrants with north-south and east-west axes. The areas defined by both the radii and quadrants are called Sectors.

Sectors are comprised of smaller units called Emergency Response Planning Areas (ERPAs), which also generally follow political and/or physical boundaries. An ERPA is the fundamental planning area identified in the Oswego County REPP. Each ERPA, as a unit, would follow a specific protective response action in the event of an incident at the JAF/NMP site. ERPAs, in turn, are further subdivided into traffic zones, which represent population clusters in particular geographic areas which follow specified evacuation routes leaving the EPZ. (For a more detailed discussion of the ERPAs and traffic zones, see Section III.A and Appendices A and D of this report.)

The Sectors, therefore, approximate the divisions specified in NUREG-0654 without dividing densely populated political subdivisions. Each Sector is comprised of one or more ERPAs. The Sectors are defined as follows:

Sectors A, B, C, and D - Four approximately 90° quadrants comprised of ERPAs generally within a two-mile radius.

Sectors E, F, G, and H - Four approximately 90° quadrants comprised of ERPAs generally within a five-mile radius.

Sectors I, J, K, and L - Four approximately 90° quadrants comprised of ERPAs within the 10-mile EPZ.

Sector M - a 360° Sector encompassing the entire 10-mile EPZ.

The Sectors and their component ERPAs are listed in Table 1 and illustrated in Figures 3 through 15. Descriptions of the ERPA boundaries are presented in Appendix A of this report.

Segments and Subareas

Appendix 4 of NUREG-0654 specifies that all population and evacuation time estimate analyses be presented by Sector, as described above. However, as specified in Section J.10.b of NUREG-0654, population estimates have also been prepared for a different geographic breakdown of the area -- comprised of Segments and Subareas. The Segments are radial areas of 22-1/2° each, with the center line of the northern Segment being true north from the following coordinates located adjacent to the Nine Mile Point Unit 2 reactor building:

- o Latitude: N 43° 31' 17.497 Sec
- o Longitude: W 76° 24' 26.735 Sec

The 16 radial Segments intersect with three concentric rings lying from 0 to 2 miles, 2 to 5 miles, and 5 to 10 miles from the Unit 2 reactor building to form 48 Subareas within the 10-mile radius area. It is noted that the Segment and Subarea boundaries are not irregularly shaped because they follow polar coordinate specifications.

The plume exposure pathway EPZ is irregular and extends generally further than 10 miles from the JAF/NMP site. The outermost Subarea boundaries are defined by a true 10-mile radius. Therefore, a portion of land exists between the outermost Subareas and the plume EPZ. The population in this area is thus included in Sector estimates, but not included in Subarea estimates.

The following is a description of the methodology and sources used to derive permanent resident, transient, and special facilities population estimates for the various geographic areas discussed above. Estimates of three population categories are presented in this report as baseline estimates in order to provide the largest possible figure for each category. The estimates, therefore, are not additive for determination of the total population at any given point in time because the data may represent various times of day for each of the subgroups. For example, the largest estimate for the special facilities population represents a weekday when school is in session. The permanent resident population, on the other hand, is at its largest at nighttime when most people are at home and businesses and schools are closed. However, to calculate evacuation travel times, the baseline estimates presented herein were adjusted for each population category to coincide with the specific, time-based scenario under study. (The scenarios are discussed further in Section IV.A of this report.)

B. Permanent Resident Population

Permanent residents, as defined in Appendix 4 of NUREG-0654, are those persons who reside in the EPZ, including schoolchildren, but excluding persons residing in institutions identified as special facilities in the Oswego County REPP and Section II.D of this report. This definition of permanent residents differs from the U.S. Department of Commerce - Bureau of the Census, which includes persons living in institutions as part of the permanent resident population. Therefore, two separate estimates of the permanent resident population (including and excluding the population living in institutions) are provided in this report.

The 1990 Census data was used to determine the 1991 permanent resident population in the EPZ. Census information is now available in block-level detail for Oswego County. The Census block and tract boundaries were superimposed on a map delineating the traffic zones and ERPA boundaries. For the vast majority of cases, individual Census blocks are entirely located within a particular traffic zone. Where blocks are located in more than one traffic zone, the proportion in each zone was determined by the National Planning Data Corporation (NPDC). This approach results in an adequate determination of population location.

The population data presented in this report is for the year 1991. Growth factors were applied to the 1990 Census population data to estimate the current permanent resident population in the EPZ. These growth factors were calculated by the NPDC by estimating the 1990 - 1991 rates of change in household counts in the EPZ on a Census tract level. A 1991 estimate of household size for each tract was then applied to the estimated number of households to determine the 1991 population in each tract. The NPDC household size variable accounted for factors such as marriage patterns, divorces, increased longevity of the elderly, housing availability, and birth rates. Growth factors were calculated for the portion of Oswego County in the EPZ by dividing 1991 Census tract population by 1990 Census tract population. These growth factors were then applied to 1990 population data (for appropriate Census blocks within a given tract) to estimate 1991 permanent resident population on a block level basis.

In all cases, population estimates were developed at the traffic zone level by adding data for individual Census blocks. Traffic zone estimates were then added to provide ERPA estimates; similarly, ERPA estimates were summed to produce Sector estimates of population. The estimates for the 1991 permanent resident population are summarized by Sector in Table 2. Appendix A (Table A-1) presents 1991 permanent resident population summarized by ERPA.

Estimates of the permanent resident population with and without automobiles have also been prepared, as specified in NUREG-0654. The breakdown of the permanent resident population into persons with and without automobiles is required as input to the evacuation travel time estimate analysis, and was calculated in the following manner.

The 1990 Census provides block-group level data on the average household size, and on the number of households with no automobiles, and those households with one or more automobiles. The total number of households in each block-group was determined by dividing the total population by the appropriate household size factor. The resulting number of households in each block-group was then subdivided into households with automobiles and households without automobiles. Household size factors were then re-applied to calculate the population with and without automobiles.

The 1990 Census data on household size was thus used as the auto occupancy factor, and varied from Census block-group to Census block-group. By dividing the number of persons with an automobile by the auto occupancy factor, the number of automobiles used by people evacuating from their homes was determined. Implicit in this calculation is the assumption that families owning automobiles would use only one vehicle during an evacuation from their homes. During an evacuation under a weekday daytime scenario when parents may be at work, those families owning multiple vehicles were assumed to use them when evacuation trips originated from different locations (such as work or home).

It has been assumed that 50% of the permanent resident population who do not have access to an automobile will be evacuated by friends or neighbors in their automobile. This concept is known as ridesharing. Appendix H documents actual evacuation scenarios throughout North America within the past 12 years wherein a great majority of transit dependent residents were evacuated by ridesharing.

The estimated permanent resident population with and without automobiles, and the number of automobiles are summarized by Sector in Table 2. The transit dependent population -- those persons without automobiles or those without access to an automobile -- are anticipated to be evacuated by bus and other emergency vehicles as described later in this report (see Section III.C and Section III.D).

C. Transient Population

The transient population includes employees not residing within the EPZ, people staying at hotels and motels in the EPZ, and visitors to parks and recreational areas within the EPZ boundary. The estimates of transient population are summarized by Sector in Table 3.

Each of the transient population components were estimated in a different manner. Parks and recreational areas such as beaches and campgrounds were inventoried by the Oswego County Emergency Management Office. The owners and/or operators of these facilities were contacted by the EMO. Population estimates for these sites were obtained through this inventory process. Population estimates for hotels and motels were assumed to include two persons for each hotel or motel room located within the EPZ. The 1991 Oswego County Accommodations Guide lists 16 establishments within the EPZ which includes a total of 337 rooms. This translates into 674 possible transients for hotel or motel accommodations at any given time within the EPZ.

Because employment data is not yet available from the 1990 Census, estimates of employment were derived using past and current New York State Department of Labor employment estimates. County-wide average employment estimates were obtained by industry type for each year between 1980 and 1990. March 1991 data, which is the most current available information from the Department of Labor, was also obtained. These estimates indicate that the average county-wide employment has remained basically the same since 1984. (An actual decrease of 162 employees was estimated.) Further evaluation shows that the construction industry has lost approximately 5000 jobs between 1984 and 1991 while the government, retail, services, and transportation and public utility industries have increased employment by roughly 5,000 jobs.

Many of the construction jobs have been lost as a result of the completion of the Nine Mile Point Unit 2 complex located within the EPZ. Assuming that construction of the NMP complex was completed in 1984, average employment throughout Oswego County has actually increased roughly 2.4% a year between 1984 and 1991.

To obtain 1991 employment estimates within the EPZ, 1984 employment numbers were increased at a rate of 2.4% a year from 1984. This approach results in an estimated employment population of 11,777 in the EPZ. This number was then compared to estimates obtained from the New York State Department of Labor which encompass areas including all of the City of Oswego, and Townships of Oswego, Mexico, Volney, Minetto, Scriba, and parts of New Haven and Palermo Townships. This area and the 10-mile EPZ overlap in many areas and therefore represents a reasonable comparison of estimated 1991 employment population. It was found that the Department of Labor estimates were slightly higher than the employment estimate for the 10-mile EPZ. This can be expected as the Townships of Oswego and Volney are more densely populated and built-up than those areas in the eastern areas of the EPZ. Table A-1 in Appendix A presents 1991 transient population summarized by ERPA.

It was assumed for the purpose of the travel time estimate analysis that 100 percent of the employees working in the EPZ commute by automobile. This conservative assumption placed the maximum number of vehicles on the evacuation routes when determining the evacuation travel time estimates. An assumed automobile occupancy factor of 1.1 was applied to the 1991 employment estimates to derive the number of vehicles used by employees to evacuate.

D. Special Facilities Population

Special facility residents include persons in hospitals and other health care facilities, nursing homes, schools (including public and private, day care, nursery, elementary, middle, and high), Universities, day camps, and correctional facilities. Special facilities located in the EPZ and pertinent data about them are listed in Appendix B of this report. Residents of the universities and nursing homes constitute the institutional population. As shown on Table 6, they were subtracted from the permanent resident population to determine the permanent resident population excluding institutions, as required in NUREG-0654 and described earlier.

All population and vehicle data for special facilities were obtained through telephone and/or letter contact with the individual facilities. The Oswego County Emergency Management Office contacted each of these facilities to obtain up-to-date information used in this report. Any special transportation, such as buses, wheelchair equipped vehicles, and ambulances, required to evacuate the special facilities' populations was considered in calculating the evacuation travel time estimates. Special facility populations for Sectors are presented in Table 4.

E. Population by Segment and Subarea

Population estimates by 22-1/2° Segments and Subareas are presented and listed for the permanent resident population (including and excluding institutional population, with and without automobiles), for the transient population, and for the special facilities population in Tables 5 through 10 and on Figures 16 through 21.

The sources and methodology used to determine the populations by Segment and Subarea are the same as those used in calculating Sector estimates. However, data was aggregated according to the specified polar coordinate system rather than by ERPA. The estimates made for Subareas were summed to provide estimates for the 22-1/2° Segments out to the actual 10-mile radius boundary. As discussed earlier in Section II.A, people located in the strip of land which exists between the outermost Subareas and the plume exposure pathway EPZ boundary will be included in Sector population totals, but will not be included in Segment population totals. Thus, totals by Segment are generally less than or equal to totals by Sector because of the population residing in the area between the actual 10-mile radius and the approximate 10-mile EPZ boundary.

F. Special Event Population

Oswego County hosts two major events each year within the 10-mile EPZ. The first event, Harborfest, occurs over a 4-day period in July, while the second event, Classic Weekend, occurs during the Labor Day Weekend in September.

1. Harborfest attracts considerable attendance from residents in and beyond Oswego County. In 1990, the Greater Oswego Chamber of Commerce conducted an economic impact study of Harborfest on the Community of Oswego and estimated total attendance at 92,900 over the 4-day event. The largest concentration of attendees occurs during Saturday night for the fireworks display in the Harbor area off Wright's Landing. Consequently, this scenario was simulated for evacuation purposes to represent a "worst case" scenario.

It is estimated that approximately 55,370 people attend the Fireworks display, exclusive of the local residents, and therefore require evacuation from the area. This figure was derived by estimating three components of the fireworks attendance - land attendance, bused attendance, and boat attendance. Land attendance was estimated as follows:

- It was assumed that 59% of the total Harborfest attendance occurs during Saturday. This figure was based on traffic counts conducted along Route 104 in Oswego by the City of Oswego Department of Public Works.

- The aforementioned survey that was conducted by the Greater Oswego Chamber of Commerce showed that 69% of the people who attended Harborfest attended the fireworks display. Hence, the population arriving by private vehicle can be estimated to be 37,820.

Harborfest officials have estimated that 3,100 vehicles use the parking areas located at the Jamesway, Ames, and Oswego Plazas and SUNY Campus. These people are then bused to the fireworks. Assuming three passengers per vehicle, this accounts for 9,300 people. In addition, attendees at the Oswego Speedway will begin to be bused to the fireworks after the last race is over at 7:30. It is estimated that 25% of the raceway attendees would attend the fireworks, or approximately 2,250 people. Therefore, the total bused attendance is estimated at 11,550.

The Coast Guard has estimated that up to 1,200 boats anchor in the harbor area to attend the fireworks. They have also estimated that five passengers (on average) are on each boat which results in a boat attendance of 6,000 passengers. Adding the private vehicle, bused, and boat attendance components results in a fireworks attendance of approximately 55,370, in addition to the local residents.

2. The Classic Weekend is held at the Oswego Speedway over a 3-day period during Labor Day weekend. Based on information provided by Classic Weekend representatives, it has been assumed that the peak period for evacuation purposes will occur on a Sunday afternoon. This period represents the peak activity for the event.

During this time period, representatives of the event have estimated the following breakdown of people at the speedway:

- 9,000 attendees in the grandstand (3 to 4 arrive per car)
- 500 people in the pit area
- 40 cars per class (with 5 to 6 people/crew)
- 30 tow trucks with 2-people per truck
- 10 to 12 firemen
- 20 to 22 EMT's
- 5 Policemen
- Approximately 40 in-house people (i.e. – vendors and concession people)

A majority of the attendees arrive from outside of the local area. This is evident by the number of recreational vehicles which stay overnight adjacent to the speedway. It has been estimated by Classic Weekend representatives that approximately 400 vehicles or 2,000 attendees stay overnight adjacent to the speedway. Ultimately, this results in an approximate on-site population of 11,879 to be evacuated during an emergency.

TABLE 1

RELATIONSHIP BETWEEN SECTORS AND EMERGENCY RESPONSE PLANNING AREAS

Figure Number	Sector*	Approximate Radius	Quadrant	Emergency Response Planning Areas (ERPAs)
3	A	2 mile	NE	1, 27
4	B	2 mile	SE	1, 2
5	C	2 mile	SW	1,3,26
6	D	2 mile	NW	1,26
7	E	5 mile	NE	1,27
8	F	5 mile	SE	1,2,4,5,9,10,27
9	G	5 mile	SW	1,3,5,6,10,11,26
10	H	5 mile	NW	1,26
11	I	10 mile	NE	1,27,29
12	J	10 mile	SE	1,2,4,5,7-10,14-20,27,29
13	K	10 mile	SW	1,3,5,6,10-13,19-25,26,28
14	L	10 mile	NW	1,26,28
15	M	10 mile	ALL	1-29

* The land portions of each Sector were included in the evacuation travel time estimate analysis. ERPAs 23-25 are located on the Oswego River; ERPAs 26-29 are located on Lake Ontario. Clearing of ERPAs 23-29 is discussed in Section III.E of this report.

TABLE 2

1991 PERMANENT RESIDENT POPULATION ESTIMATES

BY 90° SECTOR

Sector	1991 Permanent Resident Population	1991 Permanent Resident Population (Excluding Institutions)	1991 Permanent Resident Population With Autos (Excluding Institutions)	1991 Permanent Resident Population Without Autos (Excluding Institutions)	Number of Autos
2 Mile Radius					
A	148	148	145	3	89
B	607	607	596	11	356
C	449	449	435	14	262
D	148	148	145	3	89
5 Mile Radius					
E	148	148	145	3	89
F	3,676	3,667	3,579	88	2,150
G	4,923	4,923	4,788	135	2,954
H	148	148	145	3	89
10 Mile Radius					
I	148	148	145	3	89
J	12,468	12,459	12,094	365	7,193
K	34,922	30,430	27,467	2,963	18,852
L	148	148	145	3	89
360°EPZ					
M	42,597	38,096	34,877	3,219	23,199

TABLE 3

1991 TRANSIENT POPULATION ESTIMATES

BY 90^{o} SECTOR

Sector	1991 Transient Population
2 Mile Radius	
A	1,558
B	1,618
C	1,558
D	1,558
5 Mile Radius	
E	1,558
F	3,815
G	3,935
H	1,558
10 Mile Radius	
I	1,558
J	8,511
K	14,104
L	1,558
360^{o} EPZ	
M	19,005

TABLE 4

1991 SPECIAL FACILITIES POPULATION ESTIMATES

BY 90° SECTOR

Sector	1991 Special Facility Population
2 Mile Radius	
A	0
B	0
C	0
D	0
5 Mile Radius	
E	0
F	9
G	0
H	0
10 Mile Radius	
I	0
J	4,390
K	11,196
L	0
360° EPZ	
M	15,586

TABLE 5
1991 PERMANENT RESIDENT POPULATION ESTIMATES BY SEGMENT

	RING, MILES				
	0-2	2-5	0-5	5-10	0-10
Segment	Subarea Population	Subarea Population	Cumulative Subarea Population	Subarea Population	Cumulative Segment Population
N	0	0	0	0	0
NNE	0	0	0	0	0
NE	0	0	0	0	0
ENE	56	0	56	0	56
E	84	127	211	799	1,010
ESE	89	560	649	2,961	3,610
SE	75	450	525	1,051	1,576
SSE	34	430	464	978	1,442
S	136	413	549	1,235	1,784
SSW	61	906	967	3,090	4,057
SW	102	930	1,032	20,202	21,234
WSW	18	192	210	5,848	6,058
W	0	0	0	0	0
WNW	0	0	0	0	0
NW	0	0	0	0	0
NNW	0	0	0	0	0
Ring Population	655	4,008	4,663	36,164	40,827

(Also see Figure 16)

TABLE 6
1991 PERMANENT RESIDENT POPULATION ESTIMATES
(EXCLUDING INSTITUTIONAL POPULATION)
BY SEGMENT

	RING, MILES				
	0-2	2-5	0-5	5-10	0-10
Segment	Subarea Population	Subarea Population	Cumulative Subarea Population	Subarea Population	Cumulative Segment Population
N	0	0	0	0	0
NNE	0	0	0	0	0
NE	0	0	0	0	0
ENE	56	0	56	0	56
E	84	127	211	799	1,010
ESE	89	560	649	2,961	3,610
SE	75	441	516	1,051	1,567
SSE	34	430	464	978	1,442
S	136	413	549	1,235	1,784
SSW	61	906	967	3,090	4,057
SW	102	930	1,032	19,710	20,742
WSW	18	192	210	1,848	2,058
W	0	0	0	0	0
WNW	0	0	0	0	0
NW	0	0	0	0	0
NNW	0	0	0	0	0
Ring Population	655	3,999	4,654	31,672	36,326

(Also see Figure 17)

TABLE 7
1991 PERMANENT RESIDENT POPULATION ESTIMATES (EXCLUDING INSTITUTIONAL POPULATION) WITH AUTOS BY SEGMENT

	RING, MILES				
	0-2	2-5	0-5	5-10	0-10
Segment	Subarea Population	Subarea Population	Cumulative Subarea Population	Subarea Population	Cumulative Segment Population
N	0	0	0	0	0
NNE	0	0	0	0	0
NE	0	0	0	0	0
ENE	56	0	56	0	56
E	84	126	210	779	989
ESE	89	528	617	2,857	3,474
SE	75	426	501	959	1,460
SSE	34	422	456	943	1,399
S	136	401	537	1,201	1,738
SSW	58	892	950	2,872	3,822
SW	98	910	1,008	17,143	18,151
WSW	18	192	210	1,848	2,058
W	0	0	0	0	0
WNW	0	0	0	0	0
NW	0	0	0	0	0
NNW	0	0	0	0	0
Ring Population	648	3,897	4,545	28,602	33,147

(Also see Figure 18)

TABLE 8
1991 PERMANENT RESIDENT POPULATION ESTIMATES (EXCLUDING INSTITUTIONAL POPULATION) WITHOUT AUTOS BY SEGMENT

	RING, MILES				
	0-2	2-5	0-5	5-10	0-10
Segment	Subarea Population	Subarea Population	Cumulative Subarea Population	Subarea Population	Cumulative Segment Population
N	0	0	0	0	0
NNE	0	0	0	0	0
NE	0	0	0	0	0
ENE	0	0	0	0	0
E	0	1	1	20	21
ESE	0	32	32	104	136
SE	0	15	15	92	107
SSE	0	8	8	35	43
S	0	12	12	34	46
SSW	3	14	17	218	235
SW	4	20	24	2,567	2,591
WSW	0	0	0	0	0
W	0	0	0	0	0
WNW	0	0	0	0	0
NW	0	0	0	0	0
NNW	0	0	0	0	0
Ring Population	7	102	109	3,070	3,179

(Also see Figure 19)

TABLE 9
1991 TRANSIENT POPULATION ESTIMATES
BY SEGMENT

	RING, MILES				
	0-2	2-5	0-5	5-10	0-10
Segment	Subarea Population	Subarea Population	Cumulative Subarea Population	Subarea Population	Cumulative Segment Population
N	0	0	0	0	0
NNE	0	0	0	0	0
NE	0	0	0	0	0
ENE	0	0	0	0	0
E	254	12	266	3,092	3,358
ESE	254	227	481	978	1,459
SE	254	286	540	229	769
SSE	255	44	299	109	408
S	255	806	1,061	1,024	2,085
SSW	143	330	473	986	1,459
SW	143	368	511	8,956	9,467
WSW	0	0	0	0	0
W	0	0	0	0	0
WNW	0	0	0	0	0
NW	0	0	0	0	0
NNW	0	0	0	0	0
Ring Population	1,558	2,073	3,631	15,374	19,005

(Also see Figure 20)

TABLE 10
1991 SPECIAL FACILITIES POPULATION ESTIMATES BY SEGMENT

	RING, MILES				
	0-2	2-5	0-5	5-10	0-10
Segment	Subarea Population	Subarea Population	Cumulative Subarea Population	Subarea Population	Cumulative Segment Population
N	0	0	0	0	0
NNE	0	0	0	0	0
NE	0	0	0	0	0
ENE	0	0	0	0	0
E	0	0	0	360	360
ESE	0	0	0	2,081	2,081
SE	0	9	9	1,940	1,949
SSE	0	0	0	0	0
S	0	0	0	0	0
SSW	0	0	0	576	576
SW	0	0	0	10,620	10,620
WSW	0	0	0	0	0
W	0	0	0	0	0
WNW	0	0	0	0	0
NW	0	0	0	0	0
NNW	0	0	0	0	0
Ring Population	0	9	9	15,577	15,586

(Also see Figure 21)

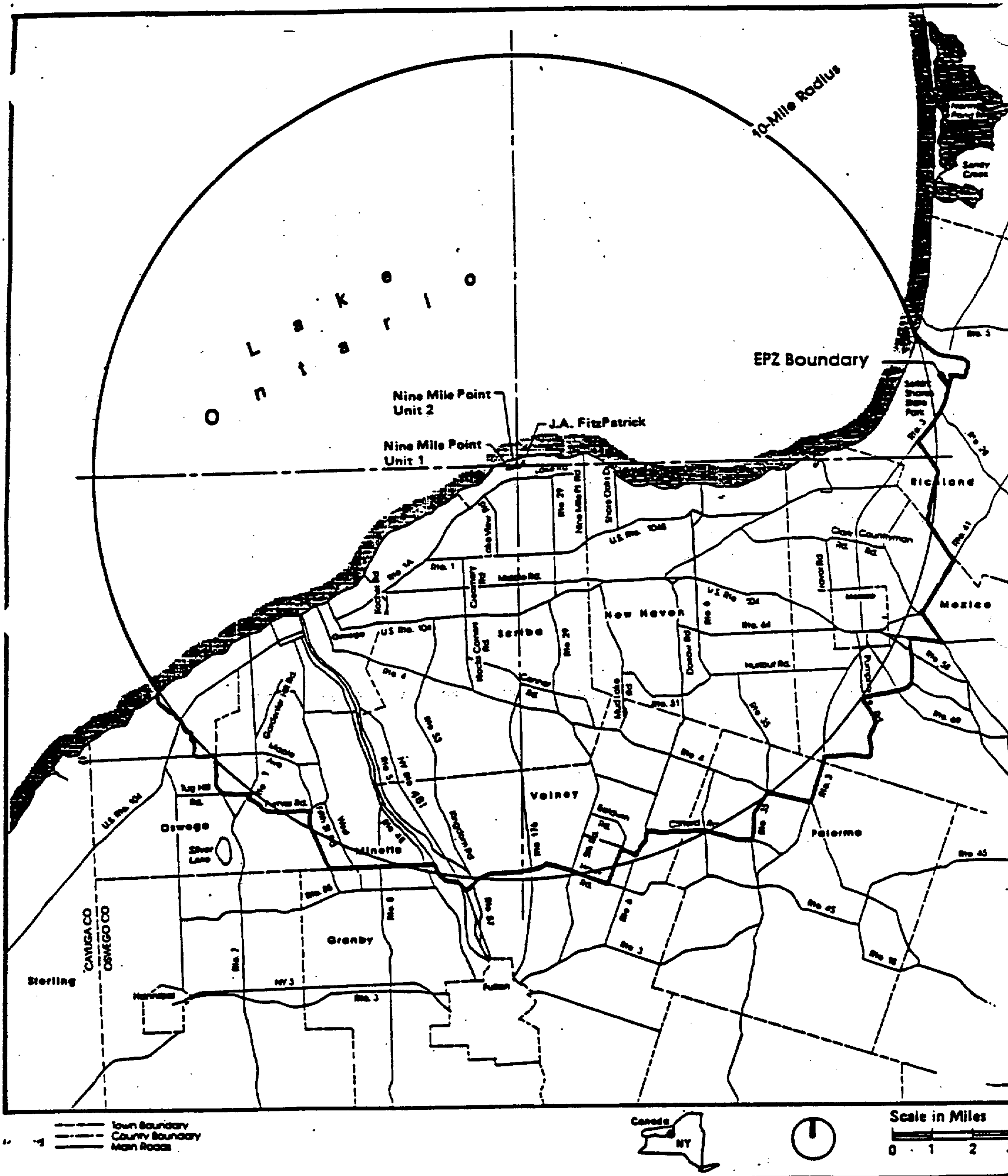

Fig. 2 10-Mile Radius and Actual EPZ Boundaries

II - 18

Parsons Brinckerhoff

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

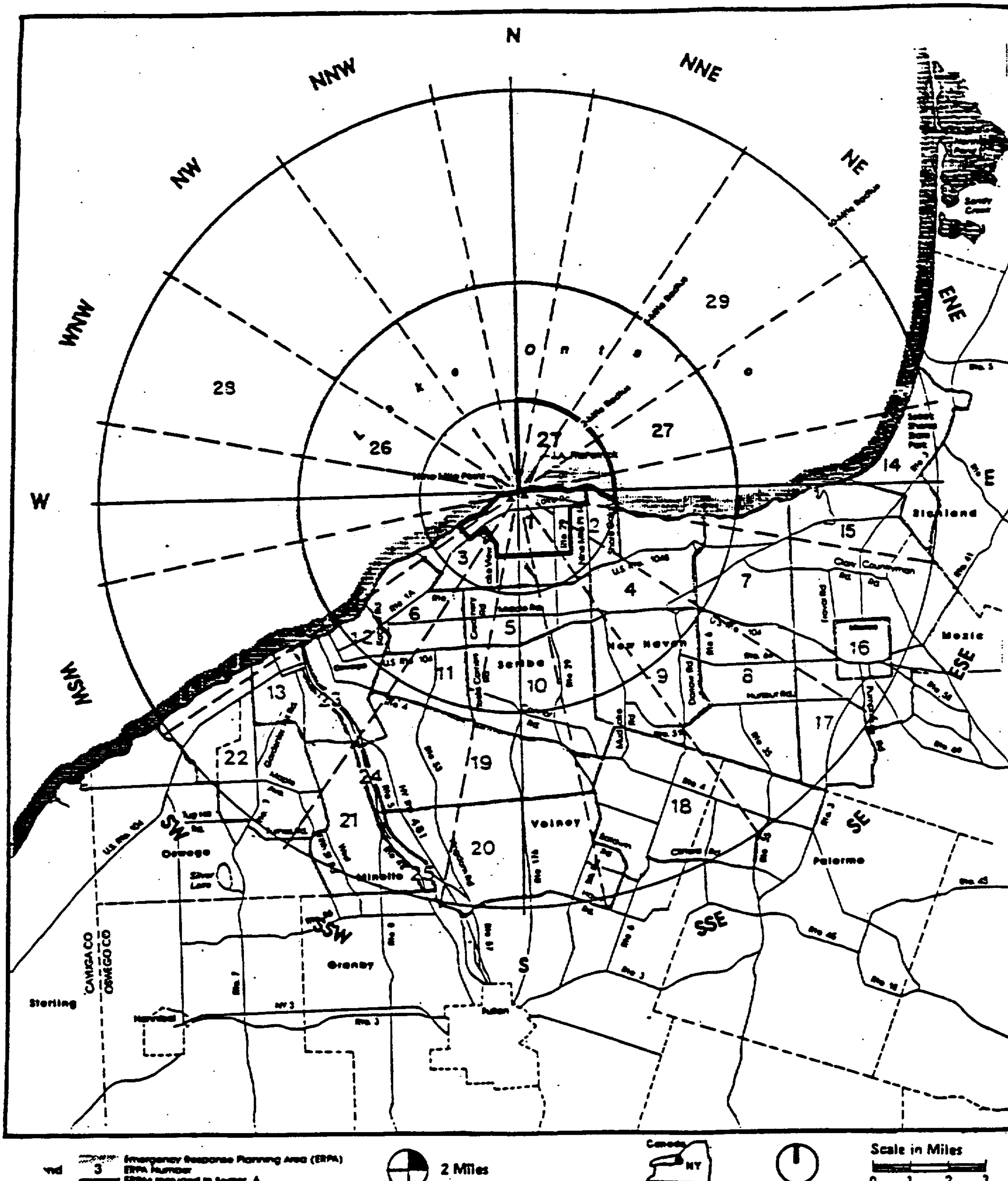

Fig. 3 Sector A—90 Degrees NE 2-Mile Radius

II - 19

Parsons Brinckerhoff

J.A. FitzPatrick, Nine Mile Point Nuclear Power Stations

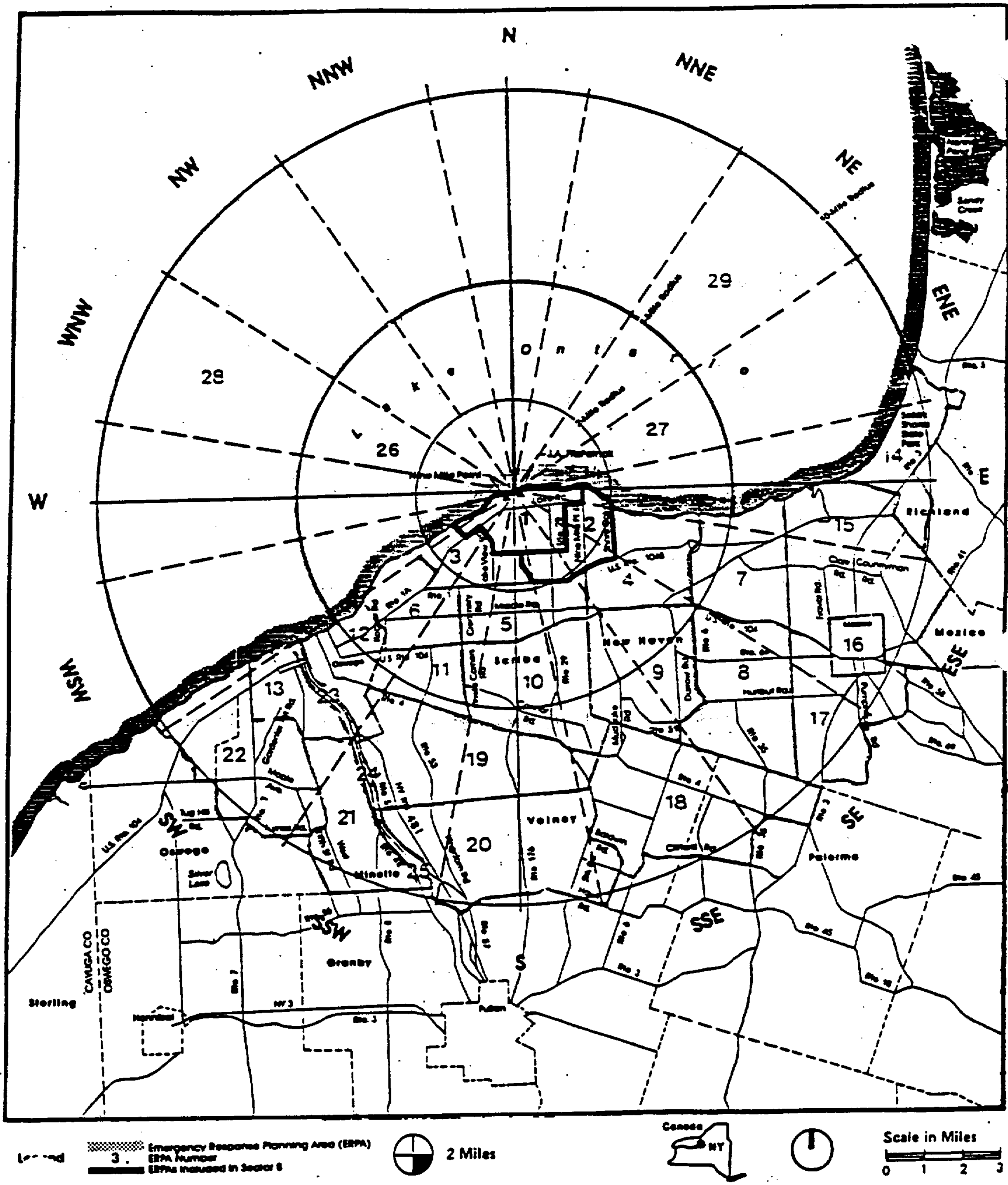

Fig. 4 Sector B—90 Degrees SE 2-Mile Radius

Parsons Brinckerhoff

II - 20

J.A. FitzPatrick/ Nine Mile Poin. Nuclear Power Stations

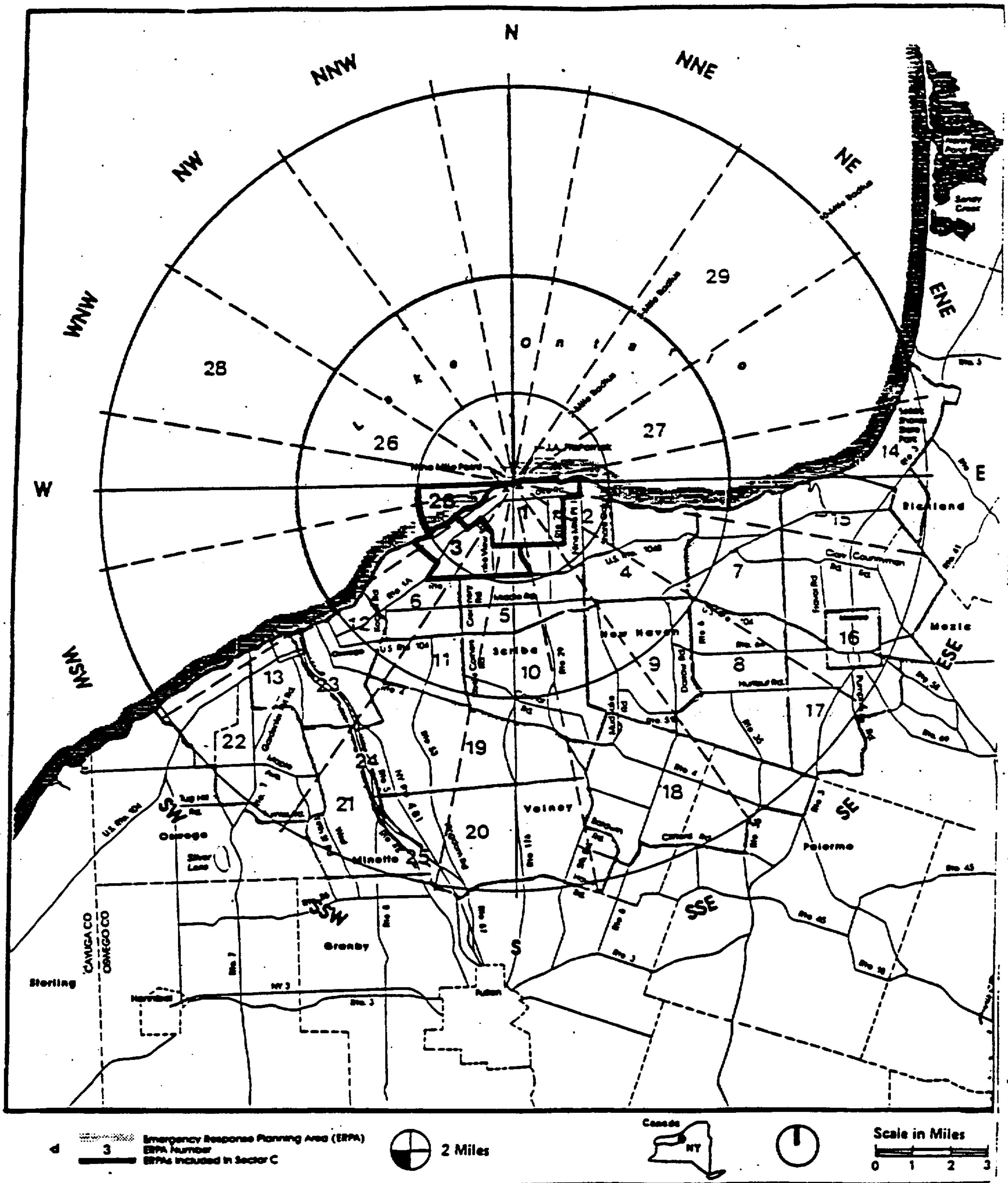

Fig. 5 Sector C—90 Degrees SW
2-Mile Radius

Parsons Brinckerhoff

II - 21

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

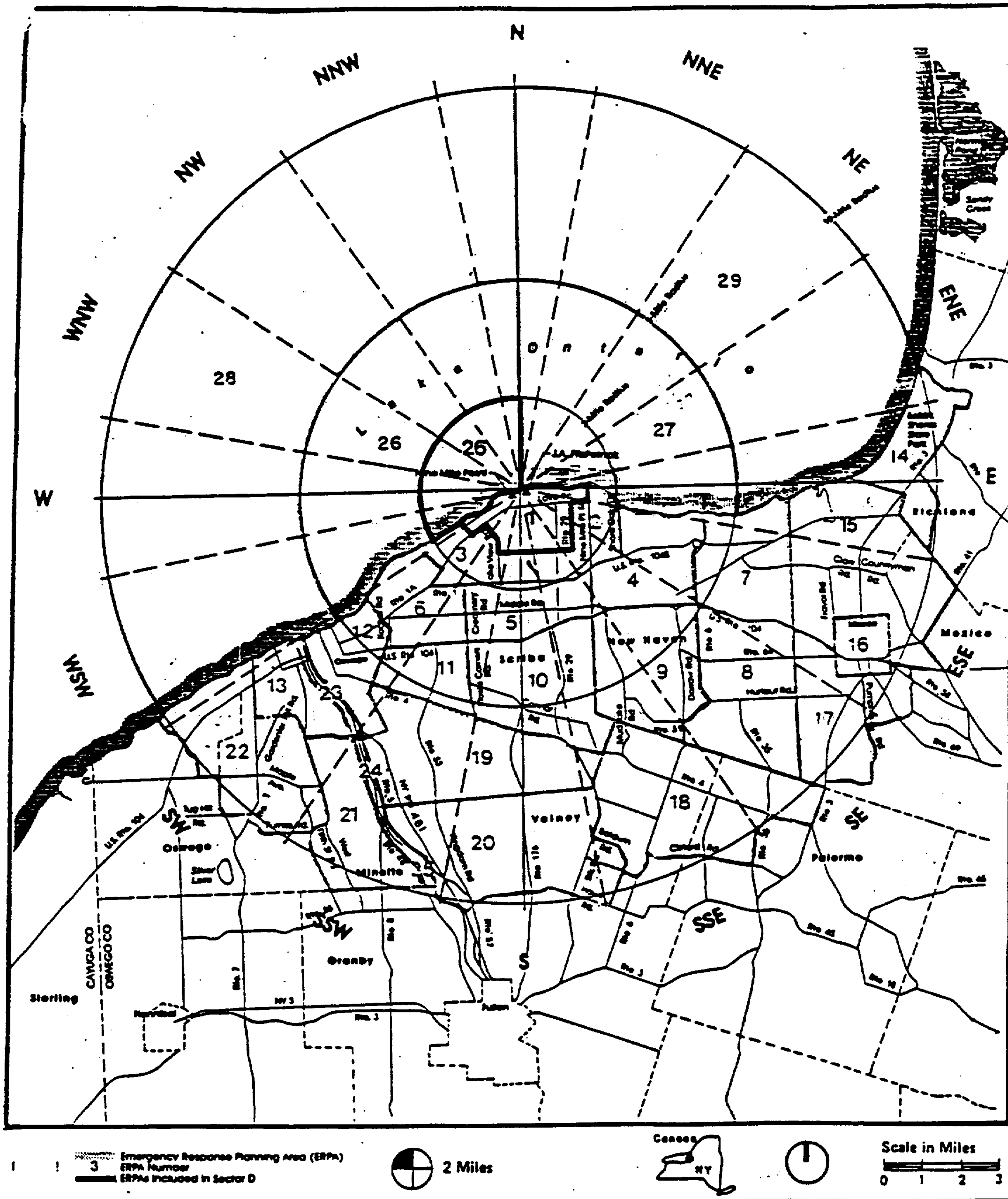

Fig. 6 Sector D—90 Degrees NW
2-Mile Radius

II - 22

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Nuclear Power Stations

Parsons
Brinckerhoff

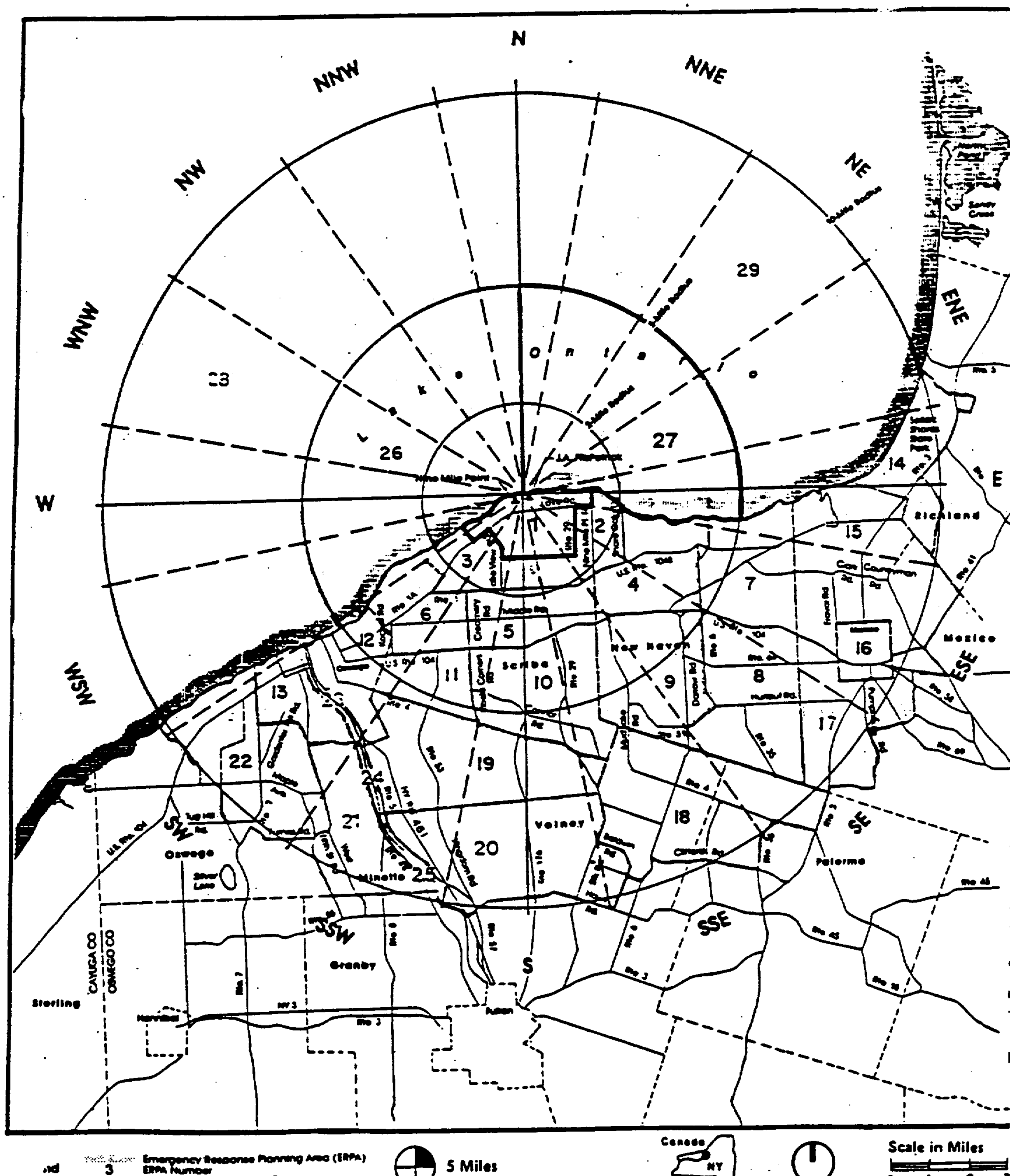

Fig. 7 Sector E—90 Degrees NE
5-Mile Radius

J.A. FitzPatrick/
Nine Mile Point
Nuclear Power Stations

Parsons

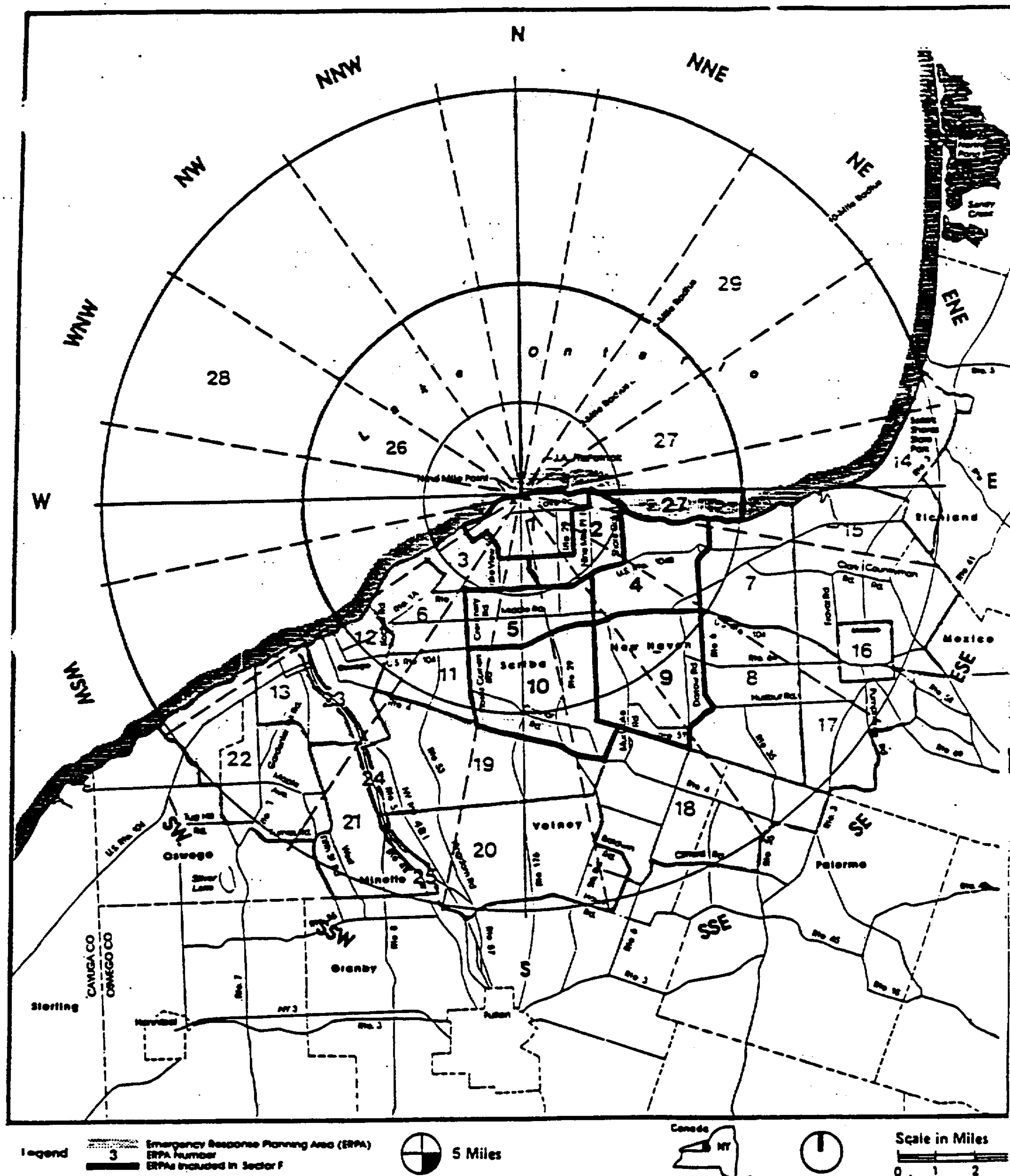

Fig. 8 Sector F—90 Degrees SE
5-Mile Radius

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II - 24

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Nine Mile Point
Nuclear Power Stations

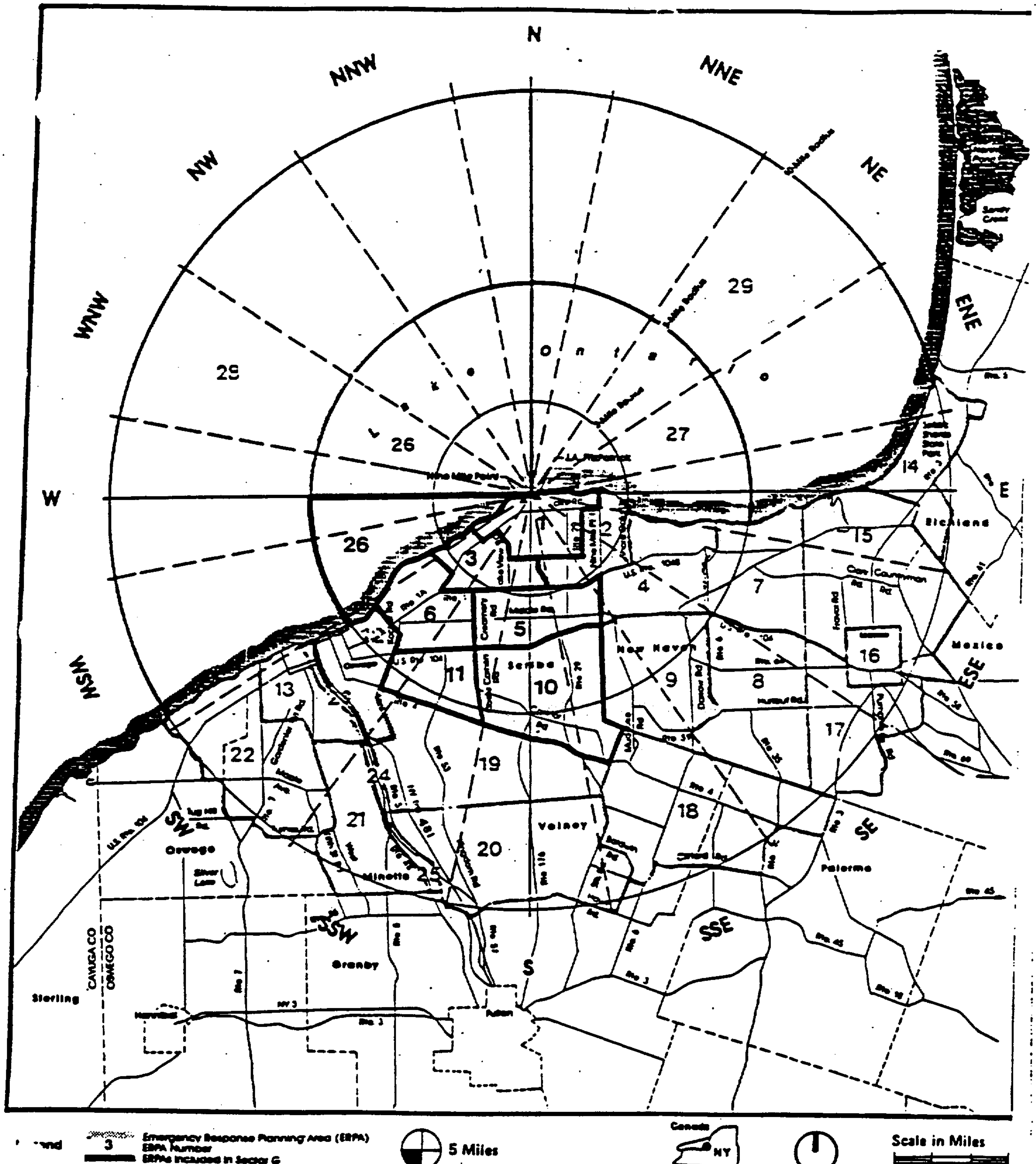

Fig. 9 Sector G—90 Degrees SW
5-Mile Radius

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II - 25

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Nine Mile Point
Nuclear Power Stations**

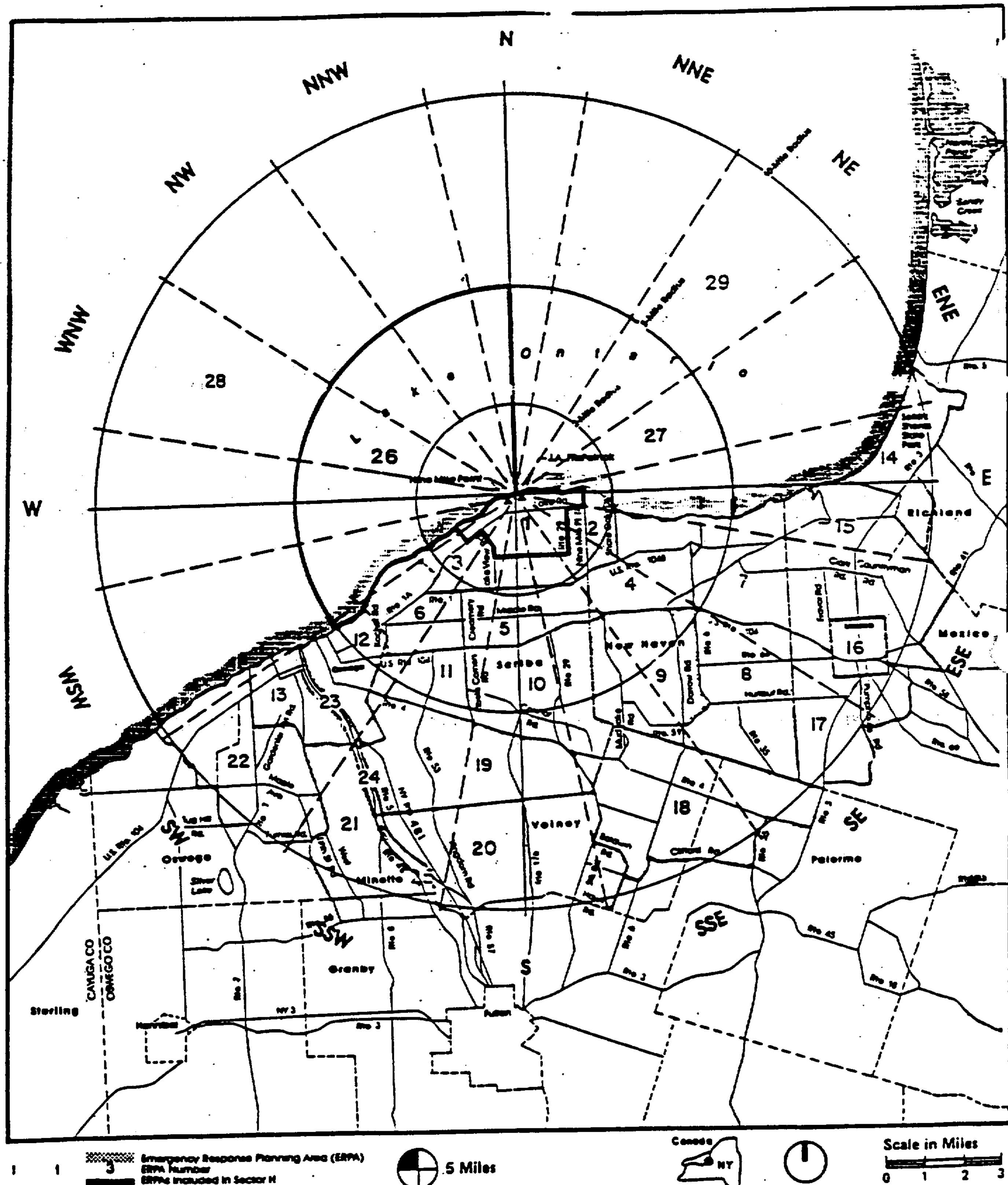

Fig. 10 Sector H—90 Degrees NW 5-Mile Radius

II - 26

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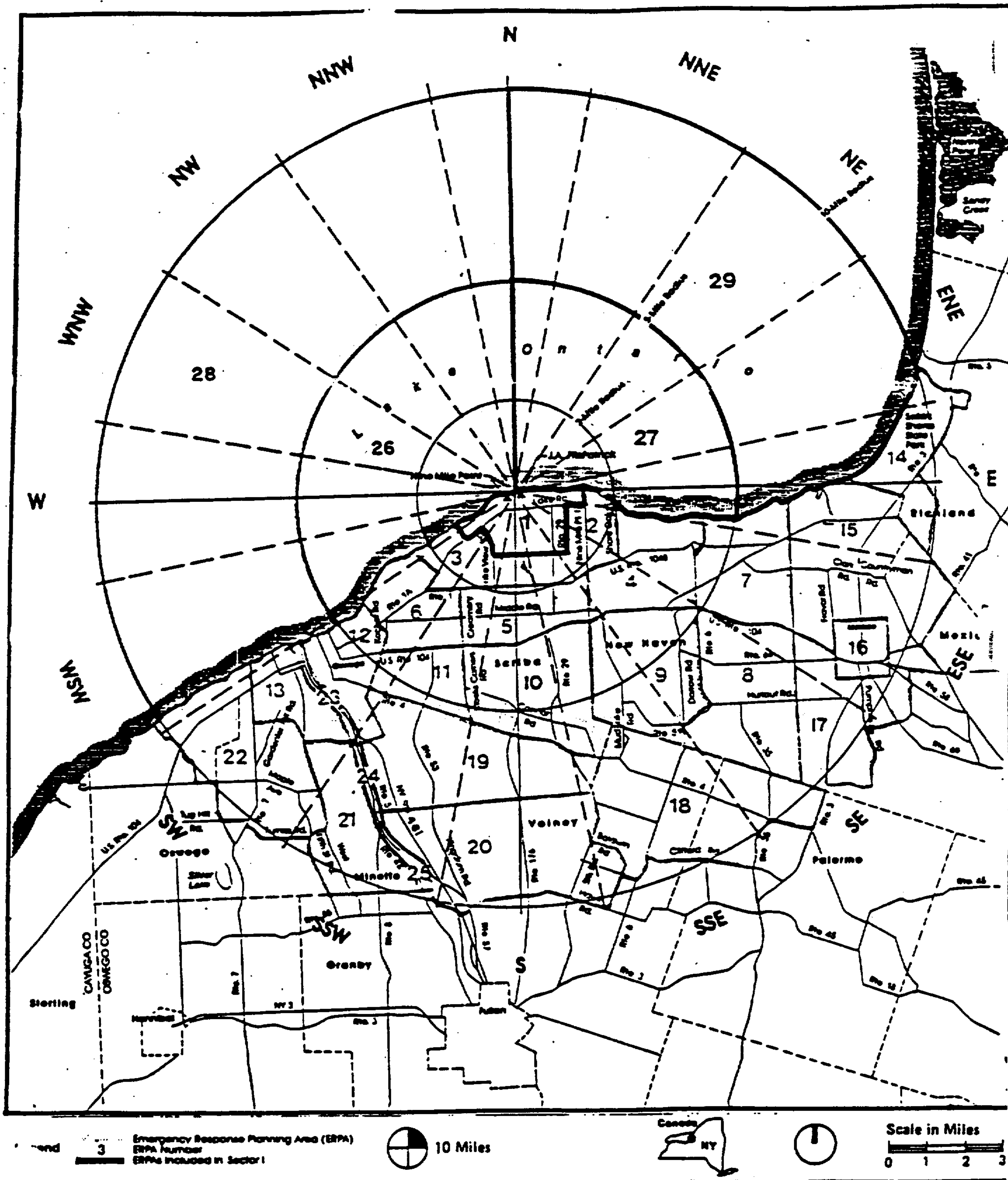

Fig. 11 Sector I—90 Degrees NE
10-Mile Radius

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II - 27

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Nuclear Power Stations

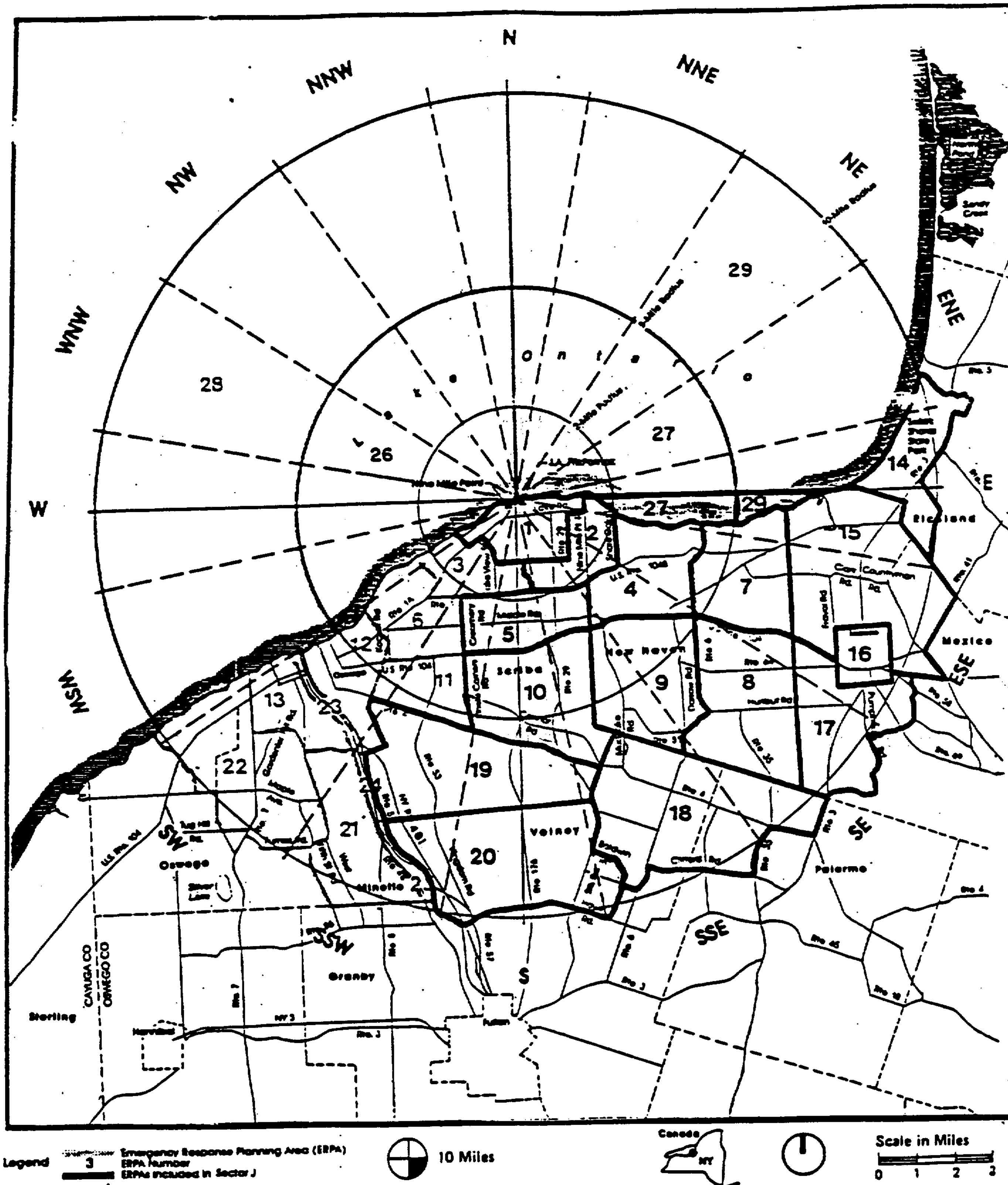

Fig. 12 Sector J—90 Degrees SE 10-Mile Radius

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II - 28

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

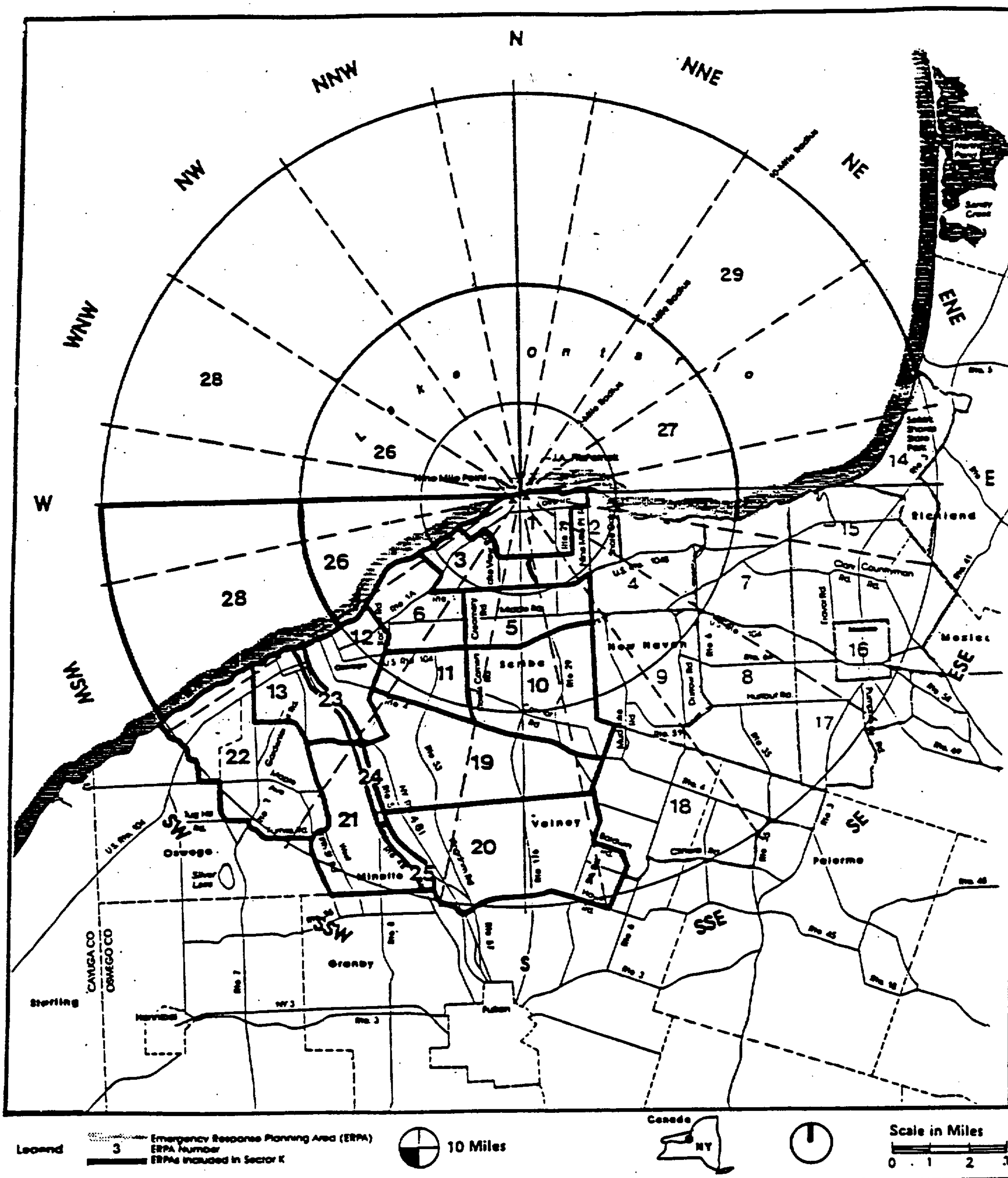

Fig. 13 Sector K—90 Degrees SW
10-Mile Radius

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II - 29

J.A. FitzPatrick/
Nine Mile Point
Nuclear Power Stations

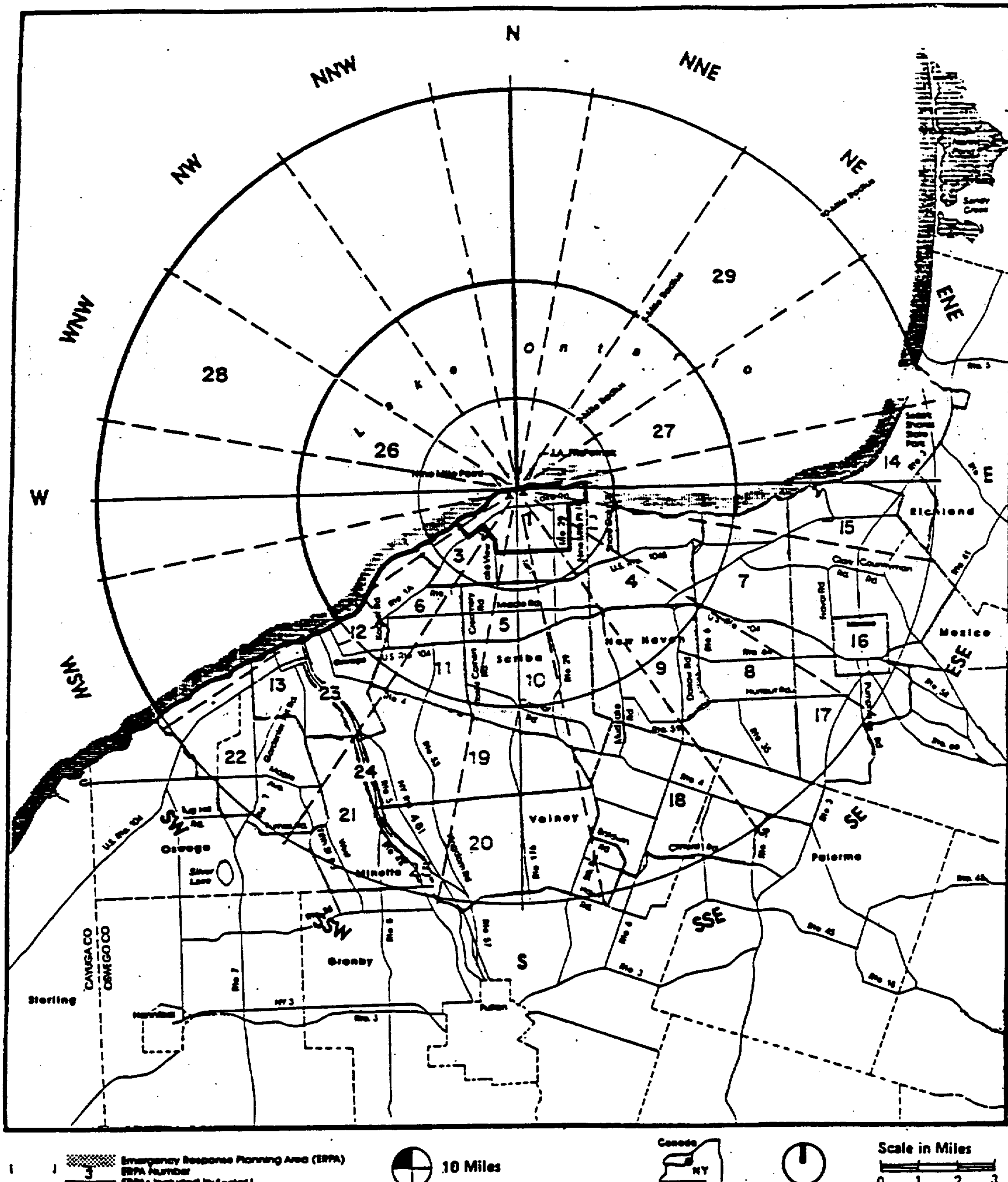

Fig. 14 Sector L—90 Degrees NW 10-Mile Radius

II - 30

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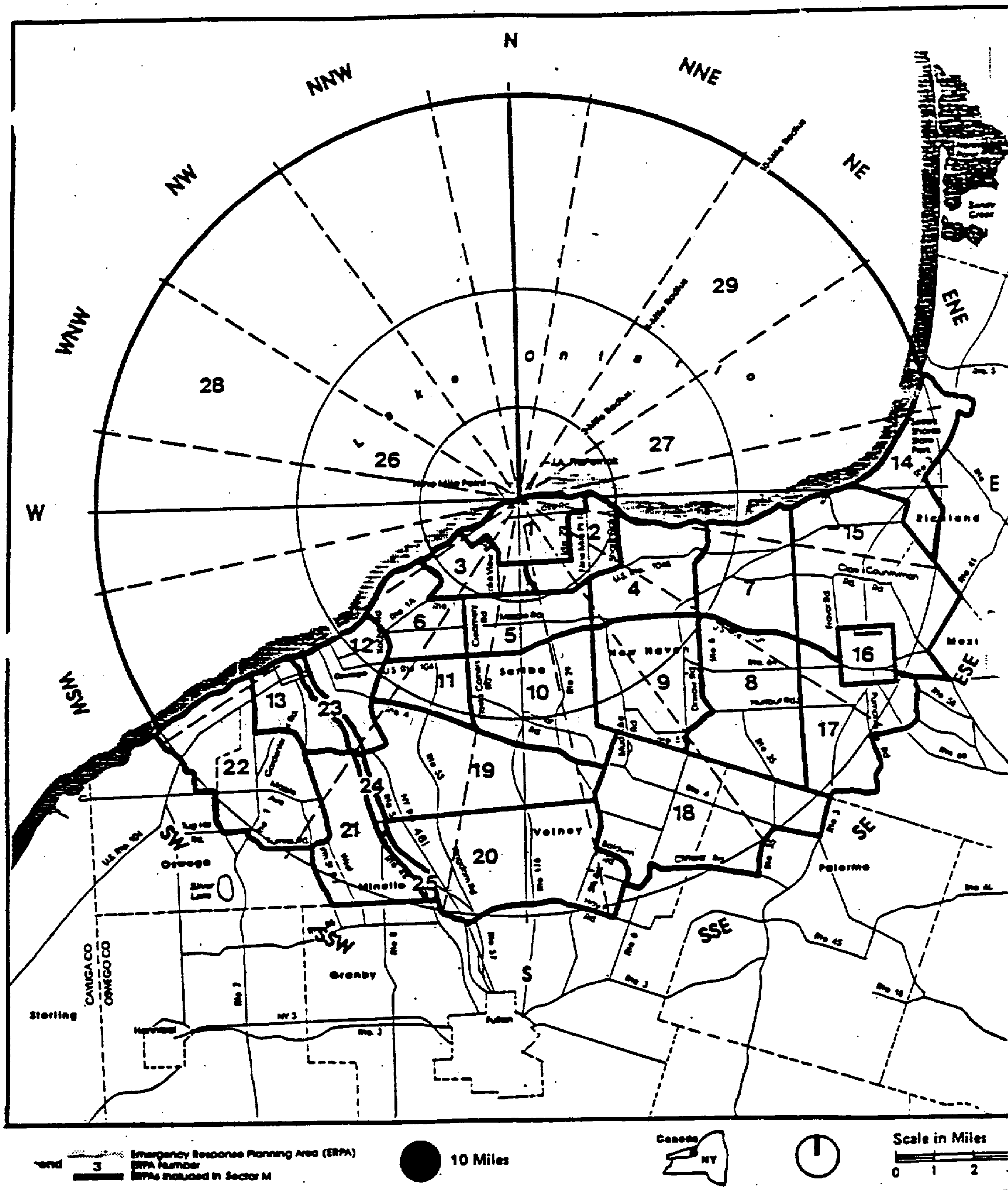

Fig. 15 Sector M—360 Degrees
10-Mile Radius

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Nine Mile Point
Nuclear Power Stations

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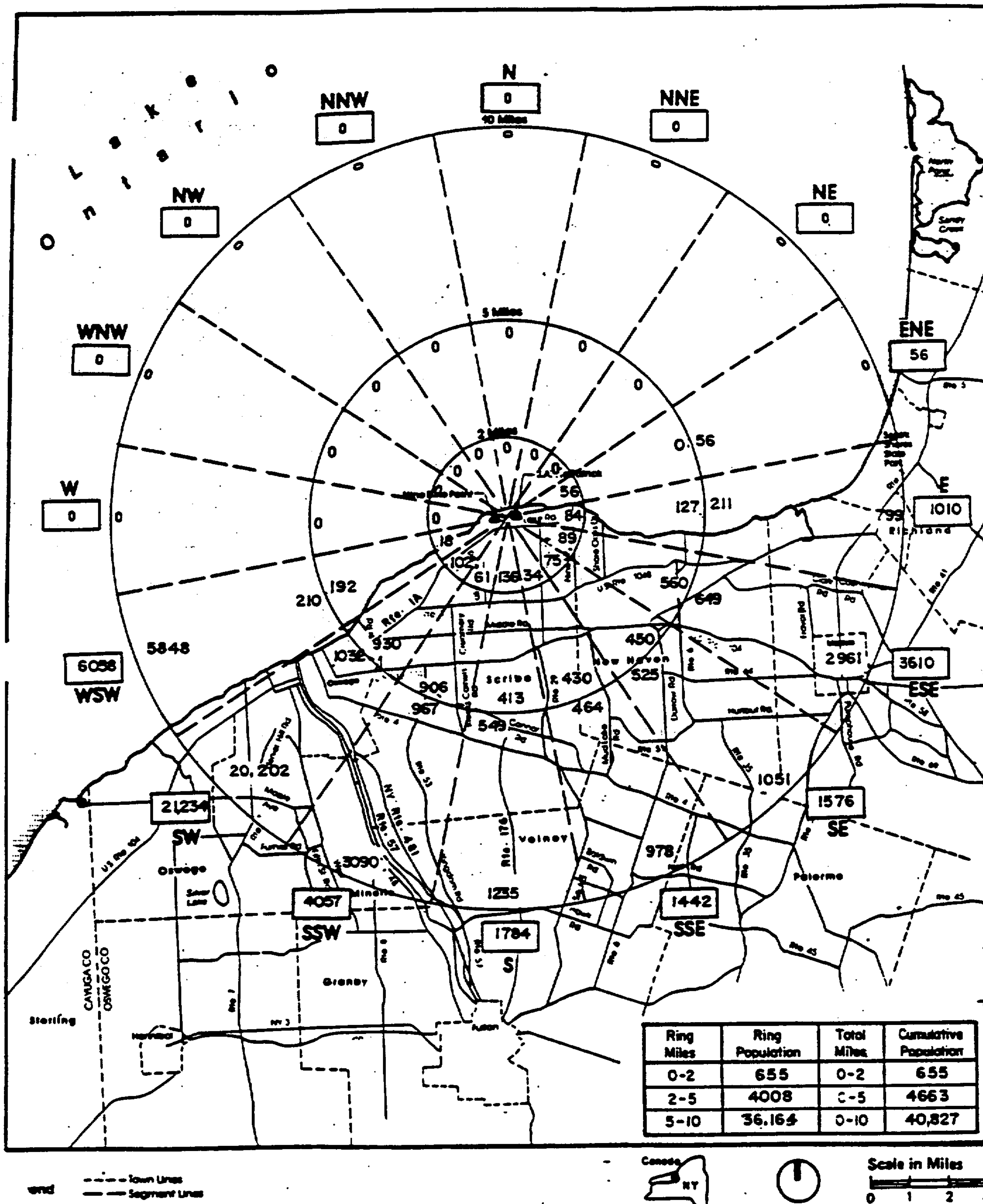
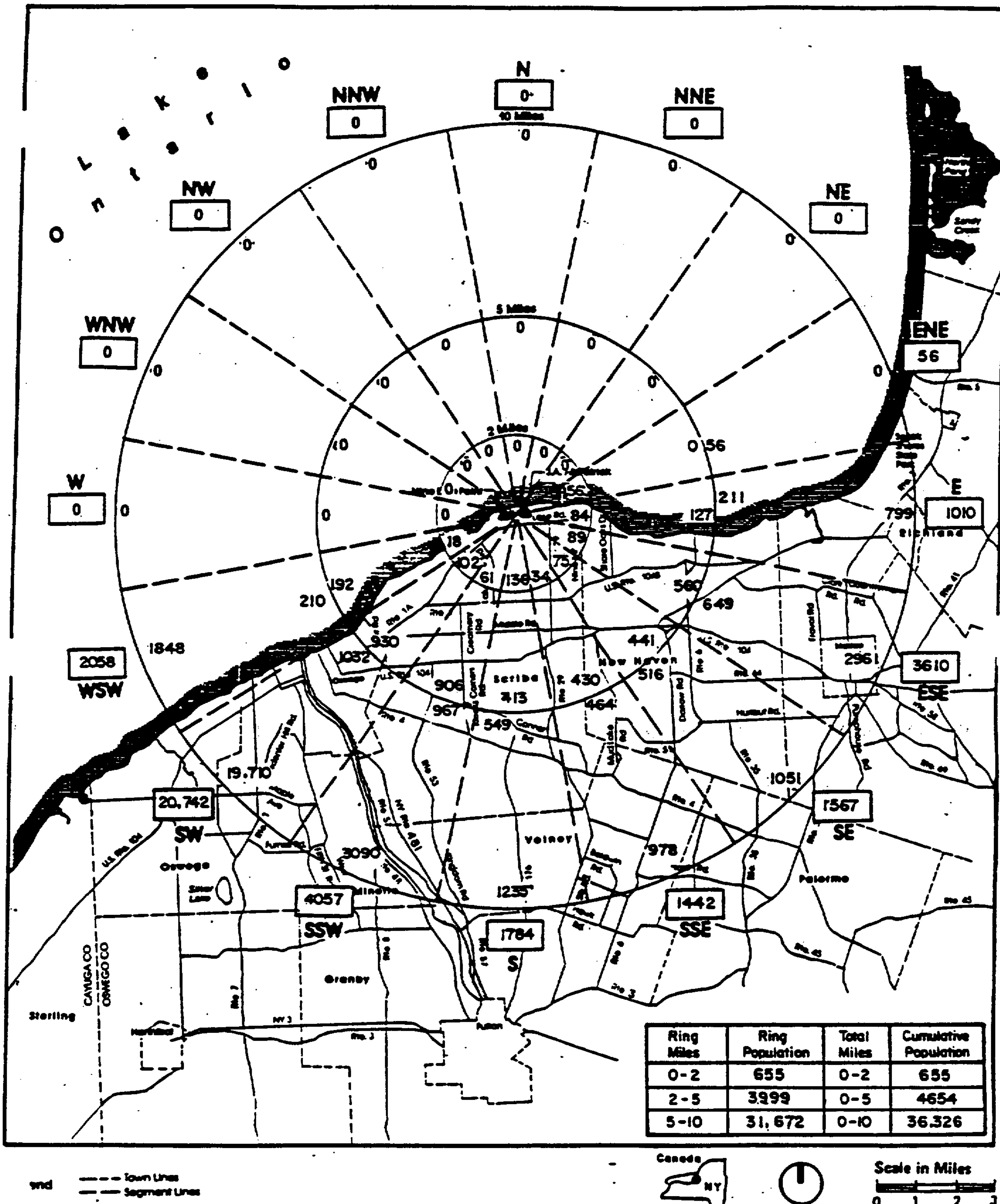


Ring Miles	Ring Population	Total Miles	Cumulative Population
0-2	655	0-2	655
2-5	4008	0-5	4663
5-10	36,164	0-10	40,827

Fig. 16 1991 Permanent Resident Population Estimates, by Segment

Parsons REV. JULY, 1993 II - 32

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

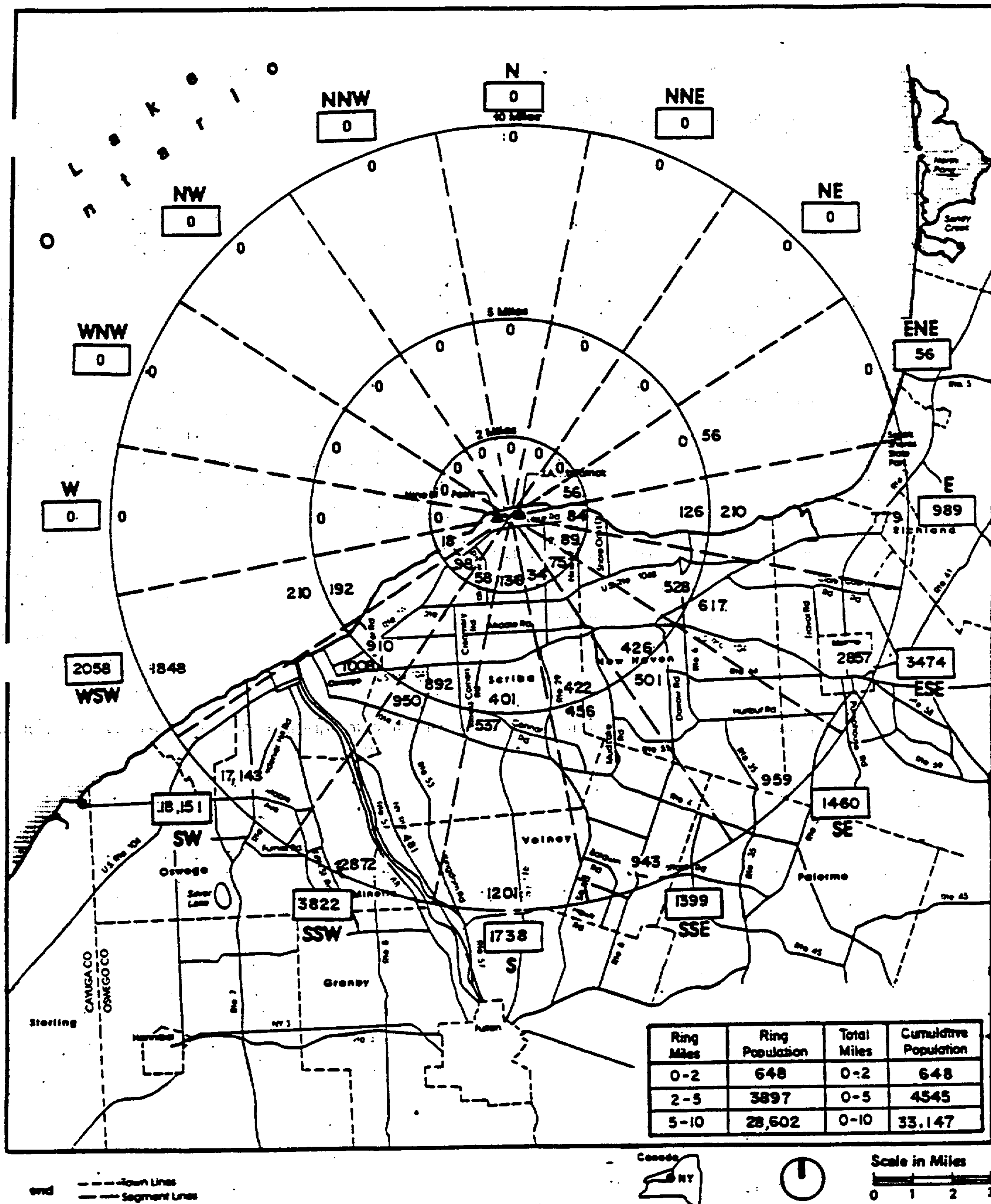


Ring Miles	Ring Population	Total Miles	Cumulative Population
0-2	655	0-2	655
2-5	3999	0-5	4654
5-10	31,672	0-10	36,326

Fig. 17 1991 Permanent Resident Population Estimates (excluding Institutional Population), by Segment

REV. JULY, 1993 II-33

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

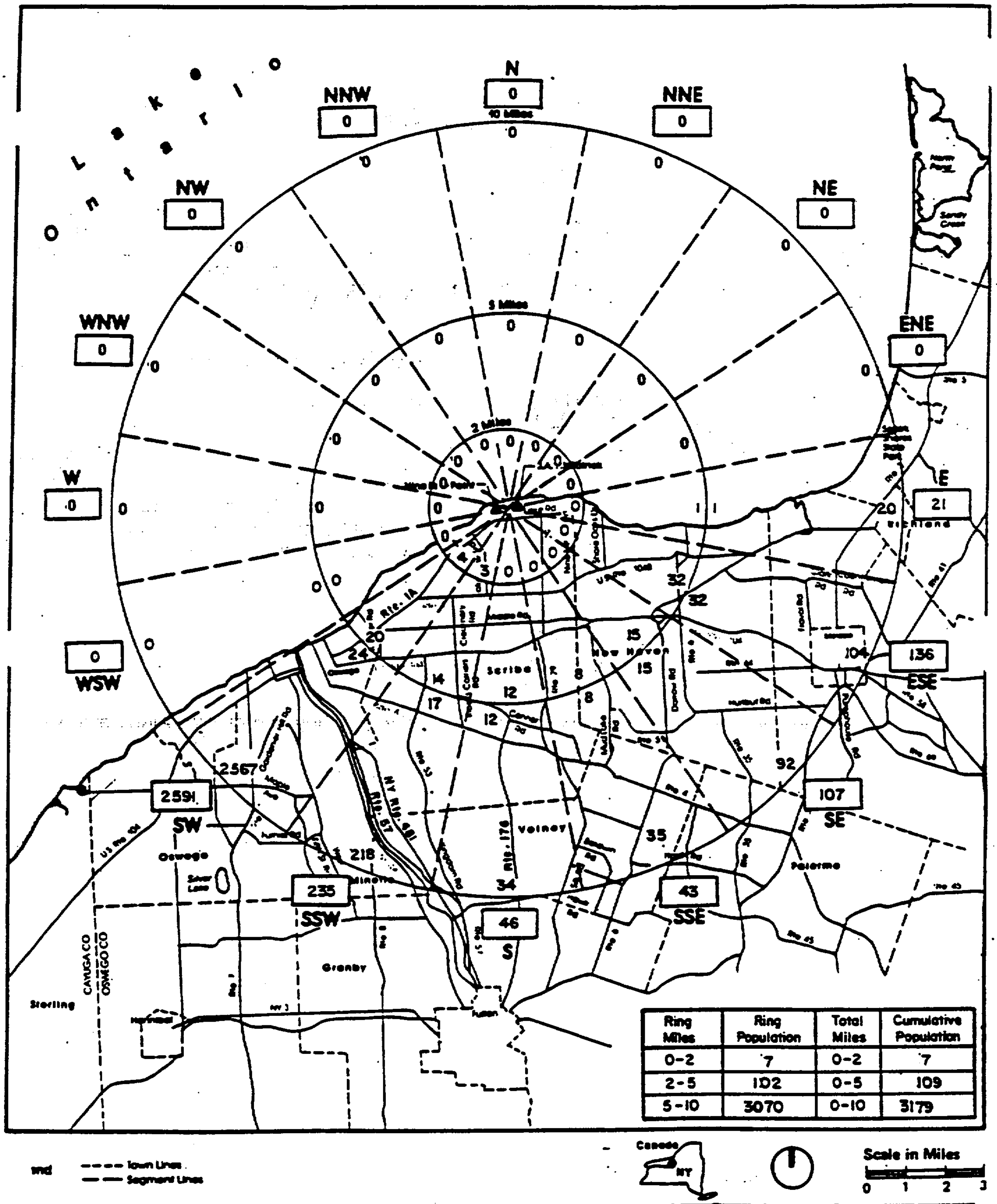


Ring Miles	Ring Population	Total Miles	Cumulative Population
0-2	648	0-2	648
2-5	3897	0-5	4545
5-10	28,602	0-10	33,147

Fig. 18 1991 Permanent Resident Population Estimates (excluding Institutional Population) with Autos, by Segment

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

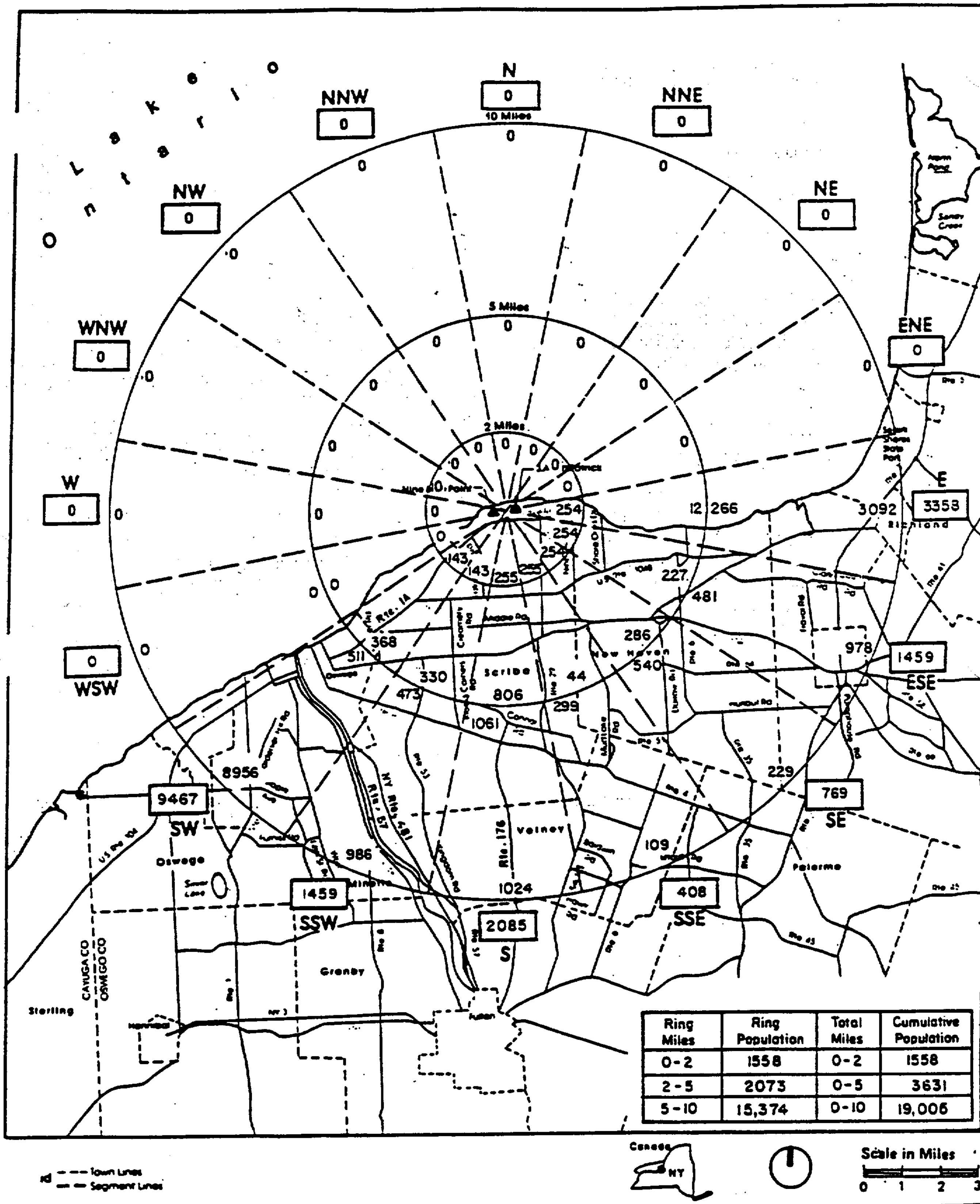
Parsons Brinckerhoff REV. JULY 1993 II - 34



Ring Miles	Ring Population	Total Miles	Cumulative Population
0-2	7	0-2	7
2-5	102	0-5	109
5-10	3070	0-10	3179

Fig. 19 1991 Permanent Resident Population Estimates (excluding Institutional Population) without Autos, by Segment

J.A. FitzPatrick, Nine Mile Point Nuclear Power Stations

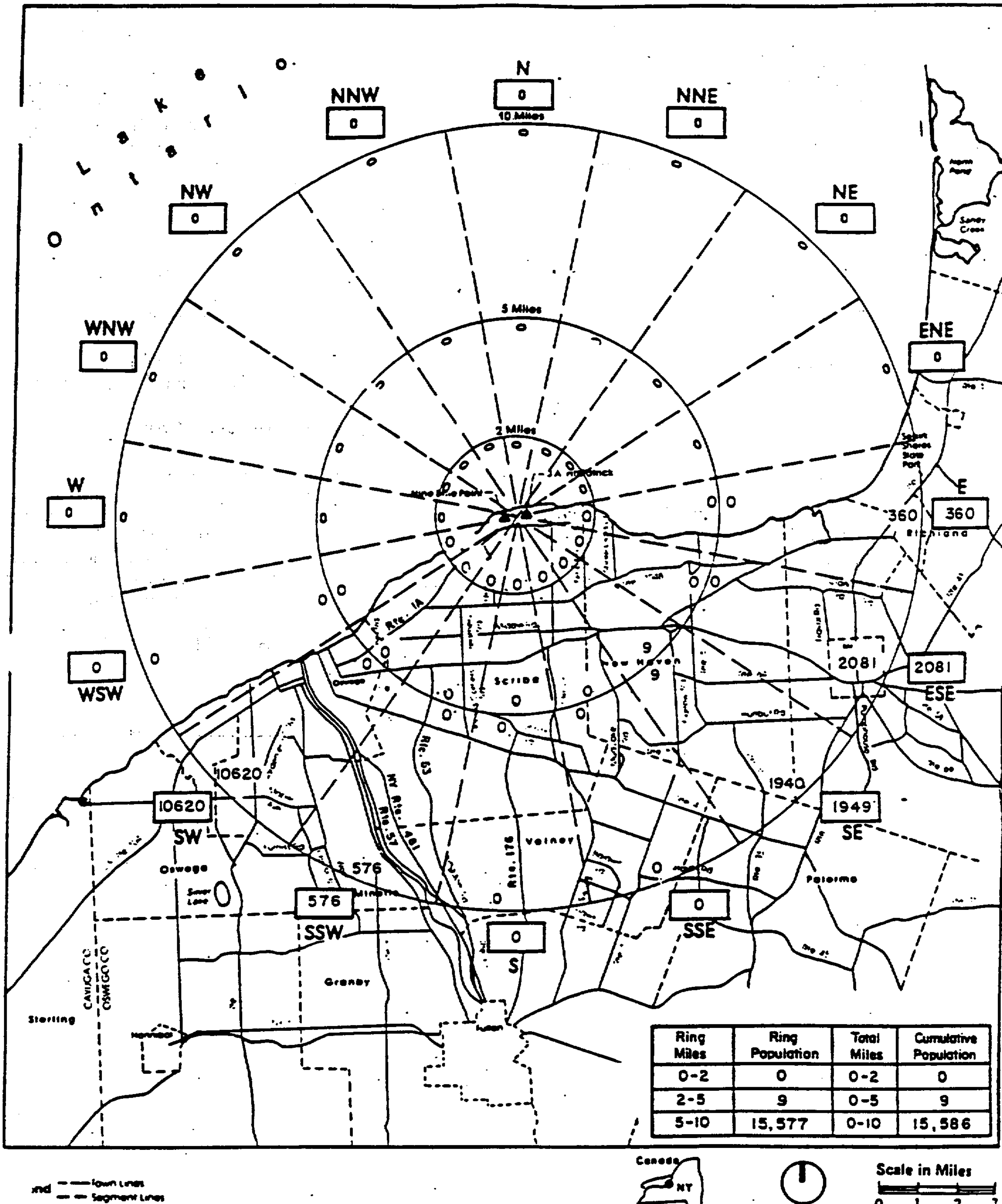


Ring Miles	Ring Population	Total Miles	Cumulative Population
0-2	1558	0-2	1558
2-5	2073	0-5	3631
5-10	15,374	0-10	19,006

Fig. 20 1991 Transient Population Estimates, by Segment

Parsons Brinckerhoff

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations



Ring Miles	Ring Population	Total Miles	Cumulative Population
0-2	0	0-2	0
2-5	9	0-5	9
5-10	15,577	0-10	15,586

Fig. 21 1991 Special Facilities Population Estimates, by Segment

J.A. FitzPatrick, Nine Mile Point Nuclear Power Stations

Parsons Brinckerhoff

III. TRANSPORTATION FACILITIES

The evacuation travel times described in this report are a function of the evacuating population size, the travel distance, roadway capacities, weather conditions, available emergency manpower, and the number of vehicles used during an evacuation. Section II of this report discussed the various evacuation populations. Section III discusses the other aforementioned factors affecting evacuation travel time.

The transportation facilities available to complete an evacuation of the EPZ consist of roadways, privately-owned vehicles, buses and vans, emergency vehicles (e.g., ambulances), boats, and aircraft. The following is a discussion of the role of these transportation facilities in a JAF/NMP area evacuation and their respective functions in the estimates of the evacuation travel times.

A. Evacuation Roadway Network

Primary evacuation routes were identified for all portions of the EPZ. Each ERPA within the EPZ was disaggregated into one or more traffic zones along recognizable geographic and/or political boundaries. Each traffic zone, which represents a population cluster in a specific geographic area that loads onto a given roadway, was then assigned a primary evacuation route for each mode of travel emanating from that zone. Traffic zone boundaries were developed to minimize the amount of cross traffic required to access a zone's associated primary evacuation route. The evacuation routes and traffic zones are included in the Oswego County REPP and are described in Appendix D of this report.

Evacuation routes for a given traffic zone were chosen to move traffic generally in a radial direction away from the JAF/NMP site in accordance with NUREG-0654 criteria. Care was taken to select routes likely to be both familiar to and regularly used by drivers in the traffic zone. In addition, the NYSDOT, Oswego County DPW, and Oswego City DPW were contacted to identify programmed roadway improvements scheduled over the next five years. While a majority of existing roadway deficiencies are not located on the evacuation roadway network, the following improvements are scheduled for construction on the evacuation roadway network:

- o Catfish Creek Bridge on Route 1 will be reconstructed during 1995 and 1996
- o I-81 will be resurfaced in 1992 between Central Square and Parish. While this section is not located within the 10-mile EPZ, it helps facilitate traffic to the State Fairgrounds reception center in Syracuse.

Limited access facilities such as I-81 are not in the EPZ, and hence were not included as primary evacuation routes. Ultimately, I-81, as well as other major routes which lead south of the EPZ such as NY Rte 481, Rte 48, and Rte 34, will facilitate a large amount of evacuation traffic as they connect Oswego County with the greater Syracuse area and the State Fairgrounds.

In developing the evacuation routes, it was assumed that traffic would operate in a normal two-way pattern, with the exception of any one-way streets. This operational strategy would not only permit emergency vehicles and buses to enter the evacuating area, but would also minimize the possibility of a total blockage of a route because of an incident such as an automobile accident. If an accident did occur, traffic could be diverted around that point in the opposing travel lanes. Backup evacuation routes were also determined for portions of the primary evacuation network likely to become extremely congested and are included in the Oswego County REPP. A more detailed discussion of these bottleneck locations appears in Section IV.J.

The selected primary evacuation routes, as well as many others, were traveled to assess their adequacy for evacuation purposes. The data gathered for each route during the field reconnaissance conducted on October 27 and 28, 1991 was used to determine the evacuation capacity of each roadway and included the number of lanes, lane width, shoulder width, location and the timing of traffic signals (if applicable), and the posted speed limit. Roadway capacities were estimated based upon current traffic engineering practices outlined in the 1985 edition of the Highway Capacity Manual. The Oswego County Department of Public Works, the City of Oswego Department of Public Works, and the New York State Department of Transportation were contacted to verify those highways in the EPZ that were modified (e.g., widened, new facilities, etc.) since the last evacuation time study was prepared in May 1984. These were also field-verified during October, 1991.

This roadway inventory data was used to disaggregate the evacuation network into over 160 individual links within the EPZ. A link represents a roadway segment where the physical and operating characteristics are similar, or a portion of a route between other intersecting primary evacuation routes. Figure 22 shows the links within the 10-mile EPZ for the JAF/NMP evacuation roadway network. The primary direction of travel during an evacuation is indicated by directional arrows and the location of traffic control points are also identified on the map. The map does not show all the local streets necessary to access the evacuation routes, nor does it show the evacuation links between the EPZ and the State Fairgrounds in Syracuse. I-81, Rte 48, Rte 34, and I-690 are the primary evacuation routes between the EPZ and the State Fairgrounds located in Syracuse. Approximately 75 additional links were field inventoried and have been added to the analysis for the purpose of estimating evacuation travel times of schools in the EPZ to the State Fairgrounds. This is consistent with FEMA guidance memorandum EV-2, "Protective Actions for School Children".

Each link in the EPZ is numbered for reference, and corresponds to the link characteristic data shown in Appendix E. The links between the EPZ and the State Fairgrounds are also tabulated in Appendix E. The information shown includes, for each link, the evacuation route name, the number of lanes in the outbound direction, the free flow travel speed, the link length, the various factors which affect capacity, and the upper and lower bound evacuation capacities (service traffic volumes) under normal, inclement, and adverse weather conditions, respectively. The procedures used to calculate the evacuation capacities are discussed below.

1. <u>Evacuation Capacity Analysis</u>

An important variable in the determination of evacuation travel times is the capacity of roadways in the network to accommodate evacuating vehicles. NUREG-0654 stipulates that normal and adverse weather conditions be addressed in terms of their effects on travel times and capacity. For this reason, it was necessary to develop a procedure to estimate "evacuation capacities' which would represent the number of vehicles serviced per unit of time by each segment of the network under flow conditions likely to occur during an evacuation for both normal and adverse weather conditions.

Because of the large and sudden demand placed on a roadway system during an evacuation, it was assumed that traffic would be congested, speeds would be low, flow would be unstable, and there would be stoppages of momentary duration. It was assumed that these operating conditions would prevail for the duration of the evacuation, with the exception of the very beginning and end of the evacuation phase, when volumes are anticipated to be somewhat lower. The traffic flow conditions indicated above correspond to a roadway segments capacity defined as Level of Service E as described in the *Highway Capacity Manual**. Level of Service is a qualitative measure of the effect of a number of factors on traffic flow including speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

For Level of Service E flow conditions, standard procedures (as outlined in the *Highway Capacity Manual*) were followed to calculate the service volume of a roadway. The service volume at Level of Service E, which is called "evacuation capacity" in the context of this report, was calculated for each link in the network to represent the upper-bound capability of the roadways to accommodate traffic under normal weather conditions.

At the time of an incident at the JAF/NMP site, events may occur even under fair weather which would reduce the capability of roadways to accommodate evacuating traffic. For example, some traffic control officers designated to monitor traffic checkpoints may be unable to fulfill their assignments. Traffic throughput, therefore, would not be maximized at these locations. In addition, a light snow or rain which results in a moist road surface may have a slight impact on roadway capacity. To represent these conditions, service volumes were calculated at Level of Service D. In general, this calculation accounts for a 10 to 20 percent reduction in evacuation capacity, depending on the roadway type, for multilane, and two-lane facilities, respectively. Therefore, evacuation travel times were calculated as a range of values under normal weather conditions, with lower-bound travel times determined using Level of Service E capacities and upper-bound travel times calculated using service volumes consistent with Level of Service D operations.

Under adverse weather conditions, such as snow, fog, severe thunder storms which result in heavy rains, localized flooding, or ice, the ability of roadways to carry traffic is further reduced. Two factors account for this reduction -- a decreased quality and amount of physical space on the roadway surface (e.g., snow on shoulders) and a more cautious attitude on the part of the driver (resulting in increased headways). As discussed with the County and State Highway officials, adverse weather conditions are no longer considered to be just a heavy snowstorm in the Oswego area (when evacuation may not be the preferred response option), but would include an ice storm which immobilizes the area until roadway crews can salt, sand, and clear the roadways. Level of Service D service volumes were further reduced by 20 percent to account for these factors to estimate adverse weather evacuation capacities.

During times of heavy snowfall, the City of Oswego Department of Public Works estimates that it would take up to three hours to clear all of the City streets. However, snow emergency routes located within Oswego County require approximately 30 minutes to clear once crews are mobilized for duty. Beyond the EPZ, it is estimated that two hours are required to clear NY 481 and I-81 to Syracuse.

During an emergency, the Oswego County Department of Public Works has stated that it would assist in clearing State roads within the EPZ. Priority planning for snow removal on bus routes will be coordinated by the Oswego County Emergency Management Office.

* Highway Research Board, Special Report 209; 1985

As a first step in the determination of capacity, base evacuation capacities/service volumes were calculated for each link in the network at the levels of service mentioned above. The base evacuation capacities were then modified by factors which take into account the impact on traffic operations of existing roadway widths and shoulder areas. All applicable modification factors were abstracted from the Highway Capacity Manual.

The roads and highways used for evacuation were categorized into four basic groupings for purposes of capacity computations:

- o Freeways,
- o Multi-lane highways,
- o Two-lane, two-way roadways, and
- o Roadways controlled by traffic signals.

Appendix F details the specific methodology used to calculate evacuation capacities for these roadway types.

B. Privately-Owned Vehicles

It was assumed for the purpose of computing evacuation travel time estimates that families owning automobiles would evacuate as a unit from their homes in one car. However, a percentage of multi-car families might utilize their additional vehicles in an evacuation. The impact of these additional automobiles would be to increase the evacuation travel time estimates roughly proportionally to the percent increase in the number of cars used to evacuate along the critical evacuation routes. It is noted that multi-car families were assumed to use more than one vehicle when the evacuation trips originated from several locations (e.g., a mother departing from home and a husband departing from work) . The number of families with zero, one, or several cars was determined from the 1990 Census and adjusted to the year 1991 as described earlier in Section II for each traffic zone in the EPZ.

C. Buses and Vans

Buses and vans will be used to evacuate the ambulatory population who will not have their own means of transportation available at the time of an incident. This ambulatory population includes schoolchildren, residents of special facilities, transients without autos, and the general public without autos. The available vehicles in the JAF/NMP area to evacuate these people consist of public, private, and school-district-owned buses and vans. The priorities associated with the deployment of buses and vans depend on whether school is in session at the time of an evacuation. The criteria used to determine bus assignments are fully discussed in Section IV.F. The following is a discussion of the general role of these vehicles in the Oswego County REPP and travel time estimate analysis.

In all, 76 emergency bus routes have been established within the EPZ, not including assignments at specific facilities such as schools, nursing homes, hospitals or day camps. Based on the number of transit-dependent people in each traffic zone (as described earlier in Section II.B), the required number of buses for each traffic zone was determined. The public, private, and school district bus operators in the area were contacted by the Oswego County Emergency Management Office to determine the number of vehicles each company could provide. For the purpose of this study, the bus companies were then assigned service areas based on location and the number and type of available vehicles. Where possible, service areas were defined to be contiguous with traffic zone and ERPA boundaries to clearly identify responsibilities during a staged or partial evacuation. The following list tabulates the bus companies identified by the Oswego County Emergency Management Office and the current vehicle inventory of each company:

- o City School District of Oswego (61 buses and 2 vans with a total passenger capacity of 3,537)
- o Phoenix Central School District (36 buses with a total passenger capacity of 2,135)
- o Central Square Central School District (44 buses and 11 vans with a total passenger capacity of 2,024)
- o A & E Medical (4 buses and 3 vans with a total passenger capacity of 187)
- o Oswego County Opportunities (12 buses and 11 vans with a total passenger capacity of 419)
- o Centro of Syracuse, Inc. (187 buses and 9 vans with a total passenger capacity of 8257. Two trolleys with a passenger capacity of 42 are assumed not available for use during an evacuation)
- o Mexico Academy and Central Schools (44 buses and 2 vans - with a total passenger capacity of 2,236)
- o Oswego County BOCES (31 buses with a total passenger capacity of 577).

The estimated total ambulatory population without autos who require evacuation by bus or van includes school children, permanent resident population who are not considered to be part of a rideshare initiative, the university and nursing home institutional population, transient population, and special facility residents of healthcare, day care, and correctional facilities is listed below.

- o School Children = 10,166 (Students of elementary, middle, and high schools located within the EPZ)
- o Permanent Resident Population without Autos = 1,610
- o Institutional Population = 1,337
- o Transient Population = 0
- o Special Facilities Population = 543

The total passenger demand of these components totals 13,656. With 457 available buses and vans which can transport 19,372 passengers, sufficient resources exist to evacuate those who require transportation in the EPZ. The vehicular inventories and their respective capacities, and the ambulatory population estimates without autos who require evacuation by bus listed above reflect information available at the time this report was compiled. Current information is available in the latest Oswego REPP. An estimate of the non-ambulatory population, those people who are bed ridden and require evacuation by an ambulance and those persons who are in wheel chairs and require evacuation via a wheel chair equipped vehicle, is discussed in Section D.

D. Emergency Vehicles

Emergency vehicles such as ambulances and wheelchair-equipped buses and vans would be used to evacuate non-ambulatory residents from special facilities, and members of the general population requiring and requesting such transport. Each special facility was contacted by the Oswego County Emergency Management Office to identify the number of residents requiring wheelchair or stretcher transportation. In addition, the Oswego County Emergency Management Office has compiled a list of non-institutionalized mobility impaired people that was considered in the assignment of emergency vehicles and assessment of evacuation times.

Various ambulance corporations and fire departments in the County were also contacted to ascertain the availability of emergency vehicles. Eleven (11) ambulances are available in Oswego County from four providers. Thus, the total number of stretcher patients that could be carried at any one time is 22; however, the total demand for ambulance assisted evacuation passengers from hospitals and nursing homes (those who require stretchers when they are transported) located in the EPZ is 67. Bus companies were also inventoried to determine the wheelchair capacity of their fleets. A total of 422 wheelchair passengers can be transported on the available bus and van resources which exceeds the evacuation demand of 347 wheelchair passengers; thus, a one-wave evacuation of wheelchair passengers can be obtained.

Table 11 presents total vehicle estimates for the EPZ by Sector. Table 12 and Figure 23 contain the same data presented by Segment and Subarea. It should be noted that these total vehicle estimates include all vehicles belonging to multi-car families.

E. Boats

Water traffic within the EPZ on Lake Ontario (ERPAs 26-29) and on the Oswego River (ERPAs 23-25) would be cleared by the local law enforcement agencies as specified in the Oswego County REPP. The United States Coast Guard would also be called upon at the time of an incident to assist in an evacuation. The Coast Guard would also be responsible for blocking entry into the 10-mile EPZ from Lake Ontario and the Saint Lawrence Seaway.

Evacuation of water traffic depends on the type of craft, its fuel supply, mode of power, how long its been out of port, and weather conditions. For example, it has been estimated that it would take boats on Lake Ontario in the vicinity of the power plants as long as 1-1/2 hours to travel to their home ports in the Mexico area. Again, weather will dictate how long it would take to evacuate the lake. It has been estimated that sailboats would require up to 4-hours to evacuate the EPZ.

The Coast Guard estimates that 75% - 80% of the fishing boats on Lake Ontario are equipped with radios. The Coast Guard anticipates that notification would be spread from one location to the next if an evacuation were ordered. Once all boats have been notified of an evacuation, the boats on Lake Ontario would be directed to safe ports located outside of the 10-mile EPZ. Boats located in the harbor area and along the Oswego River are to dock at the nearest port, or their home ports where the passengers would then be evacuated by auto or bus. This activity is particularly significant during Harborfest and the Fishing Derby.

Weather conditions, particularly on Lake Ontario, will be the key factor in determining how long it will take to evacuate water traffic in the EPZ. For example, the Oswego County Sheriff's Marine Patrol estimates that 2-3 hours would be required to confirm evacuation of all boats within the EPZ when seas are less than 2-feet on Lake Ontario. During times of adverse weather, or when the seas are greater than 2-feet on the Lake, the Marine Patrol and Coast Guard estimate the confirmation of an evacuation could take as long as 6-8 hours.

F. Airplanes

There are no commercial airports within the JAF/NMP EPZ. South of the EPZ, there is a county airport in Volney.

TABLE 11

1991 TOTAL VEHICLE ESTIMATES

BY 90° SECTOR

Sector	1991 Total Vehicles
2 Mile Radius	
A	89
B	356
C	262
D	89
5 Mile Radius	
E	89
F	2,150
G	2,954
H	89
10 Mile Radius	
I	89
J	7,193
K	18,852
L	89
360° EPZ	
M	23,199

TABLE 12
1991 TOTAL VEHICLE ESTIMATES BY SEGMENT

	RING, MILES				
	0-2	2-5	0-5	5-10	0-10
Segment	Subarea Vehicles	Subarea Vehicles	Cumulative Subarea Vehicles	Subarea Vehicles	Cumulative Segment Vehicles
N	0	0	0	0	0
NNE	0	0	0	0	0
NE	0	0	0	0	0
ENE	4	0	4	0	4
E	18	9	27	346	373
ESE	14	305	319	1,575	1,894
SE	14	311	325	983	1,308
SSE	14	232	246	543	789
S	13	347	360	935	1,295
SSW	29	383	412	2,761	3,173
SW	27	436	463	12,261	12,724
WSW	2	25	27	650	677
W	0	0	0	0	0
WNW	0	0	0	0	0
NW	0	0	0	0	0
NNW	0	0	0	0	0
Ring Vehicles	135	2,048	2,183	20,054	22,237

(Also see Figure 23)

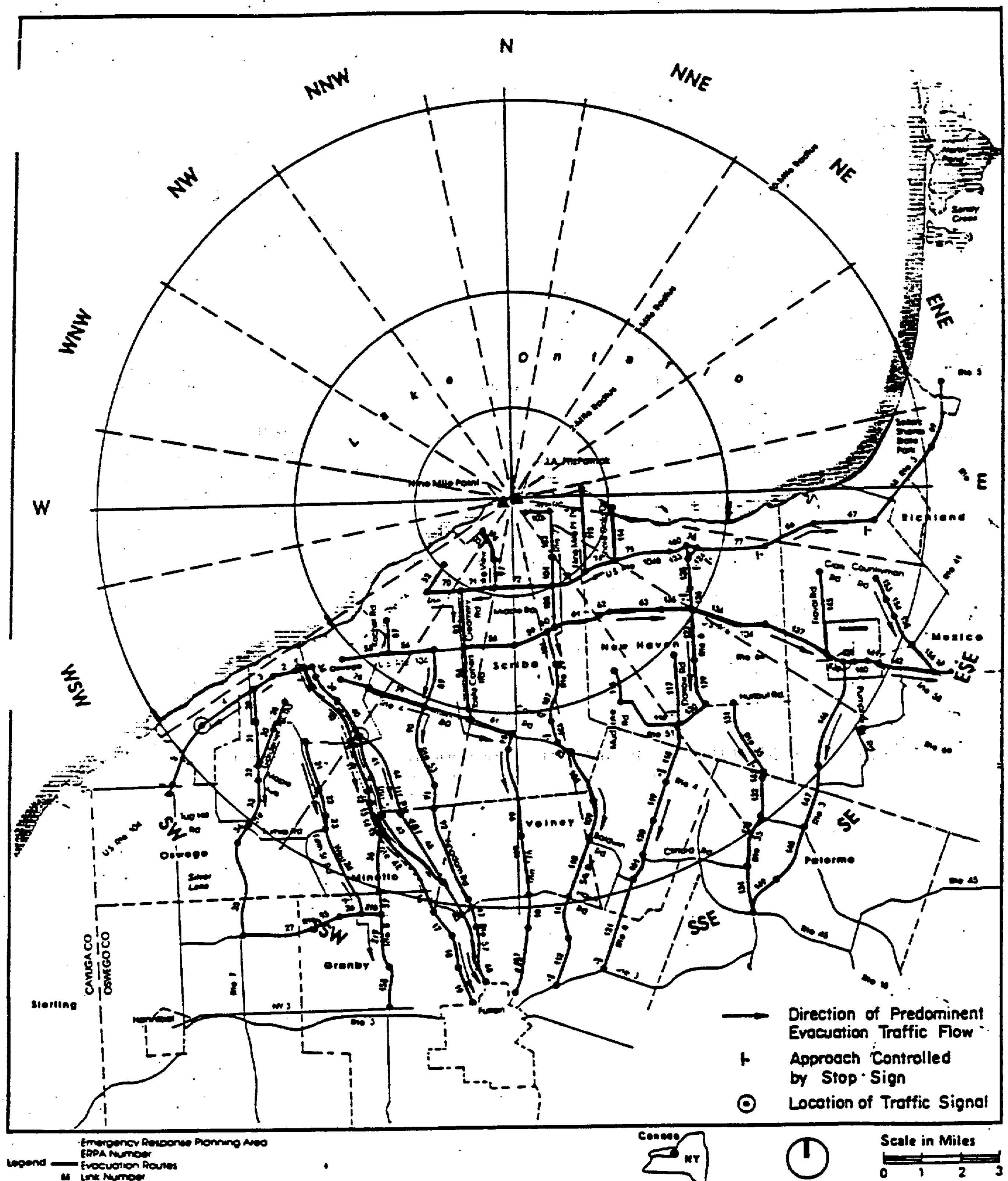


Fig. 22 Evacuation Route Links

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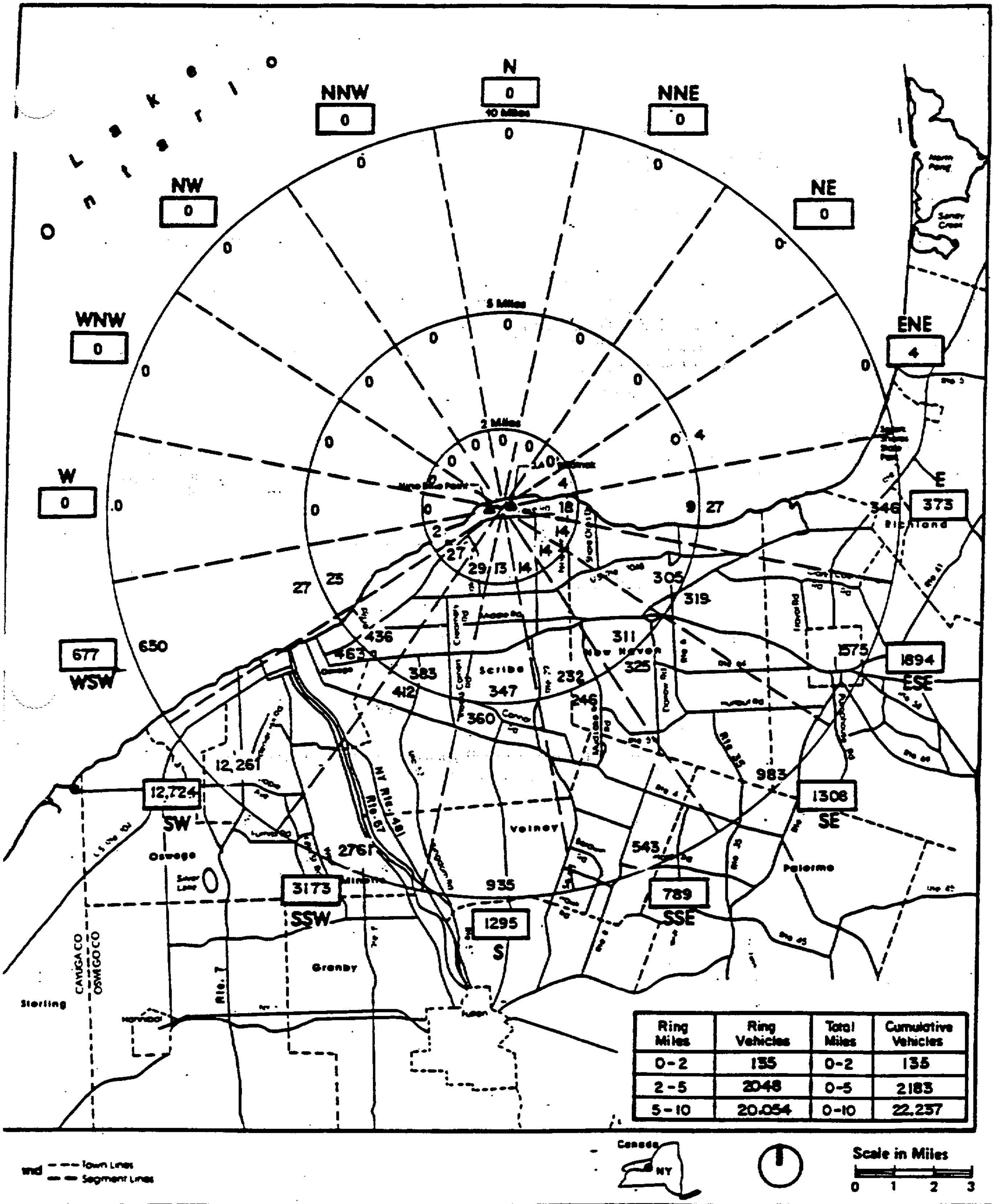
J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations



Ring Miles	Ring Vehicles	Total Miles	Cumulative Vehicles
0-2	135	0-2	135
2-5	2048	0-5	2183
5-10	20,054	0-10	22,237

Fig. 23 1991 Total Vehicle Estimates, by Segment

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

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IV. ANALYSIS OF EVACUATION TRAVEL TIMES

A. Scenarios

Evacuation travel time estimates are prepared to serve as a guide for local emergency coordinators in refining their emergency response plans, and as an aid to local officials in selecting protective actions during an emergency. Evacuation travel time estimates were prepared by ERPA for eight distinct time-based scenarios and two distinct weather conditions for inclusion in the Oswego County REPP. These estimates assumed a simultaneous evacuation of the entire EPZ. The eight scenarios included in the emergency preparedness plan are listed below in order of increasing evacuation travel time as explained in Section V.:

- Nighttime
- Weekend/Holiday winter, daytime
- Weekend/Holiday summer, daytime
- Evening
- Classic Weekend
- Weekday, school not in session
- Weekday, school in session
- Harborfest

These time-based scenarios were chosen and analyzed for the emergency preparedness plan because they cover all significantly different patterns of population distribution and transportation availability. Hence, the decision maker is provided with a tool for deciding the travel time required to simultaneously evacuate the entire EPZ under two different weather conditions and at different times of the day. These evacuation travel times are shown by ERPA in Appendix G.

The travel time estimates presented in this section of the report are for the specific 90^{O} Sectors required in NUREG-0654, as well as for the entire EPZ (Sector M). A detailed description of the above scenarios is described below:

Nighttime Scenario - The baseline scenario is nighttime, when most people in the general population are in their residences, institutions have minimal staff on duty, and relatively few businesses are functioning. This scenario is considered to be representative of the resident population distribution. Nighttime differences among days of the week and seasons are not regarded as large enough to warrant a separate designation.

Weekend days and holidays - Weekend days and holidays are similar to each other, different from the patterns so far discussed, and different for winter and summer. During these times families tend to be together, and recreational activities predominate. Thus winter and summer weekend days and holidays are designated as two separate scenarios. Seasonal patterns for spring and fall do not need to be considered separately, but can be subsumed under winter or summer. The main differences are expected to be in terms of park and camp attendance and facility usage (peaks in summer) and other seasonal activities.

Evenings - This time of day is substantially different for institutions, especially medical institutions, because of staffing levels. This scenario is only somewhat different from nights for the general population because of a tendency to be away from home (shopping, entertainment, etc.). As with nights, weekday-weekend and seasonal differences for the evening scenario are not expected to be large for either the general population or institutions.

Classic Weekend - Classic Weekend is an annual event which is held at the Oswego Speedway over the Labor Day weekend. This scenario is similar to that of a summer weekend when the local campground and park attendance is near its peak. The peak time period of activity for the event occurs during Sunday afternoon, the final day of racing.

Weekday School-not-in-Session Scenario - The Weekday School-not-in-Session Scenario is identical to the Weekday School-in-Session Scenario except that the schools are closed. For evacuation purposes, this scenario would occur during the summer months when the children could be at many of the areawide beaches, campgrounds, or parks. This scenario would result in additional vehicles evacuating a dispersed population in the EPZ and hence, the longest potential evacuation times under the Weekday School-not-in-Session Scenario.

Weekday School-in-Session Scenario - Weekdays are characterized by "normal" activity patterns. Most households have at least one member at work. Institutions are usually at their maximum staffing levels, businesses are usually open and active, and children are in school. This scenario, as opposed to a Weekday School-not-in Session Scenario, significantly affects bus transportation needs and usage as well as Reception/Congregate Care Center activities because of the greater potential need to reunite families who have been evacuated by different means and from different locations.

Harborfest - Harborfest is held annually over a four day period in July. The event is typically held between Thursday and Sunday with a majority of its events centered around Oswego Harbor. The peak activity period during the Harborfest festivities occurs during Saturday night when fireworks are displayed. This event draws a large number of attendees from outside the EPZ. In addition, it also draws a number of boats to the Harbor area.

B. Weather Conditions

NUREG-0654 stipulates that two weather conditions, normal and adverse, be considered in the evacuation travel time analysis. Therefore, both the nighttime (minimum evacuation travel time estimate) and weekday school-in-session (maximum evacuation travel time estimate, excluding Harborfest) scenarios were analyzed assuming the following weather conditions:

- o For normal weather, clear sky and dry roadway pavement;
- o For adverse weather, reduced visibility during the summertime (e.g., due to fog, severe thunderstorms resulting in heavy rain or localized flooding) and during the wintertime, a slippery roadway surface (e.g., due to plowed snow or ice).

The effects of these weather conditions on the roadway capacities, and hence the evacuation travel time estimates, have been discussed earlier in Section III.A.1.

C. Trip Generation

For each traffic zone included in a given 90° Sector, the number of evacuation trips generated by that zone was estimated by trip type. The number of trips varied significantly by scenario. For example, for the weekday school-in-session scenario, large numbers of evacuation trips were attributable to transient employees working in the EPZ. However, for the nighttime scenario, this same trip type (employees) was much less significant because most businesses would be closed.

The number of trips from a given traffic zone was based on population and vehicle occupancy data. For example, if a zone has a nursing home with 120 ambulatory and 15 wheelchair-bound residents, and if the facility owns one 10-passenger wheelchair van, then five vehicle trips would be generated by the nursing home (three buses provided by a bus company with 40 passengers each, one facility-owned van, and one other 5-passenger wheelchair van provided by a bus company).

Vehicle trips generated by each zone were then converted to passenger car equivalents (PCEs) for traffic assignment purposes. Buses were weighted as the equivalent of two cars, since their primary impact would be one of increased roadway space during a slow, congested evacuation condition.

D. Traffic Assignments

The assignment of the evacuation vehicles generated by each traffic zone over designated evacuation routes was performed by a computer model developed specifically for evacuation planning studies. The model loads the network and computes the travel and delay times for all zones being analyzed in any given Sector.

A static traffic assignment procedure which assumes instantaneous loading of the evacuation network and concurrent vehicular demand on all roadway segments is incorporated in the computer model. This procedure is not an exact simulation of vehicle movement during an evacuation or any other travel situation; however, the static traffic assignment results were compared to those obtained from a dynamic traffic simulation model for a sample number of routes in the Indian Point EPZ (located in parts of Westchester, Rockland, Orange, and Putnam Counties in the State of New York), and were found to be very similar. A detailed description of the static traffic assignment algorithm, and the results of the comparison between static and dynamic assignment is presented in Appendix I.

E. Notification Time

The JAF/NMP EPZ is served by a siren notification system that meets the acceptable design objectives specified in Appendix 3 of NUREG-0654. Tone alert radios are provided to private residences within the EPZ located in areas out of the siren range. In addition, all schools, special facilities, and major industries in the EPZ have been provided with tone alert radios. The Oswego County REPP contains backup notification procedures such as route alerting in the event of a siren/tone alert system malfunction.

F. Components of the Evacuation Travel Time

The estimates of evacuation travel time include the following components:

Public Preparation Time - Twenty minutes are assumed to be required for the public to prepare for evacuation after official notification to leave their homes.

Terminal Time - The terminal time for vehicles departing from home represents the time to drive via local residential streets and collector roads in a traffic zone to the first link of the predesignated primary evacuation route. For bus routes, terminal time is comprised of both traveling time and loading time at pickup points for transit dependant people.

Roadway Travel Time - The roadway travel time is the amount of time required for all vehicles to traverse the entire length of their evacuation route to the edge of the 10 mile EPZ. This time depends on both normal operating speeds on the road and on delays due to congestion (where the vehicle volumes approach or exceed the capacity of the roadway at a particular location). Hence, the roadway travel time is the amount of time beginning when the first vehicle enters the evacuation route, assuming normal operating speeds, until the last vehicle leaves the sector, taking into account reduced speeds attributable to congestion.

Round Trip Time - For vehicles required to make multiple trips to and from the evacuating area, round trip time represents the time to travel beyond the EPZ to a predesignated host facility or reception center, return to the evacuating area for a second assignment, leave the EPZ, and load and unload passengers at terminal points. This round trip time is particularly important for the school-in-session scenario because schoolchildren would be evacuated first by buses to the New York State Fairgrounds in Syracuse. Enough buses exist to evacuate all transit dependent people out of the EPZ in one-wave during all of the evacuation scenarios; however, a sufficient number of ambulances do not exist to evacuate non-ambulatory residents in one-wave . Non-ambulatory residents at several nursing homes in the City of Oswego as well as people who require evacuation by ambulance would be required to wait for wheelchair-equipped vehicles and ambulances to complete initial assignments during an evacuation.

It should be noted that the evacuation travel time estimates do not include preparation time required to mobilize bus and ambulance personnel and equipment, traffic control personnel, and the Coast Guard. These activities generally take place within one to two hours before an order to evacuate is given.

When school is in session, there are enough buses available to evacuate all transit-dependent ambulatory individuals (i.e., schoolchildren, resident population and transients without automobiles, and special facility residents) in one trip. This determination is based on a worst-case assumption of a simultaneous full-EPZ evacuation when schools are open. The Oswego County REPP contains procedures intended to minimize the likelihood of such an occurrence, such as go-home plans and sheltering options. In the event an evacuation is considered during the normal school dismissal time, the time frame required for students to return home is on average 3 hours. However, for the purpose of this study, the following steps were assumed in the calculation of evacuation travel time estimates (including round-trip time) for a school-in-session scenario:

1. School districts use their full-sized buses to evacuate schools in their districts as a first priority.
2. All elementary schools, middle schools, private schools, nursery schools, and day care centers are evacuated with district-owned and contracted vehicles.

A. Central Square Central School District buses assist in evacuating schools within the City School District of Oswego because enough district-owned vehicles are not available.

B. Phoenix Central School District buses assist in evacuating schools within the Mexico Academy and Central Schools because enough district-owned vehicles are not available.

C. BOCES self-evacuates with its own vehicles with assistance from Phoenix Central School District buses.

3. School district-owned vans are used to run general population bus routes in ERPAs near JAF/NMP.

4. Centro of Oswego and Oswego County Opportunity vehicles are used to run general population bus routes.

5. A & E medical vehicles assist in the evacuation of hospitals.

6. Centro of Syracuse vehicles are used to help evacuate the SUNY Campus in Oswego.

7. The evacuation travel times assume that people who require the use of a walker are transported from the nursing home or hospital to the evacuation buses with the use of a wheelchair and placed in an available seat.

A total of 4,000 students would need to be evacuated from the dormitories located on the SUNY Campus. These students would be evacuated on buses supplied by Centro of Syracuse as well as in registered on-campus vehicles of students who reside in the dormitories.

According to the Oswego REPP, eighteen buses are available to the SUNY Campus in the event of an emergency. Assuming the buses can accommodate 66 passengers per bus, the buses would be able to evacuate 1,188 students from the campus dormitories.

There are also 1,219 registered student vehicles on the SUNY campus which belong to students residing in dormitories. According to campus security, these vehicles remain on campus virtually all of the time. Assuming that each vehicle would evacuate three passengers, the student registered vehicles could evacuate 3,657 students. This assumption is valid as the students who reside in the high density campus dormitories, live with roommates and tend to act as a family unit. The combined capacity of the supplied buses and student vehicles is 4,845 passengers which exceeds the student population of 4,000. Moreover the remaining student population, faculty and staff commute to the Campus either by vehicle or walking. These people would therefore evacuate using their own vehicle or rideshare. Those that walk to the Campus are included in the general population for the City of Oswego thus, they are included either in the general population with auto or transit dependent populations.

G. <u>Evacuation Travel Time Estimates</u>

The results of the evacuation travel time analysis described in this report are presented by Sector in Tables 13, 14, 15, and 16 for the nighttime normal weather, nighttime adverse weather, school-in-session normal weather, and school-in-session adverse weather scenarios, respectively. The travel time estimates are presented for the following population subgroups (as defined earlier):

- o Permanent resident population with automobiles;
- o Permanent resident population without automobiles;
- o Special facilities population; and
- o Transient population.

The evacuation travel time estimates calculated for the JAF/NMP EPZ are in accordance with the implementation procedures and other operational strategies indicated in the Oswego County REPP. The implementation procedures include provisions such as predesignated evacuation routes for all ERPAs, prioritized traffic control locations, and bus routes with pickup points for the public.

As mentioned earlier, travel times were calculated as a range under normal weather conditions. When deciding which end of the range to use to estimate evacuation travel time, a decision maker would consider factors including the degree of mobilization, the degree of public cooperation, the extent of capacity restrictions on key highway links, weather, and roadway conditions.

Lower-bound evacuation travel times (shorter times) can be anticipated when:

(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents, vehicle breakdowns, and highway construction do not occur;

(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs, etc.) is attained;

(c) An informed and cooperative public follows directions as instructed. (In other words, the public has been sufficiently educated as to their responsibility in an evacuation, and has been given adequate notice of the possibility they may have to evacuate.)

Upper-bound evacuation travel times (longer times) for normal weather conditions are representative of a situation where:

(a) Capacity restrictions resulting from light rain or snow showers adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;

(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;

(c) A low degree of cooperation from the public occurs. (In other words, the public is believed to be unsure as to what is expected of them.)

The evacuation travel times represent the time for the last vehicle in a Sector to clear the Sector boundary.

H. Confirmation Time

Confirmation of evacuation will be provided, to the extent possible, by law enforcement and other assigned emergency workers concurrent with their patrolling of the EPZ during evacuation. The City of Oswego estimates it will take about 2- hours to confirm evacuation using police patrol cars and visual inspection. As discussed earlier in Section III.E., confirmation time can take from 2-3 hours during periods of calm weather and up to 6-8 hours during periods of inclement weather.

I. Distribution of the Evacuated Population by Time

The time required to evacuate the last individual from a Sector is an important piece of information for an emergency planner and decision maker. Obviously, everyone else will already have been evacuated when the last person leaves; thus, it is also important to obtain an estimate of the percent of the population evacuated as a function of time.

An output of the model used to estimate travel times is a prediction of the temporal distribution of the population as they leave the evacuating area. To produce this output, an approximation was made of the total population evacuated by Sector for each scenario by applying average vehicle occupancy rates to the number of vehicle trips generated by each traffic zone within the Sector. When a traffic zone had evacuated entirely at a given point in time, the estimated population for that zone was added to the Sector population already evacuated. The resulting total was then divided by the total Sector population to determine the percent of the total population evacuated as a function of time.

Typical population distribution curves for the entire 10-mile EPZ (Sector M) are presented in Figures 24 through 31 for the eight evacuation scenarios which were simulated under normal and adverse weather conditions. Inspection of these curves indicates that significant portions of the total population would be evacuated well before the last person leaves the EPZ.

J. Critical Locations

The Oswego County REPP calls for the stationing of traffic control personnel at key locations throughout the evacuation network. The public transportation agencies located within the EPZ estimate that it takes approximately 1 hour to mobilize these check point personnel. The REPP also identifies backup evacuation routes for roadway segments likely to become congested. One of the factors which determined where to place the personnel and where to specify backup routes was based on an output from the computer assignment model that identified critical bottleneck links along each route in the network. These critical links represent the locations of potential maximum delays for evacuees traversing that route. Figures 32 and 33 indicate the critical links for the nighttime and school-in-session scenarios, respectively. Both figures are a composite representation of the critical links identified for an evacuation of all 13 sectors described earlier in this report.

TABLE 13

EVACUATION TRAVEL TIME ESTIMATES BY SECTOR
NIGHTTIME SCENARIO
NORMAL WEATHER

Sector	Quadrant	Resident Population With Autos From - To	Resident Population Without Autos From - To	Special Facilities From - To	Transients From - To
2-Mile Radius					
A	NE	0:40- 0:40	0:40 0:50	- -	0:40- 0:40
B	SE	0:40- 0:40	0:40-0:50	- -	0:40- 0:40
C	SW	0:40- 0:40	0:40 0:50	- -	0:40- 0:40
D	NW	0:40- 0:40	0:40 0:50	- -	0:40- 0:40
5-Mile Radius					
E	NE	0:50- 0:50	0:50 1:00	- -	0:50- 0:50
F	SE	0:50- 0:50	1:00-1:00	0:50 - 0:50	0:50- 0:50
G	SW	0:50- 2:00	1:00-1:50	- -	0:50- 1:50
H	NW	0:50- 0:50	0:50 1:00	- -	0:50- 0:50
10-Mile Radius					
I	NE	1:00- 1:00	1:00 1:10	- -	1:00- 1:00
J	SE	1:10- 2:10	1:20-2:20	1:10 - 1:10	1:00- 2:10
K	SW	2:40- 4:00	3:00-4:30	10:50 - 11:40	2:40- 4:00
L	NW	1:00- 1:00	1:00 1:10	- -	1:00- 1:00
360° EPZ					
M	ALL	2:40- 4:00	3:00-4:30	11:20 - 12:30	2:40- 4:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given Sector.

(5) All times have been rounded to the nearest 10 minutes.

(6) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE 14

EVACUATION TRAVEL TIME ESTIMATES BY SECTOR
NIGHTTIME SCENARIO
ADVERSE WEATHER

Sector	Quadrant	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
2-Mile Radius					
A	NE	0:40	0:50	-	0:40
B	SE	0:40	0:50	-	0:40
C	SW	0:40	0:50	-	0:40
D	NW	0:40	0:50	-	0:40
5-Mile Radius					
E	NE	1:00	1:10	-	1:00
F	SE	1:00	1:10	1:00	1:00
G	SW	2:20	2:10	-	2:20
H	NW	1:00	1:10	-	1:00
10-Mile Radius					
I	NE	1:10	1:20	-	1:10
J	SE	2:40	2:50	1:20	2:30
K	SW	5:00	5:20	13:40	5:00
L	NW	1:10	1:20	-	1:10
360° EPZ					
M	ALL	5:00	5:20	14:40	5:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:

(a) resident population (with and without automobiles);

(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);

(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given Sector.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE 15

EVACUATION TRAVEL TIME ESTIMATES BY SECTOR
SCHOOL-IN-SESSION SCENARIO
NORMAL WEATHER

Sector	Quadrant	Resident Population With Autos From - To	Resident Population Without Autos From - To	Special Facilities From - To	Transients From - To
2-Mile Radius					
A	NE	0:50 - 2:30	0:50-2:40	- -	0:50 - 2:30
B	SE	1:40 - 2:30	1:40-2:30	- -	1:40 - 2:30
C	SW	0:50 - 2:30	0:50-2:40	- -	0:50 - 2:30
D	NW	0:50 - 2:30	0:50-2:40	- -	0:50 - 2:30
5-Mile Radius					
E	NE	1:40 - 2:40	1:40-2:40	- -	1:40 - 2:40
F	SE	2:00 - 3:20	2:10-3:30	0:50 - 0:50	2:00 - 3:20
G	SW	1:50 - 3:10	2:10-3:20	- -	1:50 - 3:10
H	NW	1:40 - 2:40	1:40 -2:40	- -	1:40 - 2:30
10-Mile Radius					
I	NE	1:50 - 2:40	1:50-2:50	- -	1:50 - 2:40
J	SE	2:20 - 3:50	2:30-4:00	1:10 - 2:20	2:20 - 3:50
K	SW	4:10 - 7:20	4:30-7:30	12:30 - 15:20	4:10 - 7:20
L	NW	1:50 - 2:40	1:50-2:50	- -	1:50 - 2:40
360° EPZ					
M	ALL	4:10 - 7:20	4:30-7:30	13:20 - 15:20	4:10 - 7:20

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given Sector.

(5) All times have been rounded to the nearest 10 minutes.

(6) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE 16

EVACUATION TRAVEL TIME ESTIMATES BY SECTOR
SCHOOL-IN-SESSION SCENARIO
ADVERSE WEATHER

Sector	Quadrant	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
2-Mile Radius					
A	NE	3:00	3:10	-	3:00
B	SE	3:00	3:00	-	3:00
C	SW	3:00	3:10	-	3:00
D	NW	3:00	3:10	-	3:00
5-Mile Radius					
E	NE	3:10	3:20	-	3:10
F	SE	4:00	4:10	1:00	4:00
G	SW	3:50	4:00	-	3:50
H	NW	3:10	3:20	-	3:10
10-Mile Radius					
I	NE	3:10	3:20	-	3:10
J	SE	4:30	4:40	2:50	4:30
K	SW	9:00	9:10	18:30	9:00
L	NW	3:10	3:20	-	3:10
360° EPZ					
M	ALL	9:00	9:10	18:30	9:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:

(a) resident population (with and without automobiles);

(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);

(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given Sector.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

FIGURE 24
Evacuation Travel Time Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
School-In-Session Scenario

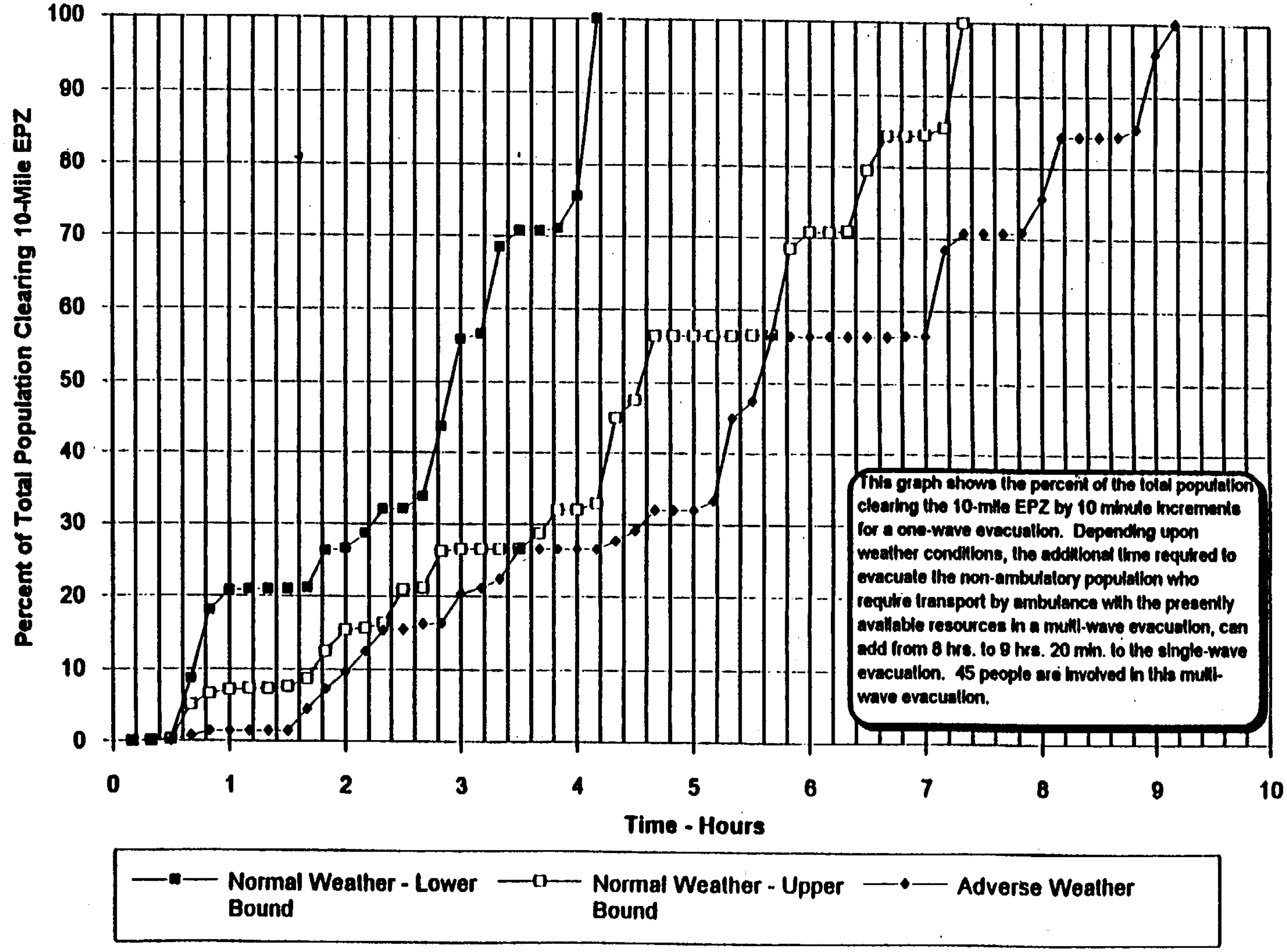


FIGURE 25
Evacuation Travel Time Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
School-Not-In-Session Scenario

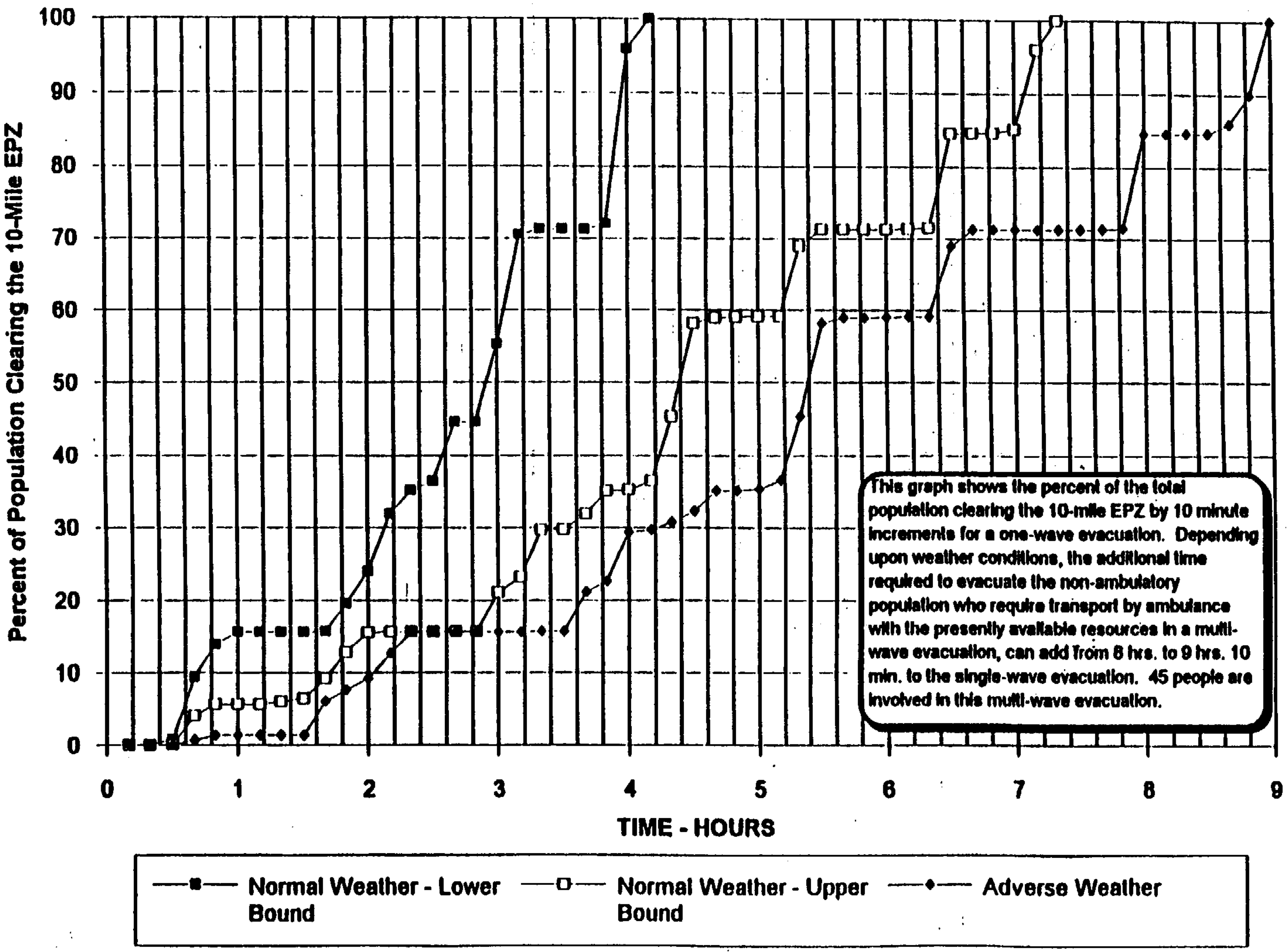


FIGURE 26
Evacuation Travel Time Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
Summer Weekend/Holiday Scenario

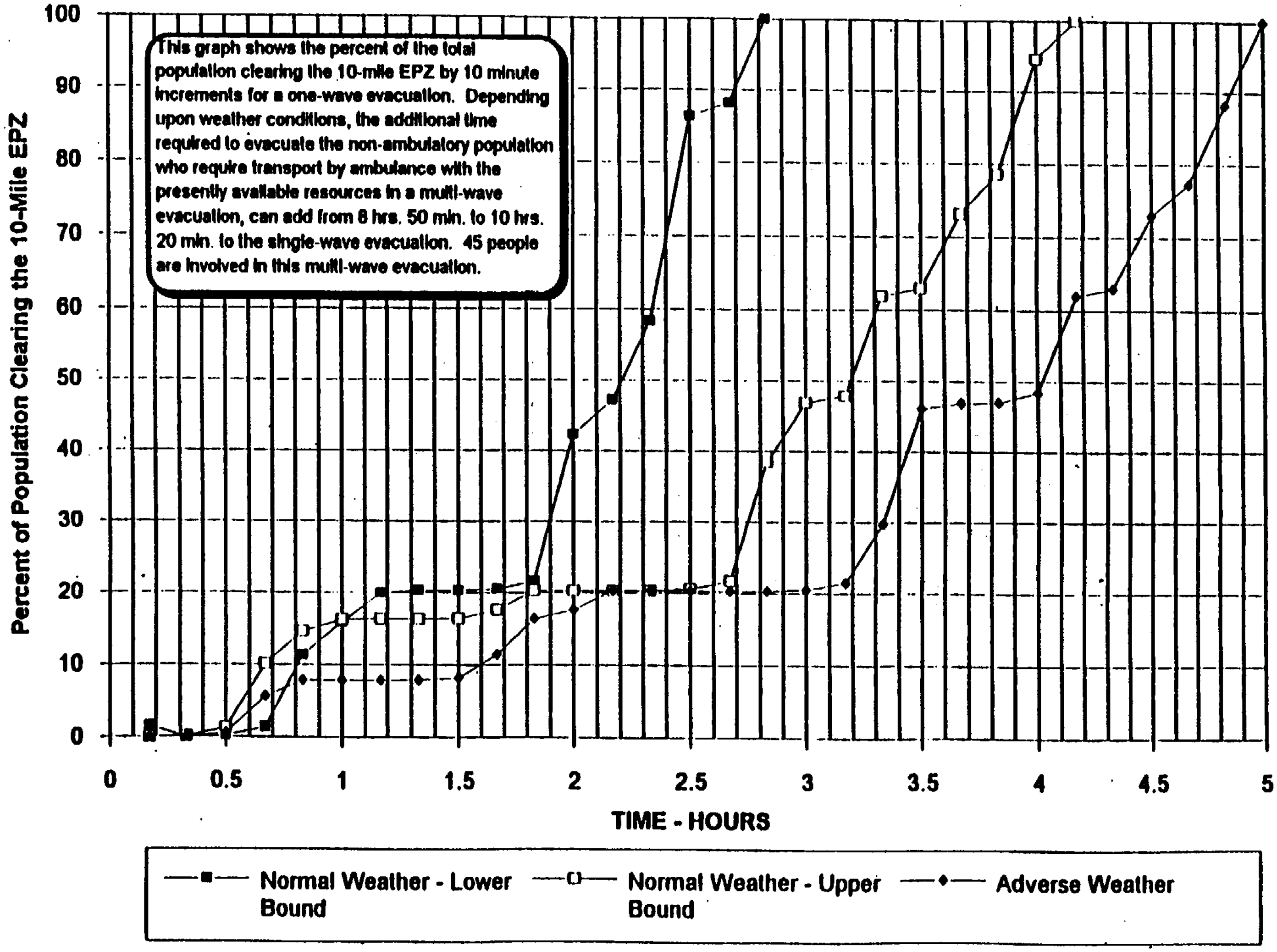


FIGURE 27
Evacuation Travel Time Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
Winter Weekend/Holiday Scenario

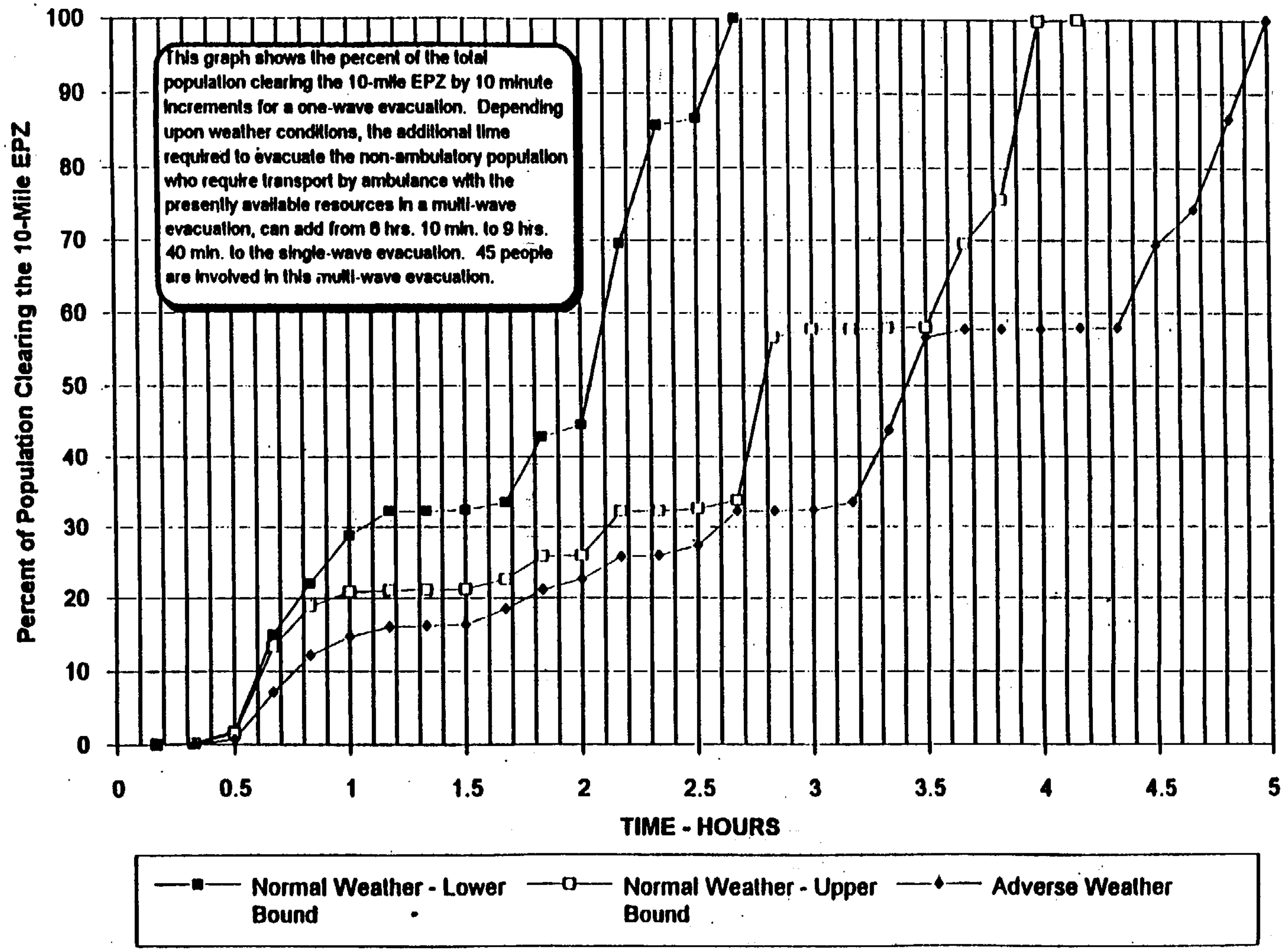


FIGURE 28
Evacuation Travel Time Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
Nighttime Scenario

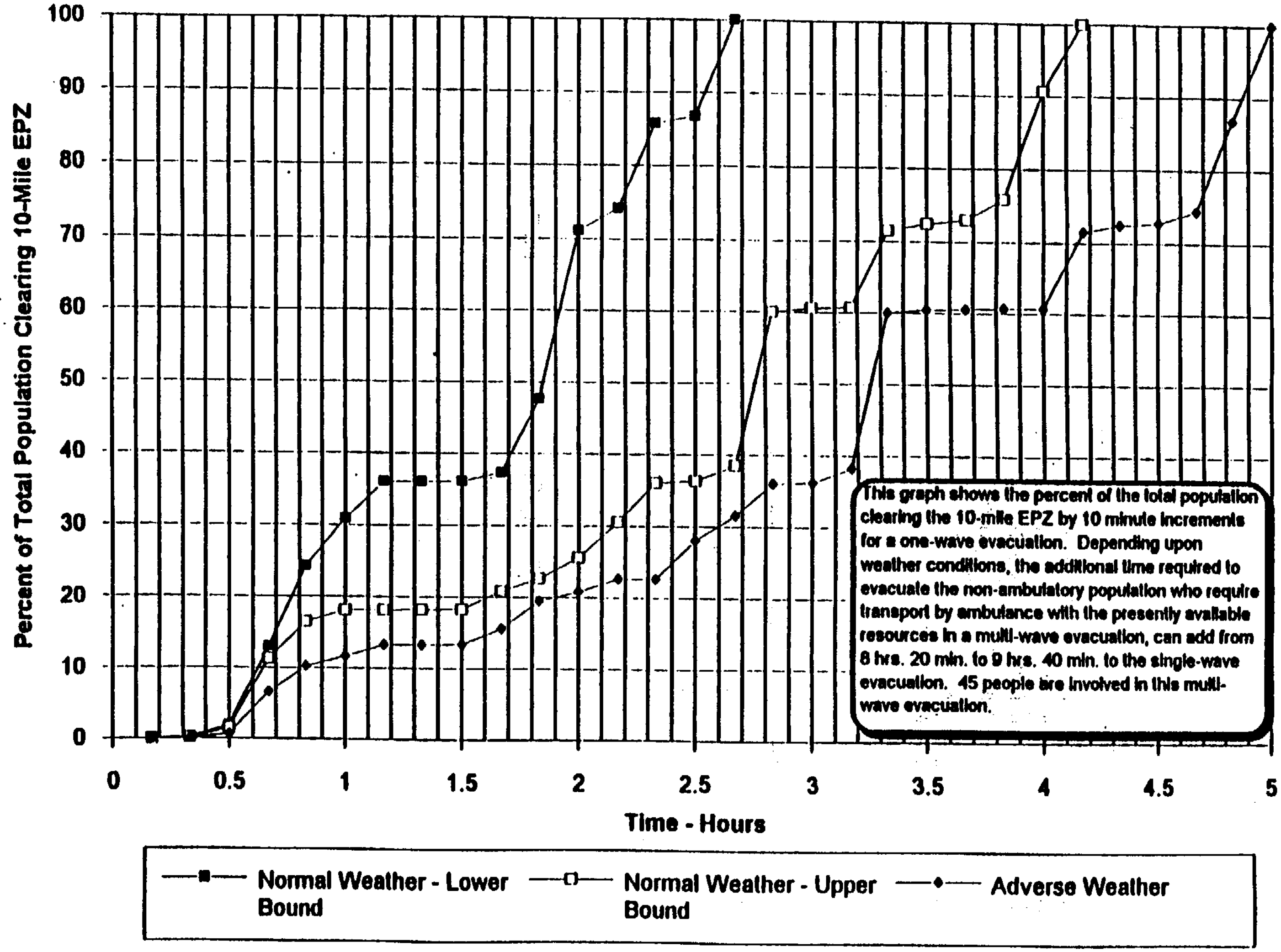


FIGURE 29
Evacuation Travel Time Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
Evening Scenario

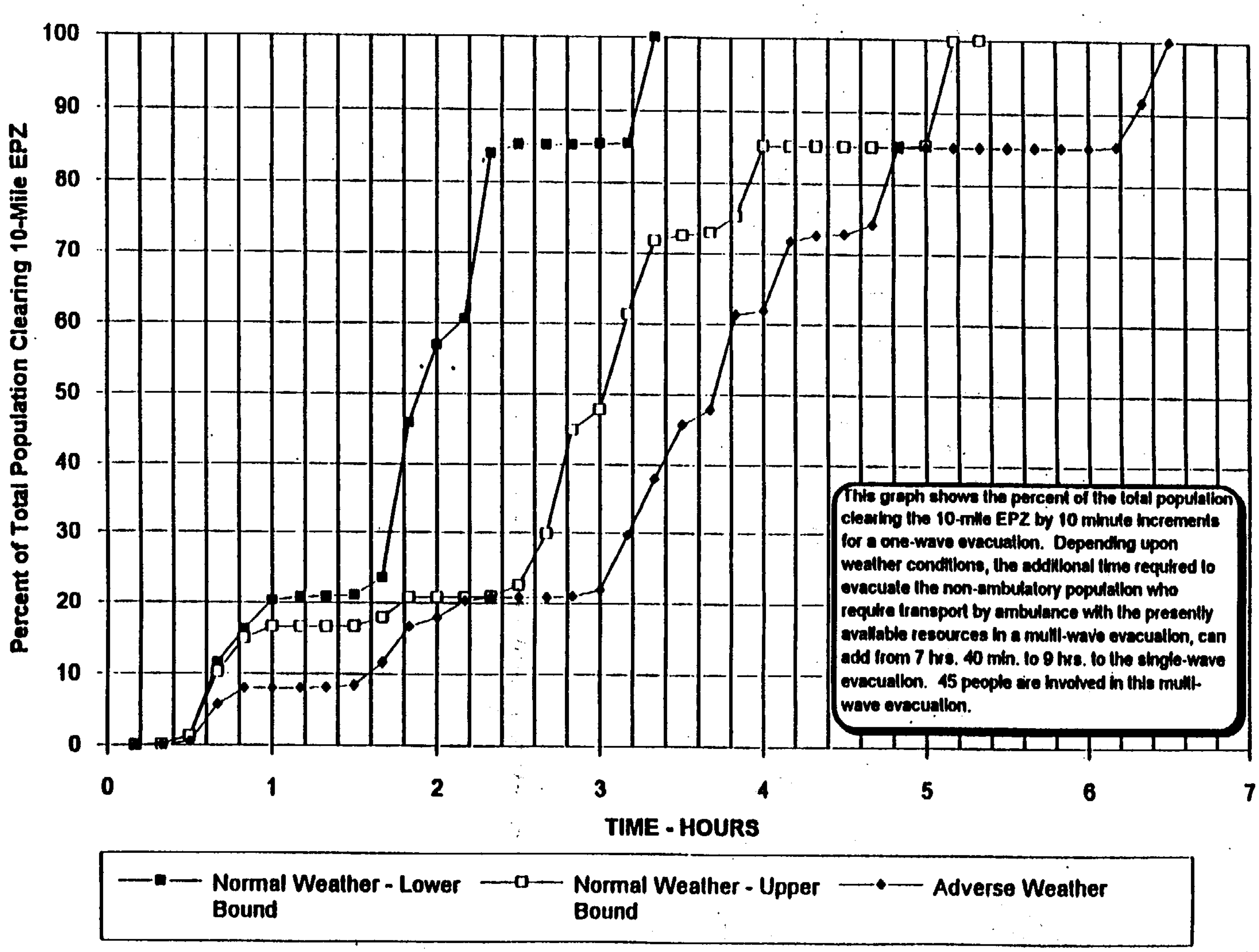


FIGURE 30
Evacuation Travel Time Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
Classic Weekend Scenario

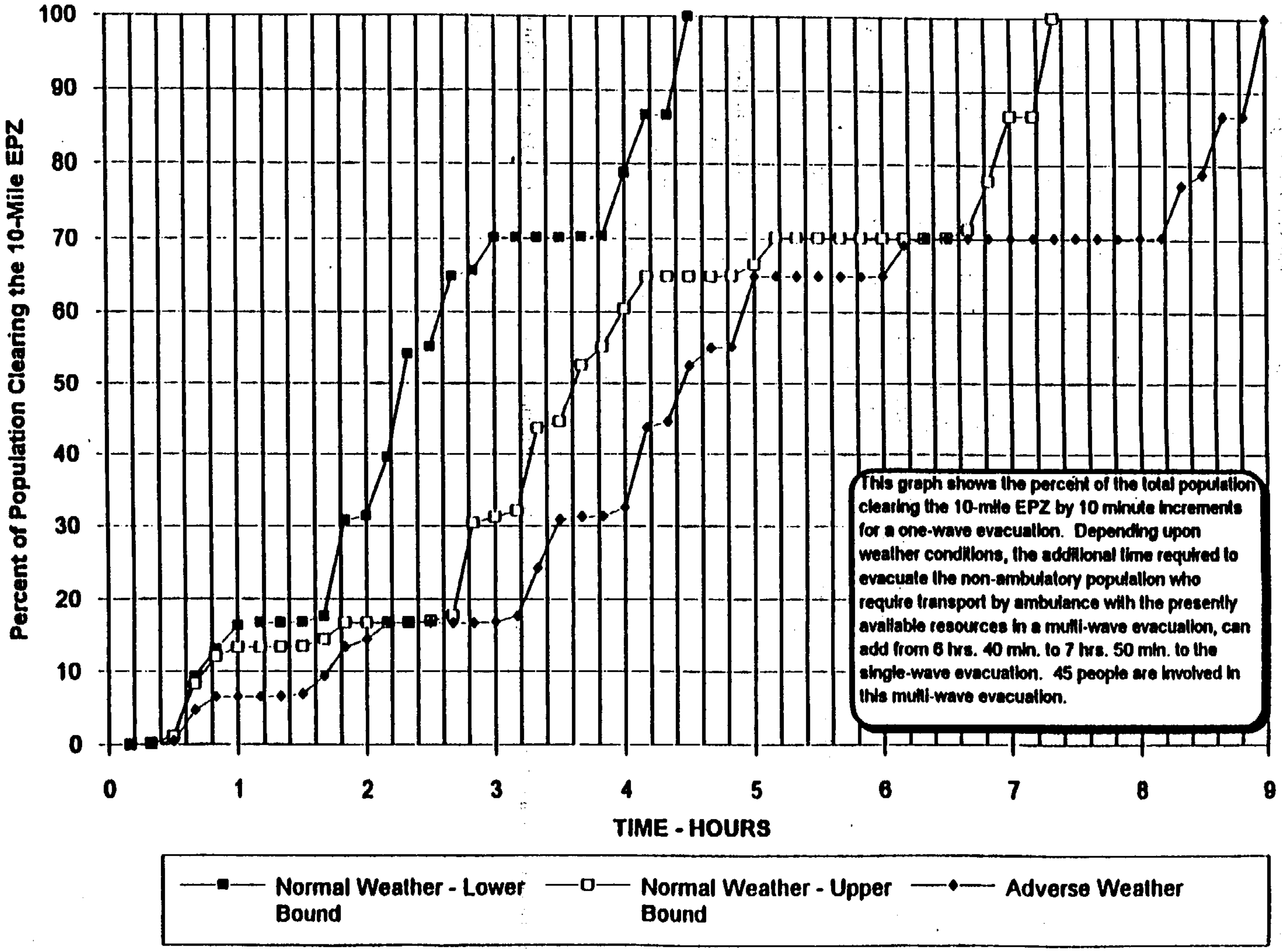
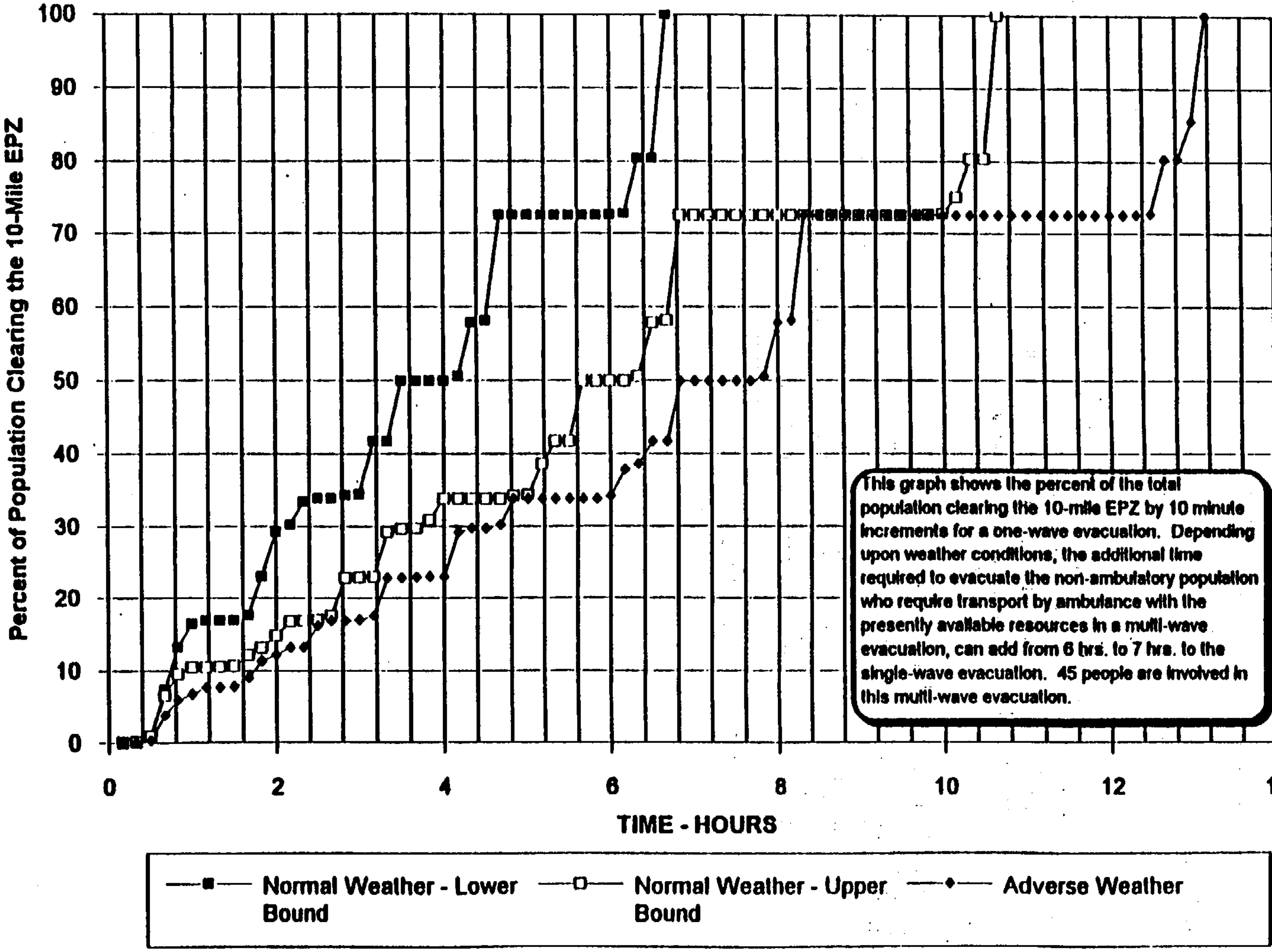


FIGURE 31
Evacuation Time Travel Estimates
James A. FitzPatrick/Nine Mile Point Nuclear Power Stations
Harborfest Weekend Scenario



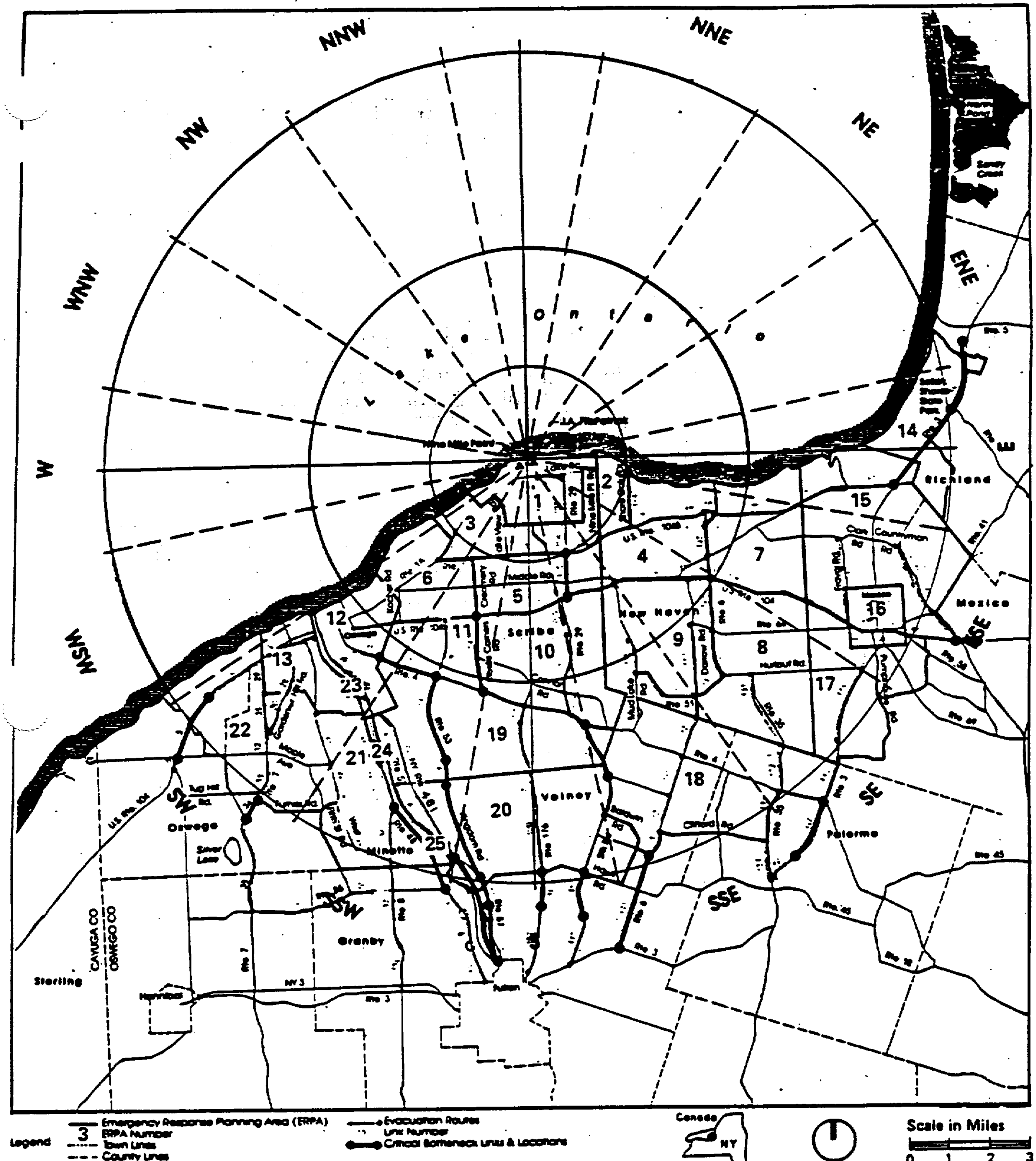


Fig. 32 Critical Bottleneck Links, School-in-Session Scenario

Parsons Brinckerhoff

IV-20

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

REV. JULY, 1993

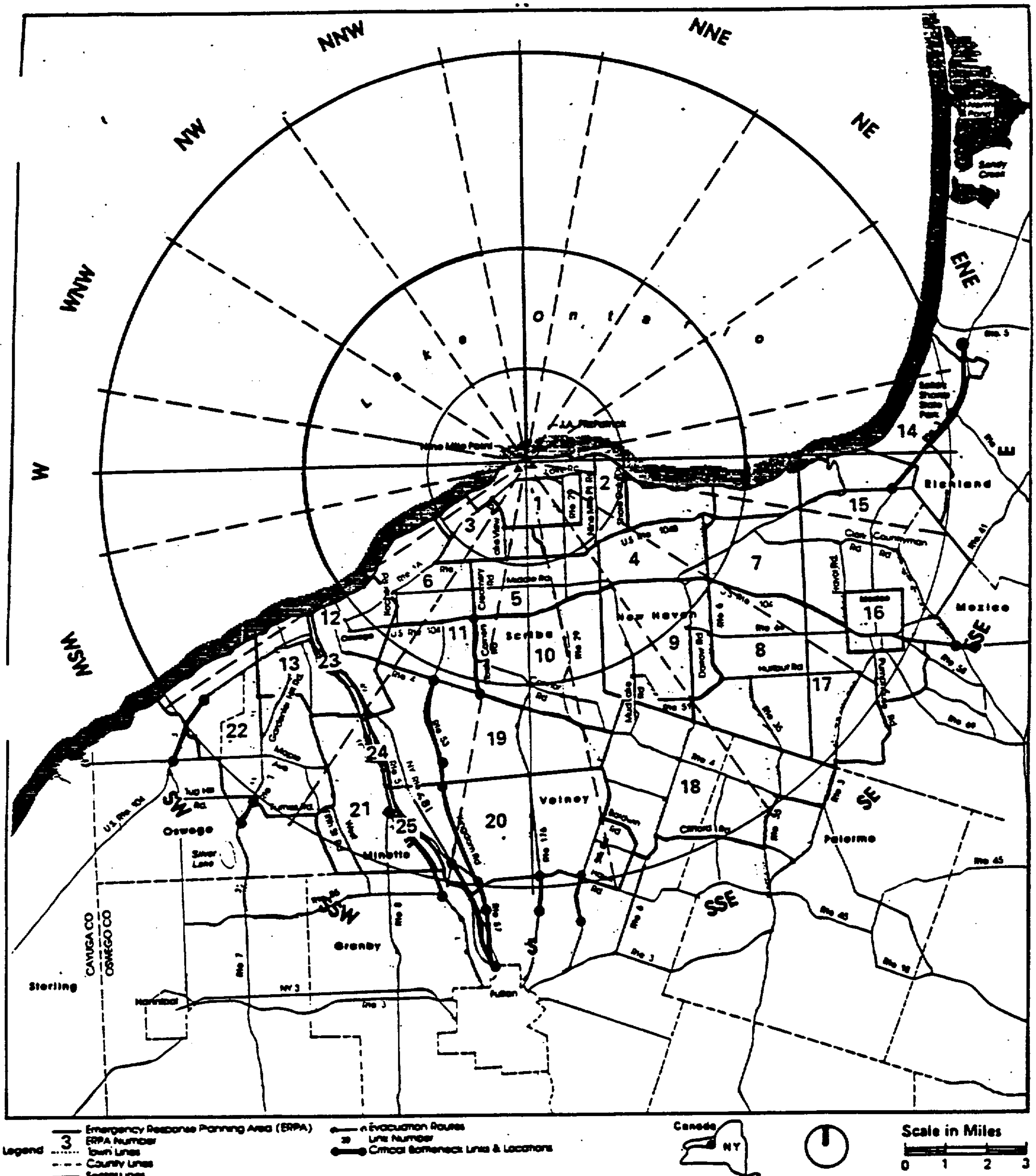


Fig. 33 Critical Bottleneck Links Nighttime Scenario

J.A. FitzPatrick/ Nine Mile Point Nuclear Power Stations

Parsons Brinckerhoff

IV-21

REV. JULY, 1993

V. COMPARISON TO EARLIER EVACUATION TIME ESTIMATES

Evacuation travel time estimates have been prepared for eight specific scenarios. These scenarios are listed below in order of increasing evacuation travel time:

- Nighttime
- Weekend/Holiday winter, daytime
- Weekend/Holiday summer, daytime
- Evening
- Classic Weekend
- Weekday, school-not-in-session
- Weekday, school-in-session
- Harborfest

The evacuation travel times vary for each scenario because the number of vehicles required to evacuate the different population groups within the EPZ varies for each scenario. For example, the Nighttime Scenario requires the fewest number of vehicles to evacuate the population because the majority of the population is at home, most businesses are closed, and institutions have a minimal staff on duty. In essence, the number of vehicles evacuating the EPZ is small because for the most part, only the permanent resident population is being evacuated. Hence, the nighttime scenario is evacuated in the shortest amount of time.

On the other side of the spectrum, the Harborfest Scenario requires the longest amount of time to evacuate. When compared to the Nighttime Scenario, approximately 100,000 people are estimated to require evacuation during the fireworks display on Saturday night from the EPZ. This substantial population size involves more vehicles for evacuation purposes than any other scenario. Additional vehicles on the evacuation roadway network ultimately result in additional traffic congestion and longer evacuation times.

The other six scenarios result in evacuation times which fall somewhere between the nighttime and Harborfest scenarios. Similarly, the evacuation times vary with the number of vehicles evacuating the EPZ. For example, during the weekend scenarios, parks, campgrounds, and beaches are open to the public. During evening hours, the permanent resident population tends to be away from home as they may be shopping or attending entertainment venues. During the Classic Weekend, additional vehicles for those attending this event are in the EPZ. The weekday school-in-session and school-not-in-session scenarios see an increase in the transient population when compared to the weekday, evening, and nighttime scenarios. These additional activities result in more vehicles on the evacuation roadway network which again, increases evacuation times.

The evacuation travel time estimates prepared for this report were compared to the time estimates included in the earlier 1984 update. In general, the evacuation travel times for Sector M for all evacuation scenarios have increased. These increases are attributable in part to many factors including:

- An increase in EPZ employment estimates
- An increase in average household automobile ownership within the EPZ
- Changes to the methodology and subsequent capacities of roadways within the EPZ to conform to the current 1985 Highway Capacity Manual.

The permanent resident population within the EPZ has decreased overall from an estimated 43,349 in 1984 to an estimated 42,597 in 1991; however, there was a major population increase along the western side of the Oswego River within Traffic Zone 13b. Consequently, the evacuation travel time estimates for ERPA 13 have increased to the point where it results in longer evacuation travel times for the EPZ as a whole under all simulated evacuation scenarios.

New York State Department of Labor statistics show that employment has also increased within the EPZ. The increase in employment results in additional vehicles on the evacuation roadway network and increased travel times. In addition, the evacuation of some non-essential employees from the JAF/NMP facility is included in the evacuation travel time estimates.

There are an additional 607 registered automobiles owned by the permanent resident population in the EPZ in 1991 when compared with the 1984 update estimates. Some of these additional vehicles are the result of more multi-vehicle ownership residents which now reside in the EPZ; therefore, not all of these vehicles will be added to the vehicle estimates for evacuation time estimate purposes.

Last of all, there has been a complete revision to the engineering methodology which estimates vehicular capacities of roadways. In 1985, a new Highway Capacity Manual was published by the Transportation Research Board which replaced the standards outlined in the 1965 Highway Capacity Manual. As a result, roadway capacities for the evacuation roadway network within the EPZ are different in the 1991 update than they were for the 1984 update. Since these roadway capacities are directly related to modeling traffic flow and estimating travel times, a change in evacuation travel times is likely to occur. Appendix F outlines methodologies contained in the 1985 Highway Capacity Manual which were used in this report.

APPENDICES

APPENDIX A

EMERGENCY RESPONSE PLANNING AREAS:

DEFINITION OF BOUNDARIES AND

1991 PERMANENT RESIDENT POPULATION ESTIMATES

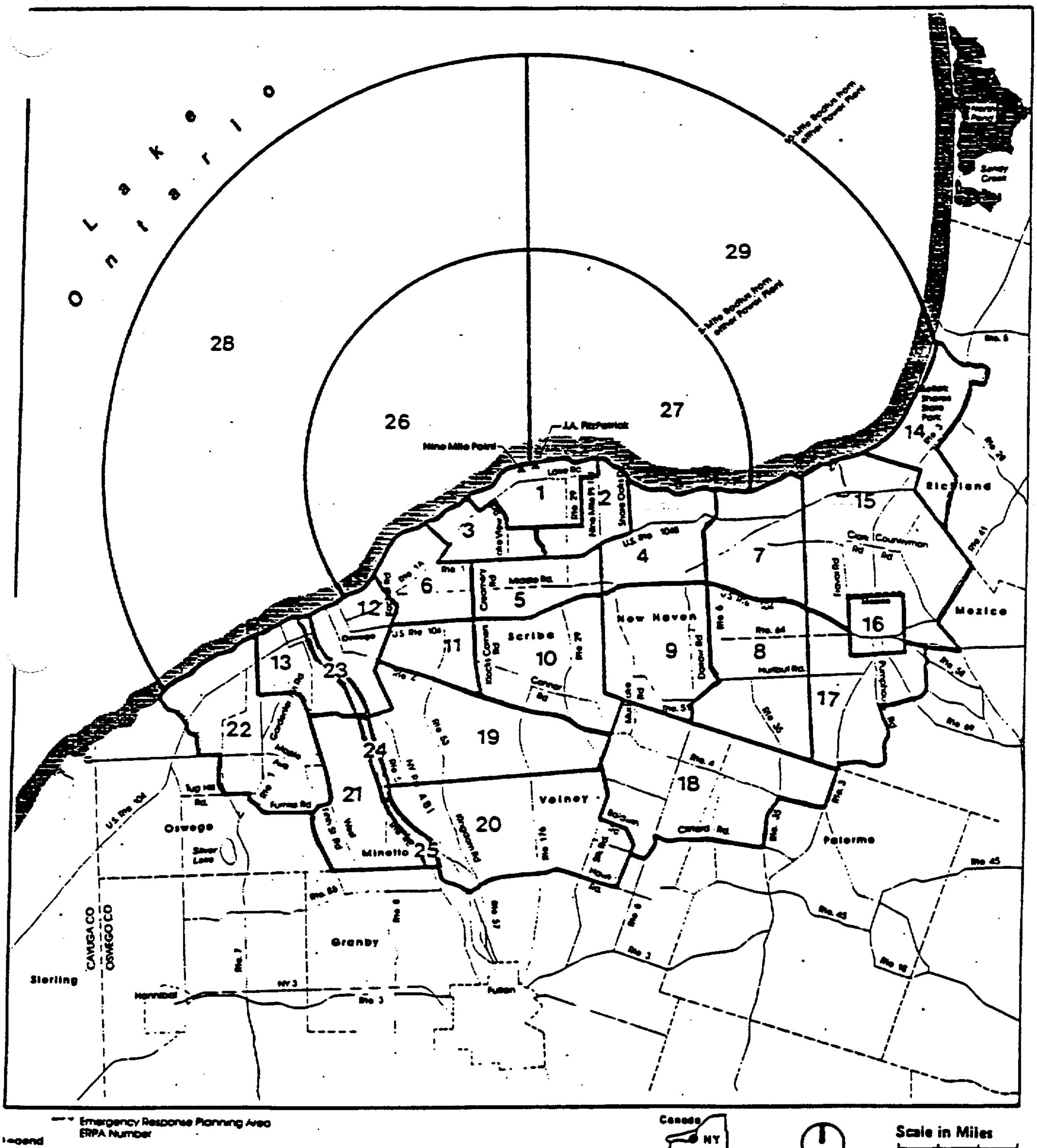


Fig. A-1

Parsons Brinckerhoff

A-1

J.A. FitzPatrick/
Nine Mile Point
Nuclear Power Stations

EMERGENCY RESPONSE PLANNING AREAS:

DEFINITION OF BOUNDARIES AND 1991 PERMANENT RESIDENT AND TRANSIENT POPULATION ESTIMATES

The plume exposure pathway Emergency Planning Zone (EPZ) for the site has been subdivided into 29 discrete Emergency Response Planning Areas (ERPAs) as shown in Figure A-1. Estimates of 1991 permanent resident population by ERPA are included in Table A-1. The boundaries of the various ERPAs are described below:

ERPA 1 — Lake Ontario on the North; Nine Mile Point, and Parkhurst Rds. to the East; Minor Rd. to the South; Bayshore, and Lakeview Rds. to the west.

ERPA 2 — Lake Ontario on the North; Shore Oaks Drive to the East; County Rte. 1 on the South; and to just west of County Rte. 29 between Miner and North Rds. to the West.

ERPA 3 — Lake View and Miner Rds. on the North; just east of County Rte. 29 to the East; to County Rte. 1 on the South; corner of County Rts. 1 and 1A to the West.

ERPA 4 — Lake Ontario on the North; Demster Beach Drive, County Rte 6 and 6A to the East; US Rte 104 on the South; Shore Oaks Dr., County Rte. 1, and to just west of Woolson and Dennis Rds. to the West.

ERPA 5 — County Rte. 1 on the North; just west of Woolson and Dennis Rds. to the East; U.S. Rte. 104 on the South; and Creamery Rd. to the West.

ERPA 6 — The road just east of the Alcan Plant and Co. Rte 1A on the North; Creamery Rd. to the East; U.S. Rte. 104 on the South; and County Rte. 63 to the West.

ERPA 7 — Lake Ontario on the North; just west of Mexico Pt. between County Rte. 43 and Ladd Rds. to the East; U.S. Rte 104 on the South; and County Rte. 6 and Demster Beach Drive to the West.

ERPA 8 — U.S. Rte. 104 on the North; just east of and Green Rd. to the East; the intersection of Johnson and Craw Rds in Vermillion on the South; and County Rte. 6 to the West.

ERPA 9 — U.S. Rte. 104 on the North; County Rte. 6 to the East; just North of Taplan Drive on the South; and to just west of Co. Rte. 51 to the West.

ERPA 10 — U.S. Rte. 104 on the North; just east of Co. Rte. 51 to the East; County Rte. 4 on the South; and Klocks Corners Rd to the West.

ERPA 11 — U.S. Rte. 104 on the North; Klocks Corner Rd. to the East; County Rte. 4 on the South; and City Line Rd. to the West.

ERPA 12 — The City of Oswego, East of the Oswego River.

ERPA 13 — The City of Oswego West of the Oswego River.

ERPA 14	County Rte. 5 (just past the bridge in Port Ontario) on the North; N.Y. Rte. 13, Manwaring Rd. and just east of S. Daysville Rd. to the East; Sherman Rd. on the South; and Lake Ontario to the West.
ERPA 15	Just north of the intersection of Rte. 104B, N.Y. Rte. 3 and Sherman Rd. on the North; Sherman, Spath and Smithers Rd. to the East; U.S. Rte 104, excluding the village of Mexico on the South; the intersection of George Rd. and U.S. Rte. 104, and just west of Mexico Pt., between County Rte. 43 and Ladd Rds. to the West.
ERPA 16	The Village of Mexico.
ERPA 17	U.S. Rte. 104 and the southern boundary of Village of Mexico, on the North; Emery, Stone, Larson and Pumphouse Rds. to the East; Gillette Rd. on the South; to just east of and Green Rd. to the West.
ERPA 18	Just below County Rte. 51, just above Taplan Dr., and the intersections of Johnson and Craw Rds. on the North; N.Y. Rte. 3, County Rte. 4, and County Rte. 35 to the East; Clifford Rd. on the South; Baldwin, Silk, and just east of O'Connor Rds. to the West.
ERPA 19	County Rte. 4 on the North; just east of Silk Rd. to the East; just above County Rte. 45, (intersecting with County Rte. 53), Myers, black Creek, and Paddy Lake Rds. on the South; the Oswego River to the West.
ERPA 20	Just above Co. Rte. 45, (intersecting with County Rte. 53), Myers, Black Creek, and Paddy Lake Rds. on the North; Silk, and Baldwin Rds. to the East; Hawk and Rowlee Rds. on the South; the Oswego River to the West.
ERPA 21	Oswego City Line on the North; the Oswego River to the East, Hickory Grove Rd. on the South; Ridge, Furniss and County Rte. 25 to the West.
ERPA 22	Lake Ontario on the North; County Rte. 7, Byer Rd., and County Rte. 25 to the East; Furniss and Tug Hill Rds. on the South; Bunker Hill Rd. and Maple Ave. to just west of Crestwood Dr. to the West.
ERPA 23	Oswego River within the Oswego City Limits.
ERPA 24	Oswego River south of the Oswego City Limits to Lock #5 in Minetto.
ERPA 25	Oswego River south of Lock #5 in Minetto North to Hickory Grove Rd.
ERPA 26	Portion of Lake Ontario within 5 miles and West of the plants.
ERPA 27	Portion of Lake Ontario within 5 miles and East of the plants.
ERPA 28	Portion of Lake Ontario between 5 and 10 miles West of the plants.
ERPA 29	Portion of Lake Ontario between 5 and 10 miles East of the plants.

TABLE A-1

1991 PERMANENT RESIDENT AND TRANSIENT POPULATION ESTIMATES

EMERGENCY RESPONSE PLANNING AREAS

EMERGENCY RESPONSE PLANNING AREA	1991 POPULATION ESTIMATES PERMANENT RESIDENTS	TRANSIENTS
1	148	1,558
2	459	60
3	301	0
4	762	464
5	824	14
6	1,028	698
7	689	337
8	706	91
9	513	68
10	970	1,651
11	1,652	14
12	8,428	5,163
13	10,862	3,341
14	127	2,534
15	1,153	780
16	1,497	378
17	713	70
18	1,056	78
19	1,246	75
20	1,605	312
21	1,953	802
22	5,905	476
TOTAL	42,597	19,005

APPENDIX B

LISTING OF SPECIAL FACILITIES IN THE EMERGENCY PLANNING ZONE

OSWEGO SPECIAL FACILITIES
CAMPGROUNDS

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	SUMMER AVERAGE WEEKEND ATTENDANCE		WINTER AVERAGE WEEKEND ATTENDANCE	
			DAYTIME	NIGHTTIME	DAYTIME	NIGHTTIME
Dempster Grove RD1 Rt.104B New Haven Between Rt.6 & Booth Rd. Oswego, New York 13126	4	Alice Burton 963-7139 Cynthia Muir 963-8411	90	90	0	0
Flat Rock Campsite Co. Rte. 16 Mexico, New York 13114	15	963-7096	484	484	69	69
Ontario Bible Conference Camp Lakeview Road Oswego, New York 13126	1	343-6111 343-9772 342-5061	272	272	0	0
Twin Pines Cabins and Campgrounds N. Road Co. Rte.1 + Rte. 1a Oswego, New York 13126	4	Jones & Janet Willie 343-2475 Sheila Higgenbotham 343-8655	250	175	0	0

OSWEGO SPECIAL FACILITIES
COLLEGES

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	COMMUTING STUDENT/STAFF Spr./Sum./Fall/Win.	STAFF/FACULTY (Day/Evening)	RESIDENT STUDENTS Spr./Sum./Fall/Win.
SUNY College at Oswego 211 Culkin Hall Oswego, New York 13126	22	Thomas M. Ryan 315-341-5555 Dr. Roger Hinrichs Radiation Safety Officer 341-3057 Bernie Henderson 341-2222	(morning) 4000/2400/4000/4000 (afternoon) 1000/500/1000/1000 (evening) 500/300/500/500	Spr 1160/240 Sum 875/230 Fall 1160/240 Win 1160/240	4000/1250/4000/4000

OSWEGO SPECIAL FACILITIES
CORRECTIONAL FACILITIES

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	# DETAINEES		STAFFING				AVAILABLE EMERGENCY TRANSPORTATION SERVICES
			MAXIMUM	AVERAGE	DAY	EVENING	NIGHT	WEEKENDS	
Oswego County Sheriff's Dept. R.D. #4, Box 5 Rte. 481, at Intersection of CR 57 Oswego, New York 13126	12	Reuel Todd, Undersheriff home 343-1897 day 343-2900 Horace Holder, Corr. Supervisor home 592-5424 day 343-6969	96	96	7	6	5	6	2 Vehicles hold a capacity of 19

OSWEGO SPECIAL FACILITIES
DAYCARE CENTERS

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	ENROLLMENT	FACILITY/ ADMIN. STAFF	SESSION HOURS	AVAILABLE EMERGENCY TRANSPORTATION SERVICES ON SITE	STUDENT DRIVERS	CAR-POOL STUDENTS
Children's Center East 10th & Mitchell Sts. Oswego, New York 13126	12	Jan Illingworth 341-2587 or 342-5019 Kathy Lee 341-2587 or 342-5019	45	2 Administrative 5 Staff	7:00 AM - 5:30 PM, M-F, 52 weeks per year	None	N/A	N/A
Growing Years 165 East Seneca Street Oswego, New York 13126 also: Latch-Key @St. Paul's Academy 115 E. 5th St. Oswego, New York 13126	12	Jeanne Brown & Kathy Vickery - Stooks (315) 342-8992	129 on - site 18 located at St.Paul's Academy	27	6:00 AM - 6:00 PM all year	None	N/A	N/A
Headstart Of Oswego Faith United Church 150 W. 5th St. Oswego, New York 13126	13	Kathi Czachor, Ida M. Scaglione, and Beth Kazel 598-4711 or 598-4718	AM class 17 and PM class 17	5	8:30 AM - 12 PM & 12:00 PM - 3:30 PM	None	N/A	N/A
Kinder College c/o The YMCA 249 West 1st Street Oswego, New York 13126	13	Melissa Cunningham 343-1981 Bonita Tyrell 343-1981	Mon. Wed. Fri. 20 Tu. Thur. 13	1 Teacher 1 - 3 Volunteers	9:00 AM - 11:30 AM	None	N/A	N/A
Minetto Nursery School Minetto Town Hall Minetto, New York 13115	21	Margaret Talamo, Program Coordinator 342-1420 Joan Swales, Teacher 342-4529	48	1 Teacher and 2 Helping Parents	M.W.F. 9:30-11:45 AM & 12:45-3:00 PM/ Tu.Th. 9:30-11:30 AM	None	N/A	N/A
Mother Goose Nursery School Presbyterian Church Church Street Mexico, New York 13114	18	Carol Pond 963-8853 Anne Wagner 963-3262 School# 963-7757	37	2 Adults	8:15 AM - 2:00 PM	None	N/A	N/A
Oswego Community Christian School, Port City Faith Assembly of God Church Pre-School Program P.O. Box 3039 436 west 5th Street Oswego, New York 13126	13	Peter Southcott 342-9322 Anne King 342-9322	14	1 Teacher 1 Assistant	Sept. - June 9:00 AM - 12:00 PM M.,W.,F.	None	N/A	N/A
Oswego Nursery School Congregation Adeth Israel, P.O.Box 23 East Third & Oneida Sts. Oswego, New York 13126	12	Cindy Hall (Tues. & Thurs.) 342-0371 Karen Metz (Mon., Wed, & Fri.) 342-0371 Lisa Potter 341-5558 or 342-1098 Angelo Ferlito 342-7158	60	4	Mon. - Fri. 9:00-11:30 AM & 12:30-3:00 PM	None	N/A	N/A

OSWEGO SPECIAL FACILITIES
HEALTHCARE FACILITIES

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	# PATIENTS		STAFFING			RESIDENT EVACUATION REQUIREMENTS *	
			MAXIMUM	AVERAGE	DAY	EVENING	NIGHT	AMB.	NON-AMB.
Oswego Hospital 110 W. Sixth Street Oswego, New York 13126	13	E. Bowmen (7 - 3) 349-5508 R. Bucher (3 - 11) 349-5566 M. Slembor(11 - 7) 349-5560	174	148	145 (7:00 AM - 3:00 PM)	56 (3:00 PM - 11:00 PM)	33 (11:00 PM - 7:00 AM)	74	22 Stretchers 52 Wheelchairs
Oswego Hospital Inpatient Unit Mental Health Center 74 Bunner Street Oswego, New York 13126	12	Michael L. Herrera, Director 343-8162 Kimberly P. Garlm, Manager 343-8162	28	24	13	11	6	none	none
Oswego Hospital Outpatient Unit Mental Health Center 74 Bunner Street Oswego, New York 13126	12	Michael L. Herrera, Director 343-8162 Constance McKinstry 343-8162	60	12	15	2	0	none	none

* NOTE: AMB. = AMBULATORY
NON-AMB. = NON-AMBULATORY

OSWEGO SPECIAL FACILITIES
NURSING HOMES

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	RESIDENTS MAXIMUM	RESIDENTS AVERAGE	STAFFING DAY	STAFFING EVENING	STAFFING NIGHT	RESIDENT EVACUATION REQUIREMENTS * AMB.	RESIDENT EVACUATION REQUIREMENTS * NON-AMB.
Harr-Wood Nursing Home 17 Sunrise Drive Oswego, New York 13126	13	Marty Miller 342-2068 Larry Peck 343-7618	120	120	59 (7:00 AM-3:00 PM)	22 (3:00 PM-11:00 PM)	13 (11:00 PM-7:00 AM)	11	99 Wheelchairs 10 Stretcher
Hillcrest Nursing Home 132 Ellen Street Oswego, New York 13126	13	Nursing Supervisor on duty 342-2440 Thomas M. Fahey Admin. 445-0394 beeper 441-6111	120	120	61 (7:00 AM-3:00 PM)	28 (3:00 PM-11:00 PM)	10 (11:00 PM-7:00 AM)	30	70 Wheelchairs 20 Stretchers
Intermediate Care Facility Fravor Road Mexico, New York 13114	4	Brenda Wallace 598-6120 Michelle Gorton 963-3995	9	9	1 (8:00 AM-4:00 PM)	3 (4:00 PM-12:00 AM)	1 (12:00 - 8:00 AM) +2 relief at 6:00 AM	7	2 Wheelchairs
Ladies Home 43 East Utica Street Oswego, New York 13126	12	Rebecca Dodge 343-2962 / 349-8222 Barbara Sharkey 343-6587	17	16	6 (7:00 AM-3:00 PM)	1 - 2 (3:00 PM-11:00 PM)	1 (11:00 PM-7:00 AM)	13	4 Wheelchairs
Pontiac Nursing Home East River Road Oswego, New York 13126	12	John A. Viverzio (W)343-1800 (H)699-1960 Patricia Squitieri (W)343-1800 (H)343-6946 George Galletta (W)343-1800 (H)343-0048	80	80	50 (6:45 AM-3:00 PM)	13 (2:45 PM-11:00 PM)	5 (10:45 PM-11:00 AM)	0	55 Wheelchairs 15 Stretchers 10 Walkers
St. Lukes Health Related Facility East River Road RD#4 Oswego, New York 13126	12	Terrence Gorman work: 342-3166 home: 342-0321 Gloria Morgan work: 342-3166 home 593-1654	120	120	20 - 25	12	9	56	64 Wheelchairs
Valehaven Home for Adults East Second Street On the corner of East Second & Oneida Streets Oswego, New York 13126	12	Jane E. Breitbeck Administrator work 342-3959 home 342-7605 Cathrine Hill, Assistant work 342-3959 home 343-6017	35	35	5 (8:00 AM-4:00 PM)	1 (4:00 PM-12:00 AM)	1 (12:00 PM-8:00 AM)	32	1 Wheelchair 2 Walkers

* NOTE : AMB. = AMBULATORY
NON-AMB. = NON-AMBULATORY

OSWEGO SPECIAL FACILITIES
PARKS/BEACHES

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	SUMMER AVERAGE WEEKEND ATTENDANCE		WINTER AVERAGE WEEKEND ATTENDANCE	
			DAYTIME	NIGHTTIME	DAYTIME	NIGHTTIME
Boars Sleepy Hollow Park 7081 Scenic Highway Pulaski, New York 13142	14	298-5560	124	124	0	0
Chedmardo Beach & Campsite Route 3 2-1/2 mi. South of Port Ontario Pulaski, New York 13142	14	Robert F. LaPoint 298-5739	100	125	0	0
City Of Oswego Parks and Recreation Dept. Fort Ontario Oswego, New York 13126	12	Anthony Ponzi 343-0243	150	150	150	150
Dowie Dale Beach Rte. 104B between New Haven and Mexico Line Mexico, New York 13114	7	Rose Dowie, Owner Pat Dowie, Daughter 963-7695	200	200	0	0
Fort Ontario N.Y. State Historical Site Fort Ontario E. 7th street Oswego, New York 13126	12	Paul Lear, Pat Sivers 343-4711 Dan Lyons, Bob Hudlim 343-1058	Peak = 500 day Avg. = 250 day	Peak = 100 even. Avg. = 25 even.	50	0
Mexico Point Beach & State Boat Launch Mexico, New York 13114	15	963-3656	150	150	0	0
Ramona Beach Rte. 3 Hager Drive Pulaski, New York 13142	14	Robert Hickey 298-4964 Robert Furnis 298-4521	210	210	18	18
Scriba Town Park O'Connor Road Oswego, New York 13126	10	Frank Church, Town Supervisor 343-3019 Judith Talbot, Recreational Director, 343-1853	Peak = 1500 Avg. = 800	0	0	0
Selkirk Shores State Park/Beach Route 3 Pulaski, New York 13142	14	Linda Rupert 298-5737 Dan Davis 298-5737	2100 with 750 cars	1000 with 350 cars	150	100
Sunset Cabin Trailer Park Co. Rte. 89 1mi. W. of Oswego Oswego, New York 13126	22	Dave & Deanne Mulcahey 343-2166	24 with 12 cars	48 with 24 cars	0	0

OSWEGO SPECIAL FACILITIES
PARKS/BEACHES

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	SUMMER AVERAGE WEEKEND ATTENDANCE		WINTER AVERAGE WEEKEND ATTENDANCE	
			DAYTIME	NIGHTTIME	DAYTIME	NIGHTTIME
Wrights Landing c/o Parks and Recreational Dept. Fort Ontario W.4th & Lake Streets Oswego, New York 13126	12	Greg Neal, Director (w) 342-8172 (h) 963-0610	400 with 300 vehicles	200 with 150 vehicles	0	0

OSWEGO SPECIAL FACILITIES
SCHOOLS

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	ENROLLMENT	FACILITY/ ADMIN. STAFF	SESSION HOURS	BUSES REQUIRED FOR EVACUATION	STUDENT DRIVERS	CAR-POOL STUDENTS
Bishop Cunningham Jr./Sr. HS East River Road Oswego, New York 13126	12	Sister DePaul, school 343-3001 Convent 343-3807 or 343-3850 Patricia Egan 343-3001	183	Administrator 1, Staff 28	Sept. to June 7:30 AM – 4:00 PM	4	10	8
Boces Special Ed Program Park/Wilber Hall, SUNY Oswego, New York 13126	17	Sharon Benecal 315-963-4240 Barbara Tyo 315-963-4244 Prescott Whitney 315-963-4246	900+ Students – AM Session 8:00–11:10 AM PM Session 12:00 – 2:30 PM 80 Children in Daycare	Administrator 1, Staff 45, Counselors 8, and Secretaries 4	8:00 AM – 2:30 PM 7:00 AM – 6:00 PM (Daycare)	18	N/A	N/A
Boces County Route 64, Mexico, New York 13114	17	Weston Hyde (315) 963-4222 Louis Pettinelli (315) 963-4266	1040	814	8:00 AM – 3:30 PM	18	Only PM students are allowed to drive and student driving is limited	N/A
Charles E. Riley Elementary School E. 8th & Bunner St. Oswego, New York 13126	12	Francis M. Witkowski, Principal 341-5835 Sara Mitchell Stenographer 341-5829	530	60	9:10 AM – 3:10 PM / September 4 – June 24, 1992	9	N/A	N/A
Fitzhugh Park Elementary Sch. East 10th & Bridge Sts. Oswego, New York 13126	12	Rick Harvell 341-5969 Gary Roy 341-5822 Ed. Center 341-5865	610	60 – 65 Faculty and Staff 50 – 65 Have Vehicles	8:00 AM – 4:00 PM September through June	11	N/A	N/A
Frederick Leighton Elementary School One Buccaneer Blvd., Oswego, New York 13126	13	L. Cravotta, Superintendent 341-5885 R. Harvell, Safety & Security 341-5969	500	46	9:00 AM – 3:15 PM	9	N/A	N/A
Kingsford Park Elementary School W. 5th & Niagara Sts. Oswego, New York 13126	13	L. Cravotta, Superintendent 341-5885 R. Harvell, Safety & Security 341-5969	571	42	9:00 AM – 3:00 PM	10	N/A	N/A
Mexico Elementary School Academy Street Mexico, New York 13114	16	Richard Carson, Principal 963-7104 Elaine Fischer 963-7104	435	30	Custodians & Cooks – 7 AM – 9 PM Students & Faculty – 8 AM – 3:15 PM	8	N/A	N/A
Mexico High School Main Street Mexico, New York 13114	16	John Proud home 963-3128 school 963-3612 James Peacock 963-3612	718	107	8:30 AM – 2:12 PM 2:00 PM – 12M Cust	17	25	25
Mexico Middle School Fravor Road Mexico, New York 13114	16	John H. Ruf 963-3775 William F. Kamalsky 963-3775	890	78	8:00 AM – 2:00 PM	15	N/A	N/A
Minetto Elementary School Rt. 8 Granby Road, Minetto, New York 13115	21	James M. Bartley Jr., Principal 341-5962 Joanne Geroux, Sect. 341-5962	530	72	9:00 AM – 3:10 PM	9	N/A	N/A

OSWEGO SPECIAL FACILITIES
SCHOOLS

LOCATION/ ADDRESS	ERPA #	CONTACT PERSONS	ENROLLMENT	FACILITY/ ADMIN. STAFF	SESSION HOURS	BUSES REQUIRED FOR EVACUATION	STUDENT DRIVERS	CAR-POOL STUDENTS
New Haven Elementary School Route 104 New Haven, New York 13121	4	Dr. Robert McGruder 963-7831 Ann Pla - Principal Fanny Yablonski - After Hours	360	30	8:00 AM - 2:00 PM	6	N/A	N/A
Oswego High School 2 Buccaneer Boulevard Oswego, New York 13124	13	Rick Harvell 341-5969 David Cowell 341-5860	1437	166 Total 155 Have Vehicles	7:45 AM - 2:15 PM Staff 7:15 - 9 PM	31	80	210
Oswego Middle School Mark Fitzgibbons Drive Oswego, New York 13126	13	Edward Metott, Principal 341-5857 James McAllister, V. Principal - 341-5805	826	86 Admin /Faculty/Staff and 12 clerical and 8 Custodial Employees	7:15 AM - 2:15 PM	14	N/A	N/A
Palermo Elementary School Co. Rte 45 Fulton, New York 13069	*	Dr. Robert McGruder 963 - 7831 Dr. Stephen Melsch 598 - 2120	356	40	9:00 AM - 3:00 PM	6	N/A	N/A
St. Mary's School 74 West 5th Street Oswego, New York 13126	13	Kathleen Crye 343-0700 Kathleen Stoner 343-0700	K - 6 Daily - 133 PreSchool 14 - 28	14	9:00 AM - 3:00 PM	3	N/A	N/A
St. Paul's Academy 115 East Fifth Street Oswego, New York 13126	12	Sister Maria Hoffman, Principal 343-8700 or home 343-9551 Fran Tynan, Sec. 343-8700 or home 342-0177	308 (PreSchool - 6) & Latch Key Program 12 - 25 students	30 & 25 Have Vehicles	8:30 AM - 3:30 PM Mon. - Fri. Sept. - June -Latch Key Program 6:30 AM - 6:30 PM	6	N/A	N/A
Oswego Community Christian School P.O. Box 3039 436 West Sixth Street Oswego, New York 13126	13	Peter Southcott 342-9322 Anne King 342-9322	47	7	8:15 AM - 3:30 PM Mon. - Fri.	1	N/A	N/A

* NOTE : SCHOOL LOCATED OUTSIDE EPZ, BUT PART OF THE MEXICO ACADEMY AND CENTRAL SCHOOLS.

APPENDIX C

LISTING OF TRANSPORTATION COMPANIES

OSWEGO EVACUATION STUDY
Ambulance Companies

Facility/Address	Overall Fleet Size	Evacuation Fleet Size	Number of Ambulance Crews			Ambulance Location	Contact People
			Morning	Afternoon	Night		
Menter Ambulance Service 13 Nestle Avenue Fulton, New York 13069	6	4	6	6	6	13 Nestle Avenue Fulton, New York 13069	James A. Menter 592 – 4145 Edward Kasperek 598 – 8064
Oswego Fire Depart. Ambulance 35 East Cayuga Street Oswego, New York 13126	4	2	3	3	3	35 East Cayuga Street Fire Dept. Headquarters Oswego, New York 13126	James Borden Thomas Abbott Mark Murray 343 – 1313
NOCA Ambulance Corp. P.O. Box 113 Delano Street Pulaski, New York 13142	3 ALS–Equipped Ambulances	3 ALS–Equipped Ambulances	2 – 3	2 – 3	3	Delano Street Pulaski, New York 13142	J. Penny Shutts 387–3231 or 298–6516 Jeff Johnson 298–6235
Donald McFee Memorial Ambulance Service P.O. Box 115 Mexico, New York 13114	3	2	2	2	2	P.O. Box 115 Mexico, New York 13114	Wm. Benjamin 963–8594 (Home)

OSWEGO EVACUATION STUDY
Bus Companies

Facility / Address	Overall Fleet Size: Number / Type Of Vehicles	Overall Fleet Size: Passenger Capacity	Overall Fleet Size: Wheelchair Capacity	Fleet Available for Evacuation: Number / Type Of Vehicles	Fleet Available for Evacuation: Passenger Capacity	Fleet Available for Evacuation: Wheelchair Capacity	No. of Vehicles Handicapped-Equipped	Driver Availability By Time-of-Day: Morning	Driver Availability By Time-of-Day: Afternoon	Driver Availability By Time-of-Day: Night	Vehicle Location	Contact People
A & E Medical	4 Buses	40	0	2 Buses	40	0	3 Vans	5–6	5–6	5–6	382 West 1st St.	James Bechtel
382 W. 1st Street	3 Vans	0	9	3 Vans	0	9					Oswego, NY 13126	342 – 9570
Oswego, New York 13126												John Larock
												343 – 6736
												342 – 2604 (Office)
Phoenix Central Sch. Dist.	1 Van	16	0	1 Van	16	0	2 Buses	N/A *	N/A *	N/A *	Oneida Street	Mary Farrell
Volney Street	3 Suburbans	8	0	3 Suburbans	8	0	2 Suburbans				Phoenix, NY 13135	695 – 1519
Phoenix, New York 13135	2 Suburbans	15	2	2 Suburbans	15	2						Dr. J. Robert Johnson
	1 Bus	36	2	1 Bus	36	2						695 – 1511
	1 Bus	26	4	1 Bus	26	4						
	1 Bus	16	0	1 Bus	16	0						
	1 Bus	21	0	1 Bus	21	0						
	2 Buses	30	0	2 Buses	30	0						
	3 Buses	47	0	3 Buses	47	0						
	1 Bus	59	0	1 Bus	59	0						
	4 Buses	60	0	4 Buses	60	0						
	11 Buses	65	0	11 Buses	65	0						
	9 Buses	66	0	9 Buses	66	0						
	2 Buses	75	0	2 Buses	75	0						
	1 Suburban	7	0	1 Suburban	7	0						
Oswego County BOCES	3 Buses	13	2	3 Buses	13	2	22 Buses	22	22	22	Oswego County	Kathleen Furneaux
Butterfly Road	19 Buses	11	4	19 Buses	11	4					BOCES	963 – 4226
Mexico, New York 13114	6 Buses	15	0	6 Buses	15	0					County Route 64	Louis Pettinelli
	1 Bus	37	0	1 Bus	37	0					Mexico, NY 13114	963 – 4286
	2 Buses	60	0	2 Buses	60	0						
Oswego County Opport.	1 Bus	14	0	1 Bus	14	0	4 Buses	24	24	24	Hannibal Street	Melody Van Buren
233 Oneida Street	2 Buses	19	0	2 Buses	19	0	7 Vans				Fulton, NY 13069	598 – 4713
Fulton, New York 13069	3 Buses	20	0	3 Buses	20	0						Gary Mashaw
	1 Bus	25	3	1 Bus	25	3						598 – 1612
	2 Buses	28	2	2 Buses	28	2						Mary Herzog
	2 Buses	32	0	2 Buses	32	0						598 – 5017
	1 Bus	32	2	1 Bus	32	2						
	2 Vans	8	2	2 Vans	8	2						
	3 Vans	10	2	3 Vans	10	2						
	3 Vans	12	0	3 Vans	12	0						
	1 Van	16	0	1 Van	16	0						
	2 Vans	16	2	2 Vans	16	2						

* Note: Bus Resources Only

OSWEGO EVACUATION STUDY
Bus Companies

Facility / Address	Overall Fleet Size: Number / Type Of Vehicles	Overall Fleet Size: Passenger Capacity	Overall Fleet Size: Wheelchair Capacity	Fleet Available for Evacuation: Number / Type Of Vehicles	Fleet Available for Evacuation: Passenger Capacity	Fleet Available for Evacuation: Wheelchair Capacity	No. of Vehicles Handicapped-Equipped	Driver Availability By Time-of-Day: Morning	Driver Availability By Time-of-Day: Afternoon	Driver Availability By Time-of-Day: Night	Vehicle Location	Contact People
City School District	1 Van	10	2	1 Van	10	2	2 Buses	74	74	74	Mark Fitzgibbons Dr.	David Christopher
Mark Fitzgibbons Drive	1 Bus	13	2	1 Bus	13	2	1 Van				Oswego, NY 13126	341 – 5858 (W)
Oswego, New York 13126	1 Bus	65	3	1 Bus	65	3						342 – 0044 (H)
	1 Van	8	0	1 Van	8	0						Richard Harvell
	6 Buses	20	0	6 Buses	20	0						341 – 5969 (W)
	1 Bus	25	0	1 Bus	25	0						343 – 2935 (H)
	3 Buses	29	0	3 Buses	29	0						
	2 Buses	55	0	2 Buses	55	0						
	8 Buses	60	0	8 Buses	60	0						
	36 Buses	66	0	36 Buses	66	0						
	3 Buses	81	0	3 Buses	81	0						
Central Square Central	42 Buses	44	0	42 Buses	44	0	0	N/A *	N/A *	N/A *	Caughdenoy Road	Donald Harwood
School District	11 Vans	16	0	11 Vans	16	0					Central Square, NY	668 – 3771 (W)
C/O Paul V. Moore H.S.											13036	699 – 3406 (H)
Central Square, NY 13036												
CNY Centro, Inc.	53 Buses	45	0	53 Buses	45	0					200 Cortland Avenue	Frank Kobliski
200 Cortland Avenue	103 Buses	43	2	103 Buses	43	2	108 Buses	140	Less than 140	140	Syracuse, New York	John Rencock
Syracuse, New York 13202	9 Vans	8	2	9 Vans	8	2	9 Vans					Duke Bailey
	5 Buses	16	4	5 Buses	16	4						442 – 3388
	8 Buses	39	0	6 Buses	39	0						
	2 Trolleys	21	0	2 Trolleys	21	0						
	2 Buses	34	2	2 Buses	34	2	3 Buses				Oswego, New York	
	4 Buses	45	0	4 Buses	45	0						
	2 Buses	32	7	2 Buses	32	7						
	5 Buses	45	0	5 Buses	45	0					Auburn, New York	
	5 Buses	34	2	5 Buses	34	2	5 Buses					
Mexico Academy and	2 Buses	0	4	2 Buses	0	4	2 Buses	41	41	41	Route 104	Allen Humbert
Central Schools	6 Buses	7	0	6 Buses	7	0					Mexico, NY 13114	Morris Bogart
Route 104	1 Bus	16	0	1 Bus	16	0						963 – 3351
Mexico, New York 13114	1 Bus	19	0	1 Bus	19	0						
	1 Bus	21	0	1 Bus	21	0						
	1 Bus	22	0	1 Bus	22	0						
	1 Bus	29	0	1 Bus	29	0						
	1 Bus	47	0	1 Bus	47	0						
	1 Bus	54	0	1 Bus	54	0						
	10 Buses	60	0	10 Buses	60	0						
	21 Buses	66	0	21 Buses	66	0						

* Note: Bus Resources Only

APPENDIX D

TRAFFIC ZONES:

DEFINITION OF BOUNDARIES

AND EVACUATION ROUTES

LISTED BY TOWN

APPENDIX D

TRAFFIC ZONES: DEFINITION OF BOUNDARIES AND EVACUATION ROUTES LISTED BY TOWN

Town of Scriba

Zone 1A:	The portion of ERPA 1 east of Sunset Bay Creek.
Route:	Nine Mile Point Road to Route 1 east (North Road) to N.Y. 104B east to N.Y. 3 north.
Zone 1B:	The portion of ERPA 1 west of Sunset Bay Creek and east of the Penn Central Railroad tracks (including J.A. FitzPatrick and Nine Mile Point Units 1 and 2).
Route:	Lake Road (Route 1A) to Route 29 south to Route 1 east (North Road) to N.Y. 104B east to N.Y. 3 north.
Zone 1C:	The portion of ERPA 1 west of the Penn Central Railroad tracks.
Route:	Lake View Road south to Route 1 west (North Road) to Creamery Road south to Klocks Corners Road to Route 4 east to N.Y. 176 south.
Zone 2C:	The portion of ERPA 2 in the Town of Scriba.
Route:	Route 29 south to Route 1 east (North Road) to N.Y. 104B east to N.Y. 3. north.
Zone 3A:	The portion of ERPA 3 east of the creek between Bayshore Grove Road and Cliff Road.
Route:	Lake View Road south to Route 1 west (North Road) to Creamery Road south to Klocks Corners Road to Route 4 east to N.Y. 176 south.
Zone 3B:	The portion of ERPA 3 west of the creek between Bayshore Grove Road and Cliff Road.
Route:	Lake Road (Route 1A) west to Route 1 east (North Road) to Creamery Road south to Klocks Corners Road to Route 4 east to N.Y. 176 south.
Zone 5A:	The portion of ERPA 5 east of Duke Road.
Route:	Route 29 south to U.S. 104 west to Route 29 south to Route 4 east to Silk Road south.
Zone 5B:	The portion of ERPA 5 west of Duke Road.
Route:	Creamery Road south to Klocks Corners Road to Route 4 east to N.Y. 176 south.

Town of Scriba (Continued)

Zone 6A: The portion of ERPA 6 east of the creek which runs from Lake Ontario to U.S. 104 and is located between County Route 53 and Klocks Corners Road.

Route: Route 1 east (North Road) to Creamery Road south to Klocks Corners Road to Route 4 east to N.Y. 176 south.

Zone 6B: The portion of ERPA 6 west of the creek which runs from Lake Ontario to U.S. 104 and is located between County Route 53 and Klocks Corners Road.

Route: Kocher Road south to U.S. 104 east to Route 53 south to Kingdom Road to Route 57 south.

Zone 10A: The portion of ERPA 10 east of the creek, east of the Niagara Mohawk power lines, and east of Duke Road.

Route: Route 29 south to Route 4 east to Silk Road south.

Zone10B: The portion of ERPA 10 west of Duke Road, west of the Niagara Mohawk power lines, and west of the creek.

Route: Klocks Corners Road to Route 4 east to N.Y. 176 south.

Zone 11A: All of ERPA 11.

Route: Route 53 south to Kingdom Road to Route 57 south.

Zone 19A: The portion of ERPA 19 east of Paddy Lake Road.

Route: Silk Road south.

Zone 19B: The portion of ERPA 19 west of Paddy Lake Road and east of Dutch Ridge Road and Black Creek.

Route: N.Y. 176 south.

Zone 19C: The portion of ERPA 19 west of Dutch Ridge Road and Black Creek, and east of the Penn Central Railroad tracks.

Route: Route 53 south to Kingdom Road to Route 57 south.

Zone 19D: The portion of ERPA 19 west of the Penn Central Railroad tracks.

Route: Route 481 south.

Town of New Haven

Zone 2A: The portion of ERPA 2 east of Sunset Bay Creek.

Town of New Haven (Continued)

Route:	Shore Oaks Drive to Route 1 east (North Road) to N.Y. 104B east to N.Y. 3 north.
Zone 2B:	The portion of ERPA 2 west of Sunset Bay Creek in the Town of New Haven.
Route:	Nine Mile Point Road to Route 1 east (North Road) to N.Y. 104B east to N.Y. 3 north.
Zone 4A:	The portion of ERPA 4 north of Route 1 (North Road).
Route:	Route 1 east (North Road) to N.Y. 104B east to N.Y. 3 north.
Zone 4B:	The portion of ERPA 4 south of Route 1 (North Road).
Route:	Route 6 south.
Zone 4C:	The portion of ERPA 4 south of Route 1 (North Road) and west of Mack Road and Catfish Creek.
Route:	U.S. 104 east to Route 6 south.
Zone 7A:	The portion of ERPA 7 north of Route 1 (North Road), east of Larkin Road and north of N.Y. 104B.
Route:	Route 1 east (North Road) to N.Y. 104B to N.Y. 3 north.
Zone 7B:	The portion of ERPA 7 south of N.Y. 104B and east of the East Branch of Catfish Creek.
Route:	U.S. 104 east.
Zone 7C:	The portion of ERPA 7 south of Route 1 (North Road), west of Larkin Road, south of N.Y. 104B, and west of East Branch of Catfish Creek.
Route:	Route 6A south to Route 6 south.
Zone 8A:	The portion of ERPA 8 north of Stone Road (Country Home Road) and east of the East Branch of Catfish Creek (east of Kirby Road).
Route:	U.S. 104 east.
Zone 8B:	The portion of ERPA 8 south of Stone Road (Country Home Road) and east of Catfish Creek and Kirby Road.
Route:	Route 35 south.
Zone 8C:	The portion of ERPA 8 west of East Branch of Catfish Creek, west of Kirby Road and west of Catfish Creek.
Route:	Route 6 south.

Town of New Haven (Continued)

Zone 9A: The portion of ERPA 9 east of Mud Lake Road (Route 51), south of Lilly Marsh Road, and east of the creek between Lilly Pond and Route 51.

Route: Darrow Road south to Route 6 south.

Zone 9B: The portion of ERPA 9 west of the creek between Lilly Pond and Route 51, north of Lilly Marsh Road, and west of Mud Lake Road.

Route: Route 51 east to Route 6 south.

Town of Richland

Zone 14A: All of ERPA 14.

Route: N.Y. 3 north.

Town of Mexico

Zone 15A: The portion of ERPA 15 north of Gibbs Road, north of Smith Road, west of Fort Leazier Road, and north of Countryman Road, Clark Road and Potter Road.

Route: N.Y. 3 south.

Zone 15B: The portion of ERPA 15 south of Gibbs Road, east of Port Leazier Road, south of Countryman Road, and east of N.Y. 3.

Route: Fort Leazier Road south to Dewey Road to Newcomb Road to Smithers Road to U.S. 104 east.

Zone 15C: The portion of ERPA 15 south of Potter Road and Clark Road, and west of N.Y. 3.

Route: Fravor Road south to U.S. 104 east.

Zone 17A: The portion of ERPA 17 east of Little Salmon River.

Route: U.S. 104 east.

Zone 17B: The portion of ERPA 17 west of Little Salmon River.

Route: N.Y. 3 south.

Village of Mexico

Zone 16A: The portion of ERPA 16 north of U.S. 104.

Route: U.S. 104 east.

Zone 16B: The portion of ERPA 16 south of U.S. 104.

Village of Mexico (Continued)

Route: N.Y. 3 south.

Town of Palermo

Zone 18A: The portion of ERPA 18 in the Town of Palermo.

Route: Route 35 south.

Town of Volney

Zone 18B: The portion of ERPA 18 in the Town of Volney.

Route: Route 6 south.

Zone 20A: The portion of ERPA 20 east of N.Y. 176.

Route: Silk Road south.

Zone 20B: The portion of ERPA 20 west of N.Y. 176 and east of Black Creek.

Route: N.Y. 176 south.

Zone 20C: The portion of ERPA 20 west of Black Creek and east of the Penn Central Railroad tracks.

Route: Route 53 south to Kingdom Road to Route 56 south.

Zone 20D: The portion of ERPA 20 west of the Penn Central Railroad tracks.

Route: N.Y. 481 south.

Town of Minetto

Zone 21A: The portion of ERPA 21 north of Route 25 and east of the Erie Lackawanna Railroad tracks.

Route: N.Y. 48 south.

Zone 21B: The portion of ERPA 21 south of Route 25 and east of West Fifth Street Road.

Route: Route 8 south.

Zone 21D: The portion of ERPA 21 west of the Erie Lackawanna Railroad tracks and north of Route 25.

Route: Route 25 south to West Fifth Street Road south to Route 85 west.

Town of Oswego

Zone 21C: The portion of ERPA 21 in the Town of Oswego.

Town of Oswego (Continued)

Route: West 5th Street Road south to Route 85 west.

Zone 22A: The portion of ERPA 22 east of the Penn Central Railroad tracks.

Route: Route 25 south to West Fifth Street Road south to Route 85 west.

Zone 22B: The portion of ERPA 22 west of the Penn Central Railroad tracks, east of Bunker Hill Road, south of Thompson Road, east of Thompson Road and south of U.S. 104.

Route: Route 7 south.

Zone 22C: The portion of ERPA 22 north of U.S. 104, west of Thompson Road, north of Thompson Road and west of Bunker Hill Road.

Route: U.S. 104 west.

Zone 12A: The portion of ERPA 12 north of U.S. 104 and east of East 13th Street.

Route: U.S. Route 104 east to Route 53 south to Kingdom Road to Route 57 south.

Zone 12B: The portion of ERPA 12 west of East 13th Street, south of U.S. 104, north of Route 4, and east of East 9th Street.

Route: Route 4 east to Route 53 south to Kingdom Road to Roue 57 south.

Route*: Route 4 east to Route 176 south.

Zone 12C: The portion of ERPA 12 west of East 9th Street and south of Route 4.

Route: N.Y. 481 south.

Zone 13A: The portion of ERPA 13 south of U.S. 104 and east of West Fifth Street Road.

Route: N.Y. 48 south.

Zone 13B: The portion of ERPA 13 south of U.S. 104, west of West Fifth Street Road, and east of Hillside Avenue.

Route: Gardenier Hill Road south to Route 7 south.

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* Note: A different evacuation route is provided for Classic Weekend attendees at the Speedway located in Traffic Zone 12B.

Zone 13C: The portion of ERPA 13 north of U.S. 104 and west of Hillside Avenue.

Route: U.S. 104 west.

APPENDIX E

ROADWAY LINK CHARACTERISTICS

OSWEGO
EVACUATION STUDY

GENERAL POPULATION EVACUATION LINKS
TWO LANE ROADS

LINK NUMBER	LANE DESCRIPTION MAINLINE	FROM	TO	LINK LENGTH	LINK DESIGN SPEED	LANE WIDTH	SHOULDER WIDTH	DIRCTNL SPLIT	PERCENT HEAVY VEH	TERRAIN	(V/C) LOS A-D	(V/C) LOS E	GOOD WEATHER CAPACITY LOS A-D	GOOD WEATHER CAPACITY LOS E	ADVERSE WEATHER CAPACITY LOS A-D	ADVERSE WEATHER CAPACITY LOS E	ADJUSTMENT FACTORS: LANE & SHOULDER WIDTH FACTORS LOS A-D	LANE & SHOULDER WIDTH FACTORS LOS E	DIRECTIONAL SPLIT
4	US 104	Johnson Rd	Cemente Rd	1.73	55	11.0	4.0	90%	0.98	ROLLING	0.62	0.97	868	1469	694	1175	0.85	0.92	0.75
5	US 104	Cemente Rd	Rte 20	1.67	70	11.0	4.0	90%	0.98	ROLLING	0.62	0.97	868	1469	694	1175	0.85	0.92	0.75
6	US 104	Rte 20	NY 104A	0.33	70	11.0	4.0	90%	0.98	ROLLING	0.62	0.97	868	1469	694	1175	0.85	0.92	0.75
10	NY 48	Erie St	City Limit	2.00	35	11.5	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
11	NY 48	City Limit	Ridgeway	1.53	70	11.5	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
12	NY 48	Ridgeway	Snell Rd	0.40	50	11.5	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
13	NY 48	Snell Rd	Power Plant	0.40	50	11.5	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
14	NY 48	Power Plant	Rte 25	0.27	40	11.5	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
15	NY 48	Rte 25	Rte 8	0.23	20	11.5	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
16	NY 48	Rte 8	Rte 85	2.58	50	11.0	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
17	NY 48	Rte 85	Robby Rd	0.80	70	11.0	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
18	NY 48	Robby Rd	Honey Hill	0.83	55	11.0	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
19	NY 48	Honey Hill	Fulton Limits	1.13	50	11.0	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
21	West 5 St	Rathburn Rd	Rte 20	1.47	50	11.5	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
22	West 5 St	Rte 20	Rte 25	0.60	65	11.5	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
23	West 5 St	Rte 25	Furniss Rd	0.40	65	10.5	0.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
24	West 5 St	Furniss Rd	Rte 85	2.80	65	10.5	0.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
26	Rte 85	West 5 St	Ridge Rd	0.69	65	10.5	0.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
27	Rte 85	Ridge Rd	Rte 7	2.38	65	10.5	0.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
28	Liberty St	Ellen St	Hillside Ave	0.83	35	12.0	0.0	90%	0.98	ROLLING	0.62	0.97	715	1405	572	1124	0.70	0.88	0.75
29	Rte 7	US 104	Byer Rd	1.00	50	13.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
30	Gard H Rd	Hillside Ave	Rte 7	1.00	55	12.0	0.0	90%	0.98	ROLLING	0.62	0.97	715	1405	572	1124	0.70	0.88	0.75
31	Rte 7	Byer Rd	Gard H Rd	1.13	50	11.0	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
32	Rte 7	Gard H Rd	Rte 20	0.53	50	11.0	1.0	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
33	Rte 7	Rte 20	Furniss Rd	1.07	40	11.0	1.0	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
34	Rte 7	Furniss Rd	Burker Hill	0.87	50	11.0	1.0	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
35	Rte 7	Burker Hill	Rte 85	2.00	40	11.0	1.0	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
36	Rte 8	NY 48	Town Line	1.59	70	10.0	1.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
37	Rte 8	Town Line	Honey Hill	2.00	70	10.0	1.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
40	NY 481	Dam Lock 6	Rte 57	1.18	70	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
41	Rte 57	NY 481	Rte 45	2.25	55	10.5	3.5	90%	0.98	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
42	Rte 57	Rte 45	NY 481	2.31	55	10.5	3.5	90%	0.98	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
43	NY 481	Rte 57	Fulton Limits	2.81	70	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
44	NY 481	Rte 57	Rte 45	2.31	70	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
45	NY 481	Rte 45	Rte 57	2.08	55	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
46	Rte 57	NY 481	Kingdom Rd	0.88	50	10.5	3.5	90%	0.98	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
47	Rte 57	Kingdom Rd	Howard Rd	0.69	70	10.0	2.0	90%	0.98	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
48	Rte 57	Howard Rd	Fulton Limits	1.54	40	10.0	2.0	90%	0.98	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
52	Lake Rd	Walker Rd	Rte 1	0.98	70	11.5	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
55	US 104	East 12 St	Kocher Rd	1.10	70	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
56	US 104	Kocher Rd	Rte 53	1.13	55	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
58	US 104	Klocks Corner	Rte 51A	1.38	70	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
59	US 104	Rte 51A	Rte 29	0.94	70	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
60	US 104	Rte 29	Rte 29	0.15	70	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
61	US 104	Rte 29	Rte 51	1.25	70	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
62	US 104	Rte 51	Middle Rd	0.38	70	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
63	US 104	Middle Rd	NY 104B	1.31	70	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
66	NY 104B	Rte 1	Rte 18	1.50	70	11.5	6.0	90%	0.98	LEVEL	0.64	1.00	980	1548	784	1238	0.93	0.94	0.75
67	NY 104B	Rte 18	NY 3	1.40	70	11.5	6.0	90%	0.98	LEVEL	0.64	1.00	980	1548	784	1238	0.93	0.94	0.75
68	NY 3	NY 104B	Rte 28	2.50	70	10.0	3.0	90%	0.98	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
69	NY 3	Rte 28	NY 13	1.75	70	11.0	3.5	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
70	Rte 1	Lake Rd	Creamery Rd	0.94	70	11.0	1.5	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
71	Rte 1	Creamery Rd	Lake View Rd	0.88	70	11.0	1.5	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
72	Rte 1	Lake View Rd	Rte 29	1.50	70	11.0	1.5	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
73	Rte 1	Rte 29	Nine Mile	0.84	70	11.0	1.5	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
74	Rte 1	Nine Mile	Shore Oaks Dr	0.75	55	11.0	1.5	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
75	Rte 1	Shore Oaks Dr	Catfish Dr	1.88	55	11.0	1.5	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
76	Rte 1	Hickory Grove	Rte 6A	0.31	55	11.5	0.5	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
77	Rte 1	Rte 6A	Rte 43	1.75	55	12.0	3.0	90%	0.98	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
78	Rte 4	Cherry St	City Line Rd	1.00	55	11.5	3.0	90%	0.98	ROLLING	0.62	0.97	766	1405	612	1124	0.75	0.88	0.75
79	Rte 4	City Line Rd	Rte 53	1.44	55	11.5	3.0	90%	0.98	ROLLING	0.62	0.97	766	1405	612	1124	0.75	0.88	0.75
80	Rte 4	Rte 53	Klocks Corner	1.42	55	11.5	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
81	Rte 4	Klocks Corner	NY 176	1.09	70	11.5	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
83	Rte 4	Rte 29	Blk Rd	0.45	55	11.0	4.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
87	Kocker Rd	Rte 1	US 104	0.86	55	11.0	5.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
89	Rte 53	US 104	Rte 4	1.50	70	11.5	3.5	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
90	Rte 53	Rte 4	Dutch Ridge	2.19	70	11.5	3.5	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
91	Rte 53	Dutch Ridge	Rte 45	0.75	50	11.5	3.5	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
92	Rte 53	Rte 45	Rte 57	2.50	70	11.0	0.0	90%	0.98	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
93	Creamery Rd	Rte 1	US 104	1.50	65	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
94	Klocks Corner	US 104	Rte 4	2.01	70	11.5	3.0	90%	0.98	ROLLING	0.62	0.97	766	1405	612	1124	0.75	0.88	0.75
96	Lake View Rd	Lake Rd	Minor Rd	0.94	35	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
97	Lake View Rd	Minor Rd	Rte 1	0.75	35	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
98	NY 176	Rte 4	Whitmore Rd	0.45	70	11.0	3.5	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75

OSWEGO
EVACUATION STUDY

GENERAL POPULATION EVACUATION LINKS
TWO LANE ROADS

LINK NUMBER	LANE DESCRIPTION MAINLINE	FROM	TO	LINK LENGTH	LINK DESIGN SPEED	LANE WIDTH	SHOULDER WIDTH	DIRCTNL SPLIT	PERCENT HEAVY VEH	TERRAIN	(V/C) LOS A-D	LOS E	GOOD WEATHER CAPACITY LOS A-D	GOOD WEATHER CAPACITY LOS E	ADVERSE WEATHER CAPACITY LOS A-D	ADVERSE WEATHER CAPACITY LOS E	ADJUSTMENT FACTORS: LANE & SHOULDER WIDTH FACTORS LOS A-D	LANE & SHOULDER WIDTH FACTORS LOS E	DIRECTIONAL SPLIT
99	NY 176	Whitmore Rd	Rte 45	2.30	70	11.0	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
100	NY 176	Rte 45	Rowlee Rd	1.75	70	11.0	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
101	NY 176	Rowlee Rd	Howard Rd	0.80	70	11.0	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
102	Lake Rd	Fitzpatrick	Rte 29	0.80	70	12.0	0.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
103	Rte 29	Lake Rd	Miner Rd	1.10	55	12.0	3.0	90%	0.00	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
104	Rte 29	Miner Rd	Rte 1	0.60	55	11.5	3.0	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
105	Rte 29	Rte 1	US 104	1.08	55	11.0	2.0	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
106	Rte 29	US 104	Rte 51A	0.88	55	11.0	5.5	90%	0.00	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
107	Rte 29	Rte 51 A	O'Connor Rd	2.06	30	11.0	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
108	Silk Rd	Rte 4	MacDougal Rd	1.44	70	12.0	1.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
109	Silk Rd	MacDougal Rd	Baldwin Rd	1.00	40	12.0	1.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
110	Silk Rd	Baldwin Rd	Rowlee Rd	1.50	70	12.0	1.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
111	Silk Rd	Rowlee Rd	Howard Rd	1.13	70	12.0	1.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
112	Silk Rd	Howard Rd	NY 3	1.31	70	12.0	1.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
113	Nine Mile	Nine Mile Pt	Rte 1	1.88	35	11.5	0.0	90%	0.00	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
114	Shore Oaks Dr	Shore Oaks	Rte 1	1.40	35	9.0	2.0	90%	0.00	LEVEL	0.64	1.00	601	1152	480	922	0.57	0.70	0.75
115	Rte 51	Rte 51 A	Mud Lake Rd	0.88	65	10.5	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
116	Rte 51	Mud Lake Rd	Rte 6	1.13	65	10.5	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
117	Darrow Rd	Stone Rd	Rte 6	1.81	50	10.0	0.0	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
118	Rte 6	Rte 51	Rte 4	1.83	70	10.5	2.0	90%	0.00	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
119	Rte 6	Rte 4	MacDougal Rd	1.06	70	12.0	3.0	90%	0.00	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
120	Rte 6	MacDougal Rd	Clifford Rd	1.00	70	12.0	3.0	90%	0.00	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
121	Rte 6	Rte 45	NY 3	2.50	70	12.0	3.0	90%	0.00	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
123	Rte 6	Rte 1	Rte 6A	0.30	55	10.0	0.5	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
124	Rte 6A	Rte 1	Rte 6	0.38	55	10.0	0.0	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
125	Rte 6	Rte 6A	NY 104B	0.81	70	10.0	0.5	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
126	Rte 6	NY 104B	US 104	0.50	40	10.0	0.0	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
127	Rte 6	US 104	Stone Rd	1.30	70	11.0	2.0	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
128	Rte 6	Stone Rd	Rte 64	1.25	40	11.0	2.0	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
130	Rte 6	Rte 64	Rte 51	0.84	70	11.0	2.0	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
131	Rte 35	Rte 64	Johnson Rd	2.00	55	10.0	2.0	90%	0.00	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
132	Rte 35	Crow Rd	Rte 4	1.00	55	10.0	2.0	90%	0.00	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
133	Rte 35	Rte 4	Clifford Rd	1.30	55	10.0	1.0	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
134	Rte 35	Clifford Rd	Rte 45	1.10	55	10.0	1.0	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
135	US 104	US 104B	Rte 6	0.81	40	10.0	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
136	US 104	Rte 6	Rte 43	2.00	70	11.0	5.5	90%	0.00	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
137	US 104	Rte 43	Fravor Rd	1.44	70	11.5	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
138	US 104	Fravor Rd	NY 3	0.50	35	11.5	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
139	US 104	NY 3	NY 3	0.31	35	12.0	0.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
140	US 104	NY 3	Rte 41	0.31	35	12.0	0.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
141	US 104	Rte 41	Rte 58	0.30	35	10.0	1.5	90%	0.00	ROLLING	0.62	0.97	592	1198	474	958	0.58	0.75	0.75
142	US 104	Rte 58	Smithers Rd	1.30	70	10.0	4.0	90%	0.00	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
143	US 104	Smithers Rd	Fraser Rd	0.56	70	10.0	4.0	90%	0.00	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
145	Fravor Rd	Potter Rd	US 104	2.33	35	11.0	3.0	90%	0.00	ROLLING	0.62	0.97	766	1405	612	1124	0.75	0.88	0.75
146	NY 3	US 104	Hanson	2.06	70	10.5	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
147	NY 3	Hanson	Rte 4	1.03	70	10.5	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
148	NY 3	Rte 4	Clifford Rd	1.50	70	10.5	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
149	NY 3	Clifford Rd	Rte 45	1.00	70	10.5	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
153	Fort Lo. Rd	Countryman	Dewey Dr	0.88	55	9.0	0.0	90%	0.00	ROLLING	0.62	0.97	500	1054	400	843	0.49	0.66	0.75
154	Dewey Dr	Fort Lo. Rd	Pulaski Rd	0.38	55	9.0	0.0	90%	0.00	ROLLING	0.62	0.97	500	1054	400	843	0.49	0.66	0.75
155	Newcomb Rd	Pulaski Rd	Rte 41	0.81	55	9.0	0.0	90%	0.00	ROLLING	0.62	0.97	500	1054	400	843	0.49	0.66	0.75
156	Smithers Rd	Rte 41	Us 104	0.84	55	9.0	0.0	90%	0.00	ROLLING	0.62	0.97	500	1054	400	843	0.49	0.66	0.75
157	NY 176	Howard Rd	Fulton Limits	1.75	70	11.0	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
158	Rte 6	Honey Hill	Rte 3	1.00	70	10.0	1.0	90%	0.00	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
159	Rte 29	O'Connor Rd	Rte 4	0.50	55	11.0	3.5	90%	0.00	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
160	Rte 1	Catfish Dr	Hickory Grove	0.50	35	11.0	1.5	90%	0.00	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
161	Rte 6	Clifford Rd	Rte 45	0.63	40	12.0	3.0	90%	0.00	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
162	Rte 35	Johnson Rd	Crow Rd	0.13	30	10.0	2.0	90%	0.00	LEVEL	0.64	1.00	717	1334	573	1067	0.68	0.81	0.75
170	Rte 13	Rte 11	Pulaski Limits	1.20	35	10.0	4.0	90%	0.00	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
171	Rte 13	Beyond Pulaski V	Rte 3	2.50	70	10.0	4.0	90%	0.00	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
172	Rte 13	Rte 11	I-81	0.80	50	10.0	6.0	90%	0.00	LEVEL	0.64	1.00	885	1432	708	1146	0.84	0.87	0.75
175	Rte 48	Rte 3	Pine St	1.00	35	12.0	6.0	90%	0.00	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
176	Rte 48	Pine St	Rte 176	0.43	35	12.0	0.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
177	Rte 48	Rte 176	Fulton C L	0.57	35	12.0	0.0	90%	0.00	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
178	Rte 48	Fulton South C L	NY 48	0.50	65	10.0	4.0	90%	0.00	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
179	Rte 48	Rte 3	Fulton North C L	0.95	35	12.0	5.0	90%	0.00	LEVEL	0.64	1.00	969	1597	776	1278	0.92	0.97	0.75
180	Rte 3	Rte 48	Fulton West C L	0.57	35	11.0	0.0	90%	0.00	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
181	Rte 3	Fulton West C. L	Hannibal Rd	0.57	55	12.0	6.0	90%	0.00	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
182	Rte 3	Hannibal Rd	Rte 8	0.60	70	12.0	6.0	90%	0.00	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
183	Rte 3	Rte 7	Rte 8	3.00	70	12.0	6.0	90%	0.00	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
184	Rte 3	Rte 7	Rte 104	1.75	70	12.0	6.0	90%	0.00	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
201	Rte 7	Rte 3	Rte 85	2.00	70	11.0	1.0	90%	0.00	LEVEL	0.64	1.00	685	1350	548	1080	0.65	0.82	0.75
185	Rte 104	Rte 104A	Rte 3	0.10	70	12.0	6.0	90%	0.00	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
186	Rte 104	Rte 3	Rte 34	1.75	70	12.0	6.0	90%	0.00	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75

OSWEGO
EVACUATION STUDY

GENERAL POPULATION EVACUATION LINKS
TWO LANE ROADS

LINK NUMBER	LANE DESCRIPTION MAINLINE	FROM	TO	LINK LENGTH	LINK DESIGN SPEED	LANE WIDTH	SHOULDER WIDTH	DIRCTNL SPLIT	PERCENT HEAVY VEH	TERRAIN	(V/C) LOS A-D	(V/C) LOS E	GOOD WEATHER CAPACITY LOS A-D	GOOD WEATHER CAPACITY LOS E	ADVERSE WEATHER CAPACITY LOS A-D	ADVERSE WEATHER CAPACITY LOS E	ADJUSTMENT FACTORS: LANE & SHOULDER WIDTH FACTORS LOS A-D	LANE & SHOULDER WIDTH FACTORS LOS E	DIRECTIONAL SPLIT
187	Rte 104	Link 8	S/O Hannibal	0.00	70	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
188	Rte 34	Rte 104 South	I-90	10.80	70	11.0	6.0	90%	0.98	LEVEL	0.64	1.00	980	1548	784	1238	0.93	0.94	0.75
189	Rte 3	Rte 35	Rte 45	0.20	50	10.5	4.0	90%	0.98	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
190	Rte 3	Rte 45	Rte 264	1.00	70	10.5	4.0	90%	0.98	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
191	Rte 264	Rte 3	Rte 49	2.00	70	10.5	3.0	90%	0.98	ROLLING	0.62	0.97	694	1294	555	1035	0.68	0.81	0.75
192	Rte 264	Rte 49	NY 481	3.00	70	10.5	3.0	90%	0.98	ROLLING	0.62	0.97	694	1294	555	1035	0.68	0.81	0.75
193	Rte 4	Rte 3	South Rte 11	0.20	55	10.0	0.5	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
202	Rte 176	Fulton C.L.	Erie Rd	0.25	35	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
203	Rte 176	Erie Rd	Rte 3	0.51	35	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
204	Rte 176	Klocks Corner	Rte 53	0.85	50	10.0	4.0	90%	0.98	LEVEL	0.64	1.00	811	1399	649	1120	0.77	0.85	0.75
208	Rte 104	George St	10th St	0.82	35	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
174	US Rte 104	Rte 11	Rte 55B	4.40	70	10.0	4.0	90%	0.98	ROLLING	0.62	0.97	786	1357	629	1086	0.77	0.85	0.75
197	Rte 3	Rte 4th St	Emery Rd	0.57	35	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
196	Rte 3	Emery Rd	Fulton C.L.	0.29	35	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
195	Rte 3	Fulton C.L.	Blk Rd	1.25	55	11.0	2.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
194	Rte 3	Blk Rd	Rte 8	1.90	70	11.0	2.0	90%	0.98	LEVEL	0.64	1.00	896	1515	717	1212	0.85	0.92	0.75
212	Rte 481	NY481	Fulton C.L.	1.42	70	12.0	6.0	90%	0.98	LEVEL	0.64	1.00	1054	1646	843	1317	1.00	1.00	0.75
218	Rte 85	W.5th St.	Rte. 8	0.80	55	10.5	0.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
219	Rte 8	Rte 85	Rte. 3	3.10	40	10.0	1.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
220	Rte 8	Rte. 3	Rte. 370	13.40	50	10.0	1.0	90%	0.98	LEVEL	0.64	1.00	611	1235	489	988	0.58	0.75	0.75
222	Rte. 8	Rte. 3	Weller Rd	1.00	40	12.0	3.0	90%	0.98	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
223	Rte. 8	Weller Rd.	I-481	7.30	40	12.0	3.0	90%	0.98	LEVEL	0.64	1.00	853	1531	683	1225	0.81	0.93	0.75
225	Rte. 370	Rte. 8	Rte. 48	7.00	40	11.0	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
226	Weller Rd.	Rte. 3	Rte. 8	1.10	35	11.0	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
227	Rte 48	Rte. 48	I-690	0.75	55	11.0	3.0	90%	0.98	LEVEL	0.64	1.00	790	1449	632	1159	0.75	0.88	0.75
234	Rte. 176	Rte. 3	Emery	0.83	50	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75
235	Rte. 176	Emery	Rte. 3	0.28	50	12.0	0.0	90%	0.98	LEVEL	0.64	1.00	738	1449	590	1159	0.70	0.88	0.75

E-3

OSV
EVACUATION STUDY
FREEWAY LINKS

LINK NUMBER	LINK DESCRIPTION MAINLINE	FROM	TO	LINK LENGTH	LINK DES. SPD	CAPACITY PER LANE LOS D	LOS E	V/C LOS D	LOS E	NUMBER OF LANES	OBSTRCTN/ LANE WDTH	4/6 LNS DIST/OBST	HEAVY VEHICLES	DRIVER POPULATION LOS D	LOS E	GOOD WEATHER CAPACITY LOS D	LOS E	ADVERSE WEATHER CAPACITY LOS D	LOS E	LANE WIDTH FACTOR
103	I-81	Syracuse	Rte 49	10	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
104	I-81	Rte 49	I-690	2.41	70	1850	2001	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
105	I-81	Rte 104	Rte 49	1.36	70	1850	2001	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
106	I-81	Rte 2	Rte 13	0.86	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
107	I-81	Rte 22A	Rte 2	4.40	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
217	I-90	Rte 34	Rte. 8	4.25	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
221	I-81	Rte. 481	I-90	5.00	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
224	Rte. 481	Rte. 8	I-81	15.20	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
228	I-690	Rte 48	Fairgrounds	11.75	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
232	Rte 481	Merge	Rte. 481	0.25	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
233	Rte 481	Rte. 481	Rte. 6	7.00	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
236	Rte. 481	Rte. 3	Rte. 481	0.47	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
237	I-81	I-90 exit 36	I-690	3.30	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00
238	I-690	I-81	Fairgrounds	3.80	70	1850	2000	0.93	1.00	3	812	1.008	0.98	0.75	1	4079	5880	3263	4704	1.00

OSWEGO
EVACUATION STUDY

OFFICIAL POP. EVACUATION LINKS
MULTILANE ROADS

LINK NUMBER	MAINLINE	LINK DESCRIPTION FROM	TO	LINK LENGTH (miles)	LINK DES SPD	CAPACITY PER LANE LOS D	LOS E	PHF LOS D	LOS E	LANES ONE DIRECTION	OBSTRUCTION LANE WIDTH	SHOULDER DIST/OBS	HEAVY VEHICLES	DRIVER POPULATION LEAST EFF.	MOST EFF	DVLPMT ENVMENT	GOOD WEATHER CAPACITY LOS D	LOS E	ADVERSE WEATHER CAPACITY LOS D	LOS E
1	US 104	West 1 St	West 5 St	0.37	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
3	US 104	West 5 St	Hillside Ave	0.00	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
5	US 104	Hillside Ave	Johnson Rd	0.07	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
7	West 1 St	US 104	Erie St	0.47	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
20	NY 481	US 104	E. Utica St	0.31	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
30	NY 481	E. Utica St	Dam Lock 6	0.06	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
200	Rte 3	Rte 48	1st St	0.10	55	1400	1900	0.75	1.00	2	0.12	UL 2	0.96	0.75	1.00	RU	1906	3320	1525	3000
189	Rte 3	1st St	Rte 481	0.00	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	2400	4200	1904	3430
190	Rte 3	Rte 481	Rte 48 St	0.10	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
207	Rte 104	10th St	City St	0.11	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
208	Rte 104	9th St	4th St	0.30	55	1400	1900	0.70	1.00	2	0.12	UL 4	0.96	0.75	1.00	RU	1904	3407	1900	2774
209	Rte 104	4th St	Shel St	0.10	55	1400	1900	0.70	1.00	2	0.12	UL 4	0.96	0.75	1.00	RU	1904	3407	1900	2774
210	Rte 104	Brel St	1st St	0.06	55	1400	1900	0.70	1.00	2	0.12	UL 4	0.96	0.75	1.00	RU	1904	3407	1900	2774
211	Rte 104	1st Avenue River	10th 1	0.33	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
213	Rte 481	City Limits of Fulton	Gamble Ave	0.00	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
214	Rte 481	Gamble Ave	Division	0.00	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
215	Rte 481	Division	Fay	0.30	55	1400	1900	0.70	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1640	3000	1312	2296
216	Rte 481	Fay	Rte. 176	0.47	70	1700	2000	0.87	1.00	2	0.12	UL 0	0.96	0.75	1.00	RU	1900	3018	1904	2415

LINK NUMBER	ADJUSTMENT FACTORS: LANE WIDTH FACTOR	DVLPMT. ENVMENT. FACTOR	DIRECTIONAL SPLIT
1	0.91	0.96	NA
3	0.91	0.96	NA
5	0.91	0.96	NA
7	0.91	0.96	NA
20	0.91	0.96	NA
30	0.91	0.96	NA
200	0.94	0.96	NA
189	0.91	0.96	NA
190	0.91	0.96	NA
207	0.91	0.96	NA
208	0.96	0.96	NA
209	0.96	0.96	NA
210	0.96	0.96	NA
211	0.91	0.96	NA
213	0.91	0.96	NA
214	0.91	0.96	NA
215	0.91	0.96	NA
216	0.91	0.96	NA

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OSWEGO
EVACUATION STUDY

GENERAL POPULATION EVACUATION LINKS
SIGNALS

INT. CONTROL LINK NUMBER	IDEAL SAT FLOW RAT (pcphgpl)	NUMBER OF LANES	LANE WIDTH	PERCENT HEAVY VEHICLES	TYPICAL GRADE	PARKING MVMNTS/	BUS BLOCKAG (STOP/HR)	AREA TYPE	LOS D 75% OF CYCLE	LOS E 90% OF CYCLE	CYCLE LENGTH	RIGHT TURN CONSTAN	LEFT TURN CONSTAN	GOOD WEATHER CAPACITY LOS D 75% OF CYCLE	GOOD WEATHER CAPACITY LOS E 90% OF CYCLE
188	1800	1	11	2%	U2	10	0	OTHER	90.0	108.0	120	0.85	0.95	881	1057
189	1800	1	12	2%	U2	10	0	OTHER	90.0	108.0	120	0.85	0.95	900	1080
173	1800	1	11.5	2%	L	10	0	OTHER	33.8	40.5	45	0.85	0.95	890	1068
205	1800	1	12	2%	U2	10	0	OTHER	56.3	67.5	75	0.85	0.95	900	1080

ADJUSTMENT FACTORS

LANE WIDTH FACTOR	HEAVY VEHICLES FACTOR	TYPICAL GRADE FACTOR	PARKING FACTOR	BUS BLOCKAGE FACTOR	AREA TYPE FACTOR
0.97	0.99	0.99	0.85	1.00	1.00
1.00	0.99	0.99	0.85	1.00	1.00
0.97	0.99	1.00	0.85	1.00	1.00
1.00	0.99	0.99	0.85	1.00	1.00

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APPENDIX F

METHODOLOGY TO CALCULATE EVACUATION CAPACITIES

APPENDIX F

METHODOLOGY TO CALCULATE EVACUATION CAPACITIES

Introduction

The analysis of the evacuation roadway system was performed using the 1985 Highway Capacity Manual (HCM), as it represents the current standard methodology in evaluating travel facilities. The document reflects over two decades of comprehensive research conducted by a variety of research individuals and government agencies and, as such, represents the best available knowledge and guidance to the operational and design analysis of transportation facilities. Methodologies are summarized below for the four categories or roadway facilities and three weather conditions which are to be encountered in the EPZ.

Two-Lane, Two-Way Roadways

The predominant roadway type within the 10-mile emergency planning zone is the two-lane, two-way highway. A two-lane highway can be defined as a two-lane roadway with one lane dedicated for traffic in each direction. These roadways basically serve an accessibility function, usually for low traffic volumes. According to the 1985 Highway Capacity Manual (HCM), the general relationship describing traffic operations on these roadway segments is as follows:

SF_i = (2800 passenger cars per hour) x $(V/C)_i \times f_d \times f_w \times f_{hv}$

Where: SF_i = Total roadway service flow rate in both directions for prevailing roadway and traffic conditions, for a specified level-of-service, in vehicles per hour;

$(V/C)_i$ = ratio of flow rate to ideal capacity for a specified level of service, obtained from Table 8-1 of the HCM;

f_d = adjustment factor for directional distribution of traffic, obtained from Table 8-4 of the HCM;

f_w = adjustment factor for narrow lanes and restricted shoulder width, obtained from Table 8-5 of the HCM; and

f_{hv} = adjustment factor for the presence of heavy vehicles in the traffic stream.

Table 8-1 of the 1985 HCM tabulates $(V/C)_i$ factors for a variety of terrain types and passing zone allowances, each of which was evaluated based on field observations. The analysis for this project assumed the presence of few, if any, no passing opportunities for both levels-of-service D and E conditions (the HCM tables are referenced only). This assumption is valid for an evacuation scenario where virtually no opportunities would exist to pass due to anticipated traffic congestion. Accordingly, the base two-way evacuation capacity (2800 passenger cars per hour) for this type of roadway was adjusted to reflect the respective level-of-service D and E traffic flow conditions by factors of 0.64 and 1.00 (level terrain), 0.62 and 0.97 (rolling terrain), and 0.58 and 0.91 (mountainous terrain).

Each roadway link in the evacuation network is unique in that travel characteristics generally vary, even if only slightly, when proceeding along the particular route in question. As such, various factors must be applied to a link's base capacity to better reflect actual travel conditions experienced by the driver. The analysis accounts for the influence of directional frictions related to the imbalance of vehicular flows in each travel direction.

For an evacuation scenario, a skewed vehicular flow split would be expected -- the analysis used an approximate 90 percent outbound/10 percent inbound directional distribution. This distribution reflects both fewer travel gaps between vehicles in the major outbound flow and the increased inability of the minor flow to identify passing gaps in the opposite flow lane.

Additional factors accounted for travel lane widths of generally 10- to 12-foot wide, and the presence of heavy truck-type vehicles in the general traffic stream. Tables 8.4 and 8.5 of the HCM tabulate the various factors applied in the analysis for directional and lane width adjustments, while a default value of 0.98 was used for the heavy truck factor as few, if any, of these vehicles will be on the road during an emergency situation. Finally, two-way base capacity was adjusted to provide a one-way capacity in the outbound flow away from the JAF/NMP EPZ. (A conservative yet realistic 80 percent of the total flow was assigned to the outbound flow.)

As an example, from the above considerations, the base evacuation service volumes at levels-of-service D and E for Link Number 47 (Route 57 from Kingdom Road to Howard Road) were computed as follows:

$SF_i = 2800 \times (V/C)_i \times f_d \times f_w \times f_{hv} \times f_{one\ way}$

$SF_{LOS\ D} = 2800 \times 0.64 \times 0.75 \times 0.68 \times 0.98 \times 0.80 =$ 717vph
$SF_{LOS\ E} = 2800 \times 1.00 \times 0.75 \times 0.81 \times 0.98 \times 0.80 =$ 1334 vph

Basic Freeway/Multilane Highway Segments

Basic freeway segments make up a relatively small proportion of the total evacuation roadway network. The 1985 HCM defines a freeway as a divided highway facility having two or more lanes for the exclusive use of traffic in each direction and full control of access and egress. These facilities are separated by physical barriers thereby limiting driver discomfort due to oncoming traffic. The methodology uses the following equation to compute the service flow rate under prevailing roadway and traffic conditions:

$SF_i = MSF_i \times N \times f_w \times f_{hv} \times f_p$

Where: SF_i = Service flow rate or link capacity for a specified level-of-service under prevailing roadway and traffic conditions for N lanes in one direction, in vehicles per hour;

MSF_i = maximum service flow rate per lane for a specified level-of-service under ideal conditions, in passenger cars per hour per travel lane (pcphpl);

N = number of lanes in one direction of the freeway;

f_w = adjustment factor for the effects of restricted lane widths and/or lateral clearances, obtained from Table 3-2 of the HCM;

f_{hv} = adjustment factor for the effect of heavy vehicles (trucks, buses, and recreational vehicles) in the general traffic stream; and

f_p = adjustment factor for the effect of driver population, obtained from Table 3-10 of the HCM.

The analysis begins with the selection of the maximum service flow rate based on a roadway's posted and design speed. In general, roadways with a posted speed limit of 50 mph have a design speed of 60 mph while roads with a posted speed limit of 55 mph have a design speed of 70 mph.

Table 3-1 of the 1985 HCM allows for an evaluation and selection of a maximum capacity per lane associated with a specific design speed as follows:

BASE CAPACITY	DESIGN SPEED
2000 pcphpl	70 MPH
2000 pcphpl	60 MPH
1900 pcphpl	50 MPH

The base evacuation capacities at level-of-service E were further modified by a $(V/C)_i$ factor. The $(V/C)_i$ factor is the maximum volume-to-capacity ratio allowable while maintaining the performance characteristics of the level-of-service and design speed in question. These factors are also shown on Table 3-1 and are summarized below:

LOS E	LOS D
70 MPH Design Speed - 1.00	70 MPH Design Speed - 0.87
60 MPH Design Speed - 1.00	60 MPH Design Speed - 0.80
50 MPH Design Speed - 1.00	50 MPH Design Speed - 0.76

A single adjustment factor (f_w) accounts for the combined effect of lane widths, distances to the nearest obstruction, number of lanes on the freeway, and the presence of obstructions on road sides. For example, a roadway with 11-foot lanes, obstructions on both sides of the roadway at an average of 1-foot from the pavement edge for a four-lane freeway would have a factor of 0.85 -- this suggests that 15 percent of the freeway's ideal capacity is lost due to the lane width and lateral clearance restrictions present. The heavy vehicles factor (fhv) was assumed to be 0.98 because heavy vehicles in an emergency situation will compose a very small proportion of the traffic stream. The ability of motorists to negotiate the roadway is accounted for in the driver population factor (f_p) with values of 0.75 and 1.00 used to respectively reflect least (LOS D) and most (LOS E) efficient traffic stream characteristics.

Multilane Highways are undivided roadways on which opposing traffic flows are separated only by centerline pavement markings and do not have full control of access. The analysis of multilane highways differs slightly from that of freeways by the provision of one additional factor accounting for the friction experienced due to adjacent oncoming traffic as well as the presence of roadside driveways. While all other freeway-associated factors described above are directly applicable for the multilane highway, the environmental factor (f_e) is required to distinguish and analyze these facilities. Table 7-10 in the HCM lists the environmental adjustment factors for a multilane facility.

Thus, from the above considerations, the base evacuation capacities at levels-of-service D and E for Link Numbers 163 (I-81 from Syracuse to Route 49 -- a freeway segment) and 200 (Route 3 from Route 48 to 1st Street -- a multilane highway segment), as example computations, were computed as follows:

Freeway Link No. 163

$SF_i = MSF_i \times N \times f_w \times f_{hv} \times f_p$

$SF_{LOS\ D} = 1850 \times 3 \times 0.98 \times 1.00 \times 0.75 = 4079$ vph

$SFf_{LOS\ E} = 2000 \times 3 \times 1.00 \times 0.98 \times 1.00 = 5880$ vph

Multilane Highway Link No. 200

$SF_i = MSF_i \times N \times f_w \times f_{hv} \times f_e$

$SF_{LOS\ D} = 1450 \times 2 \times 0.94 \times 0.98 \times 0.75 \times 0.95 = 1903$ vph

$SFf_{LOS\ E} = 1900 \times 2 \times 0.94 \times 0.98 \times 1.00 \times 0.95 = 3326$ vph

Signalized Arterials

Several roads within the evacuation network are controlled by signalized intersections with link capacity defined and limited by the link end point -- the intersection itself. Intersection approach capacity, which governs the roadway's ability to carry and process traffic, is the maximum rate of flow which may pass through the subject approach under prevailing traffic, roadway, and signalization conditions.

The basic computation begins with the selection of an "ideal" saturation flow rate, usually 1800 passenger cars per hour of green signal time per lane (pcphpl). The saturation flow rate is the vehicular flow in vehicles per hour which could be accommodated by the specific approach assuming that the green phase is always 1.00 (i.e., no red signal phase occurs). This "ideal" saturation flow rate is adjusted as follows:

$S = S_o \times N \times f_w \times f_{hv} \times f_g \times f_p \times f_{bb} \times f_a \times f_{rt} \times f_{lt} \times G/C$

Where: S = Saturation flow rate for the subject lane group, expressed as a total for all lanes in the lane group under prevailing conditions,, in vehicles per hour of green signal time;

S_o = ideal saturation flow rate per lane, usually 1,800 pcpgpl;

N = number of lanes in the lane group;

f_w = adjustment factor for lane width; 12-ft lanes are standard; given in Table 9-5 of the HCM;

f_{hv} = adjustment factor for heavy vehicles in the traffic stream, given in Table 9-6 of the HCM;

f_g = adjustment factor for approach grade, given in Table 9-7 of the HCM;

f_p = adjustment factor for the existence of a parking lane adjacent to the lane group and the parking activity in that lane, given in Table 9-8 of the HCM;

f_{bb} = adjustment factor for the blocking effect of local buses stopping within the intersection area, given in Table 9-9 of the HCM;

f_a = adjustment factor for area type, given in Table 9-10 of the HCM;

f_{rt} = adjustment factor for right turns in the lane group, given in Table 9-11 of the HCM;

f_{lt} = adjustment factor for left turns in the lane group, given in Table 9-12 of the HCM and;

G/C = ratio of green signal time to total signal cycle length.

The lane width factor (f_w) accounts for the deleterious effect of lanes narrower than the accepted standard of 12 feet wide, while increased flow is provided for on lanes greater than this standard. The heavy vehicle factor (fhv) is assumed to be only slightly affected (i.e., a factor of 0.99 is used to account for terrain conditions) because heavy vehicles in an emergency situation will not make up a significant proportion of the traffic stream. Adjustment factors (f_g) reflecting the effect of roadway grades on the saturation flow are provided for a variety of uphill and downhill conditions. The parking factors (f_p) account for the frictional effect of a parking lane on vehicular flow in the adjacent lanes, as well as for the occasional blocking of an adjacent lane by vehicles moving into and out of curbside parking spaces. Most of the links in this category do not have parking; however, on the links where parking was observed, a minimum number of 10 parking movements per hour was assumed in the analysis. Again, this factor was selected to represent emergency evacuation characteristics when parking would be very minimal. The bus blockage factor (f_{bb}) accounts for the impacts of alighting/boarding activities of local transit buses. Clearly, this type of activity would be minimal under emergency evacuation conditions and, as such, a factor of 1.00 was used. (It must be noted that evacuation bus pickup activity will not be a frequent occurrence during an evacuation and will not affect a change in the use of this factor.) The area type factor (f_a) accounts for the relative inefficiency of business area intersections in comparison to those in other locations. Right and left turn factors (f_{rt} and f_{lt}) depend upon several parameters. However, in an emergency evacuation situation, it is assumed that most vehicles would travel in one direction and not making turns. Furthermore, if a turn was necessary within the route, a predominant turning movement is treated as a through movement. As a result, factors of 0.85 and 0.95 were applied for right and left turn movements -- the least reduction factors allowable in the methodology. The final adjustment to the saturation flow rate accounts for the amount of available green signal time relative to the total signal cycle length (G/C ratio). Factors of approximately 0.75 and 0.90 were chosen to represent levels-of-service D and E, respectively. These different traffic signal adjustment factors reflect varying degrees of preparedness, with the lower level-of-service D factor of 0.75 accounting for the likelihood of fewer traffic control agents in place during an evacuation scenario.

A select number of intersections are regulated by STOP or YIELD controls. It was determined that they would operate similar to signalized intersections with the control and regulation of vehicular flow maintained through traffic control agents. In this manner, these locations were assumed to experience the same frictions as those present any typical signalized intersections, and were thus examined using the above-described traffic signal control criteria.

Thus, from the above considerations, the base evacuation service volumes at levels-of-service D and E for Link Number 205 (Route 104 from East 12th Street to George Street in Oswego), as an example computation, were computed as follows:

$$S = S_o \times N \times f_w \times f_{hv} \times f_g \times f_p \times f_{bb} \times f_a \times f_{rt} \times f_{lt} \times G/C$$

$$S_{LOS\ D} = 1800 \times 1 \times 1.00 \times 0.99 \times 0.99 \times 0.85 \times 1.00 \times 1.00 \times 0.85 \times 0.95 \times 0.75 = 908 \text{ vph}$$

$$S_{LOS\ E} = 1800 \times 1 \times 1.00 \times 0.99 \times 0.99 \times 0.85 \times 1.00 \times 1.00 \times 0.85 \times 0.95 \times 0.90 = 1090 \text{ vph}$$

Adverse Weather Effects

The 1985 Highway Capacity Manual (HCM) does not specifically account for inclement weather conditions in the analysis of roadway travel capacities. In fact, there have been relatively few efforts to quantify the effects of adverse weather on roadway capacity. Under adverse weather conditions such as snow, fog, severe thunder storms which result in heavy rains, localized flooding, or ice, the ability of roadways to carry traffic is further reduced from that of a Level of Service D or E. Two factors account for this reduction -- a decreased quality and amount of physical space on the roadway surface (e.g., snow on shoulders) and a more cautious attitude on the part of the driver (resulting in increased headways). Level of Service D service volumes were further reduced by 20 percent to account for these factors to estimate adverse weather evacuation capacities.

A standard freeway is referenced as an example to illustrate the anticipated capacity of a roadway when adverse weather conditions prevail. At Level of Service E, one lane of a standard freeway can accommodate 2,000 vehicles per hour. 2,000 vehicles is also the theoretical capacity of one freeway lane under normal weather conditions and without incident.

At a Level of Service D, one standard freeway lane can typically accommodate 1,850 vehicles per hour; therefore, it is assumed the theoretical capacity of Level of Service D is 1,850 vehicles. The Level of Service D theoretical capacity is representative of conditions which may result from a light snow, rain, or when some traffic control officers may be unable to fulfill their assignments. A further 20% reduction in level of Service D conditions would result in a theoretical capacity of 1,480 vehicles during adverse weather conditions.

Assuming that 10,000 vehicles were anticipated to traverse this section of freeway, it would take five hours to traverse this road section assuming Level of Service E conditions (10,000 veh ÷ 2,000 veh/hr). Subsequently, it would take almost six hours under Level of Service D conditions and close to seven hours to travel when adverse weather conditions prevail on the same roadway section.

Comparison of 1965 and 1985 Highway Capacity Manual Methodologies

As previously mentioned, the 1985 HCM was used as the basis of computing roadway travel capacities in this current analysis of the JAF/NMP EPZ. Previous analyses of this roadway system used the current manual's predecessor, the 1965 Highway Capacity Manual, that was the accepted standard methodology at that time. While both manuals are theoretically correct, it is the current 1985 version that is gaining widespread acceptance for a variety of reasons.

The 1985 version has a more extensive data base in all chapters of analysis, has provisions for constant updating as warranted and, most importantly, accounts for the numerous operating characteristic and frictions that affect the roadway system and driver behaviors. The summary table below highlights the previous example 1985 HCM link computations versus those same link capacities of prior analyses utilizing the 1965 HCM, under normal conditions (i.e. a 12-foot lane, full shoulder, level terrain, and good weather).

	Facility Service Volumes			
	1965 HCM		1985 HCM	
Facility Type	LOS D	LOS E	LOS D	LOS E
2-Lane, 2-Way	696	1200	844	1516
Freeway	2404	3440	2775	4000
Multilane Highway	2660	3800	1847	3078
Signalized Intersection	659	1136	1112	1334

APPENDIX G

EVACUATION TRAVEL TIMES

BY EMERGENCY RESPONSE PLANNING AREAS

APPENDIX G

EVACUATION TRAVEL TIMES

BY EMERGENCY RESPONSE PLANNING AREAS

This appendix includes evacuation travel time estimates by ERPA for a simultaneous full-EPZ evacuation. Evacuation travel time estimates are presented for the following scenarios, weather conditions, and population groups:

<u>Scenarios</u>

School-in-Session
School-not - in Session
Weekend/Holiday Summer
Weekend/Holiday Winter
Evening
Nighttime
Classic Weekend
Harborfest Weekend

<u>Weather Conditions</u>

Normal
Adverse

<u>Population Groups</u>

Resident Population with Autos
Resident Population without Autos
Special Facilities Population
Transient Population

A total of 19 tables are included in this Appendix. Table G-1 is a summary table that indicates evacuation travel times for all scenarios under normal weather conditions. Similarly, Table G-2 shows evacuation travel times for all scenarios under adverse weather conditions. Tables G-3 through G-18 each show evacuation travel times for a particular scenario under a particular weather condition. Table G-19 shows evacuation travel times for schools in the EPZ to the New York State Fairgrounds for normal and adverse weather conditions. A range of values depict the lower and upperbound limits of the evacuation times for normal weather and dry roadway conditions to a light rain or snow shower which results in wet pavement. Evacuation travel time estimates for adverse weather approximate travel conditions after a severe ice storm or heavy snow once roadway crews have been able to clear the roads.

A suggested approach to read the tables in Appendix G is outlined below:

- Step 1 - Determine the appropriate scenario (i.e. - School-in-Session)
- Step 2 - Determine the approximate weather condition.
  - Lower bound normal weather conditions - dry pavement
  - Upper bound normal weather conditions - wet pavement
  - Adverse weather conditions - pavement conditions after a severe winter storm
- Step 3 - For lower bound normal weather ETTE tables, read the left of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ
  - For upper bound normal weather ETTE tables, read the right of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ
  - Adverse weather ETTEs are documented on separate tables for each scenario

A possible evacuation scenario is detailed as follows:

A full EPZ evacuation scenario has been ordered on a Tuesday at 11:15 AM in October. The weather conditions are observed to be sunny and the forecast is that these weather conditions will continue over the next two days. (See Table G-3 for ETTEs).

Q. How long will it take for the permanent resident population with autos to:

- Fully evacuate ERPA 5? A. 2:10
- Fully evacuate the EPZ? A. 4:10

Q. How long will it take for the permanent resident population without autos to:

- Fully evacuate ERPA 16? A. 0:40
- Fully evacuate the EPZ? A. 4:30

Q. How long will it take for the special facilities population to:

- Fully evacuate ERPA 4? A. 1:10
- Fully evacuate the EPZ? A. 13:20 (Multiple wave evacuations substantially increase special facility evacuation times.)

Q. How long will it take for the transient population to:

- Fully evacuate ERPA 5? A. 1:50 (Transient population can evacuate more quickly than permanent resident population in the same ERPA. This typically occurs when the transient population is located in a traffic zone closer to the EPZ boundary).

• Fully evacuate ERPA 16?	A. 0:40	(Transient population and permanent resident population typically require the same time to evacuate an ERPA when the population dispersion of each is similar throughout the ERPA.
• Fully evacuate ERPA 22?	A. 4:00	
• Fully evacuate the EPZ?	A. 4:10	

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	4:00 - 6:40	1:10 - 2:00	-	4:00 - 6:40
2	2:00 - 3:00	1:00 - 1:50	-	-
3	4:00 - 6:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	4:00 - 6:40	1:10 - 2:00	-	-
6	4:00 - 6:50	4:20 - 7:10	-	4:00 - 6:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	4:00 - 6:40	4:00 - 6:40	-	4:00 - 6:40
11	2:50 - 5:00	4:20 - 7:10	-	-
12	4:20 - 7:20	4:20 - 7:10	9:40 -11:20	4:10 - 7:00
13	2:30 - 4:00	3:00 - 4:30	12:20 -14:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:50 - 6:40	4:10 - 6:50	-	-
20	3:50 - 6:40	4:10 - 6:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	4:20 - 7:20	4:20 - 7:10	12:20 -14:00	4:10 - 7:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	3:10 - 5:10	1:10 - 2:00	-	3:10 - 5:10
2	1:10 - 2:10	1:00 - 1:50	-	-
3	3:10 - 5:10	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 - 1:10	1:00 - 1:00
5	3:10 - 5:10	1:10 - 2:00	-	-
6	3:10 - 5:10	3:20 - 5:20	-	3:10 - 5:10
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	3:10 - 5:10	3:10 - 5:10	-	-
11	2:20 - 3:50	3:10 - 5:10	-	-
12	4:40 - 6:50	5:00 - 7:10	10:50 -12:50	4:20 - 6:20
13	6:40 - 10:30	6:50 - 10:50	13:20 -16:40	6:10 - 10:10
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2:00
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2:00
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	4:20 - 6:20	4:20 - 6:30	-	-
20	4:10 - 6:20	4:20 - 6:30	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	6:30 - 10:30	6:20 - 10:20	6:10 -10:10	6:10 - 10:10
ALL	6:40 - 10:30	6:50 - 10:50	13:20 -16:40	6:10 - 10:10

TABLE G-1

EVACUATION TRAVEL TIME ESTIMATES BY ERPA

NORMAL WEATHER

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents.vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained.
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	1:50 - 2:50	2:30 - 4:00	-	-
4	1:00 - 1:50	1:10 - 2:40	1:10 - 2:00	1:00 - 1:50
5	2:10 - 3:40	2:30 - 4:00	-	1:50 - 2:50
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:00 - 2:30	1:00 - 2:40	-	1:00 - 2:30
8	0:50 - 2:30	1:00 - 2:10	-	0:50 - 2:30
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	1:50 - 2:50	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:30	-	4:00 - 7:10
12	4:10 - 7:20	4:20 - 7:30	10:50 -12:40	4:10 - 7:20
13	4:00 - 6:30	4:30 - 6:50	13:20 -15:20	4:00 - 6:30
14	0:40 - 0:40	0:50 - 0:50	-	-
15	0:50 - 2:30	1:20 - 3:00	-	0:50 - 2:30
16	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20
17	0:40 - 2:10	1:20 - 2:20	0:40 - 1:50	0:40 - 1:50
18	0:40 - 1:40	0:50 - 2:00	-	0:40 - 1:50
19	4:00 - 7:10	4:10 - 7:00	-	2:50 - 4:10
20	3:50 - 7:10	4:10 - 7:00	-	3:50 - 7:10
21	2:40 - 4:30	2:50 - 4:40	2:40 - 4:30	2:40 - 4:30
22.	4:00 - 6:30	4:10 - 6:40	4:00 - 6:30	4:00 - 6:30
ALL	4:10 - 7:20	4:30 - 7:30	13:20 -15:20	4:10 - 7:20

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	2:10 - 3:20	2:30 - 4:00	-	-
4	2:00 - 3:10	2:10 - 3:20	1:10 - 2:00	2:00 - 3:10
5	2:10 - 3:40	2:30 - 4:00	-	2:00 - 3:10
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:50 - 3:00	1:00 - 2:10	-	1:50 - 3:00
8	0:50 - 2:00	1:00 - 1:00	-	0:50 - 2:00
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	2:00 - 3:10	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:20	-	4:00 - 7:10
12	4:00 - 7:10	4:10 - 7:20	10:50 -12:50	4:00 - 7:10
13	4:00 - 6:20	4:20 - 6:50	13:20 -15:20	4:00 - 6:20
14	1:50 - 3:00	2:00 - 3:00	-	1:50 - 3:00
15	1:50 - 3:00	1:20 - 2:30	-	1:50 - 3:00
16	0:40 - 1:50	0:40 - 2:00	0:40 - 0:40	0:40 - 1:50
17	0:40 - 1:40	1:10 - 2:00	-	0:40 - 0:40
18	0:40 - 1:40	0:50 - 1:40	-	0:40 - 1:40
19	4:00 - 7:10	4:10 - 7:00	-	3:00 - 4:20
20	3:50 - 7:00	4:10 - 7:00	-	3:50 - 7:00
21	2:30 - 4:10	2:40 - 4:20	0:40 - 0:40	2:30 - 4:10
22	4:00 - 6:20	4:00 - 6:30	4:00 - 6:20	4:00 - 6:20
ALL	4:00 - 7:10	4:20 - 7:30	13:20 -15:20	4:00 - 7:10

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:50 - 2:50
2	2:00 - 3:00	1:00 - 1:50	-	-
3	1:50 - 2:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	1:50 - 2:50	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:50 - 2:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:50 - 2:50	1:50 - 2:50	-	1:50 - 2:50
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:10 -10:30	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:30	11:40 -13:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:30 - 3:50	-	-
20	2:10 - 3:40	2:30 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	2:30 - 4:00	3:00 - 4:30	11:40 -13:00	2:30 - 4:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:00 - 2:10	1:10 - 2:00	-	1:00 - 1:50
2	1:00 - 1:50	1:00 - 1:50	-	-
3	1:00 - 2:10	1:10 - 2:00	-	-
4	1:00 - 1:00	1:10 - 1:10	1:10 - 1:10	-
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2:10
7	0:50 - 0:50	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	8:50 -10:00	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00
14	0:40 - 0:40	0:50 - 0:50	-	0:40 - 0:40
15	0:40 - 0:40	1:20 - 1:20	-	0:40 - 0:40
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:00	2:30 - 4:00	-
ALL	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:10 - 2:10	1:10 - 2:00	-	1:10 - 2:10
2	1:10 - 2:10	1:00 - 1:50	-	-
3	1:10 - 2:20	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 - 1:10	1:00 - 1:00
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2:20
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:00 -10:00	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:30	11:20 -12:30	2:30 - 4:00
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2:00
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2:00
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:40 - 4:00	2:40 - 4:10	2:30 - 4:00	2:40 - 4:00
ALL	2:40 - 4:00	3:00 - 4:30	11:20 -12:30	2:40 - 4:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:40 - 2:30
2	2:00 - 3:00	1:10 - 1:50	-	-
3	1:40 - 2:40	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	1:40 - 2:30	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:40 - 2:40
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:40 - 2:30	1:40 - 2:30	-	1:40 - 2:30
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:20 -10:40	2:20 - 4:00
13	3:10 - 5:10	3:40 - 5:30	11:50 -13:00	3:10 - 5:10
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	3:20 - 5:10	3:20 - 5:10	3:10 - 5:10	3:20 - 5:10
ALL	3:20 - 5:10	3:40 - 5:30	11:50 -13:00	3:20 - 5:10

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	8:20	2:20	-	8:20
2	3:40	2:10	-	-
3	8:20	2:20	-	-
4	3:30	3:50	2:00	1:50
5	8:20	2:20	-	-
6	8:20	8:50	-	8:20
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	8:20	8:20	-	8:20
11	6:10	8:50	-	-
12	8:50	8:50	13:30	8:40
13	4:50	5:20	16:30	4:50
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	8:10	8:20	-	-
20	8:10	8:20	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	4:50
ALL	8:50	8:50	16:30	8:40

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	6:30	2:20	-	6:30
2	2:40	2:10	-	-
3	6:30	2:20	-	-
4	2:30	2:50	1:20	1:10
5	6:20	2:20	-	-
6	6:30	6:30	-	6:30
7	2:30	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	6:20	6:20	-	-
11	4:40	6:20	-	-
12	8:20	8:40	15:20	7:50
13	13:00	13:20	20:10	12:40
14	2:20	2:30	-	2:20
15	2:20	2:20	-	2:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	7:50	8:00	-	-
20	7:40	8:00	-	-
21	3:10	3:20	-	-
22	13:00	12:40	12:40	12:40
ALL	13:00	13:20	20:10	12:40

TABLE G-2

EVACUATION TRAVEL TIME ESTIMATES BY ERPA

ADVERSE WEATHER

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
   (a) resident population (with and without automobiles);
   (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
   (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
ADVERSE WEATHER

ERPA	Resident Population: With Autos	Resident Population: Without Autos	Special Facilities	Transients
1	4:30	4:40	-	4:30
2	4:30	4:40	-	4:30
3	3:30	4:40	-	-
4	2:10	3:10	2:20	2:10
5	4:30	4:40	-	3:20
6	9:00	9:10	-	9:00
7	3:00	3:10	-	3:00
8	3:00	2:30	-	3:00
9	2:00	2:10	-	2:00
10	4:30	3:20	-	4:30
11	9:00	9:10	-	9:00
12	9:00	9:10	15:10	9:00
13	8:00	8:30	18:30	8:00
14	1:40	0:50	-	-
15	3:00	3:20	-	3:00
16	2:50	2:50	2:50	2:50
17	2:30	2:50	2:10	2:10
18	1:50	2:20	-	2:10
19	8:50	8:40	-	5:10
20	8:50	8:40	-	8:50
21	5:30	5:40	5:30	5:30
22	8:00	8:10	8:00	8:00
ALL	9:00	9:10	18:30	9:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
ADVERSE WEATHER

ERPA	Resident Population: With Autos	Resident Population: Without Autos	Special Facilities	Transients
1	4:30	4:40	-	4:30
2	4:30	4:40	-	4:30
3	4:00	4:40	-	-
4	3:50	4:00	2:20	3:50
5	4:30	4:40	-	4:00
6	8:50	9:10	-	8:50
7	3:40	2:30	-	3:40
8	2:20	2:00	-	2:20
9	2:00	2:20	-	2:00
10	4:30	4:00	-	4:30
11	8:50	9:00	-	8:50
12	8:50	9:00	15:20	8:50
13	7:50	8:20	18:10	7:50
14	3:40	3:30	-	3:40
15	3:40	2:50	-	3:40
16	2:10	2:20	1:30	2:10
17	2:00	2:20	-	1:40
18	2:00	2:00	-	2:00
19	8:50	8:30	-	5:30
20	8:40	8:30	-	8:40
21	5:00	5:20	1:40	5:00
22	7:50	8:00	7:50	7:50
ALL	8:50	9:10	18:10	8:50

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	3:30	2:20	-	3:30
2	3:40	2:10	-	-
3	3:30	2:20	-	-
4	3:30	3:50	2:00	1:50
5	3:30	2:20	-	-
6	4:40	5:00	-	3:30
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	3:30	3:30	-	3:30
11	4:40	4:50	-	-
12	4:50	5:00	12:30	4:50
13	4:50	5:20	15:20	4:50
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	-
ALL	4:50	5:20	15:20	4:50

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	2:30	2:20	-	2:10
2	2:10	2:10	-	-
3	2:40	2:20	-	-
4	1:10	2:00	1:20	-
5	2:30	2:20	-	-
6	4:40	5:00	-	2:30
7	1:50	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	2:30	2:30	-	-
11	4:40	4:50	-	-
12	4:50	5:00	11:40	4:50
13	4:50	5:20	14:40	4:50
14	0:40	0:50	-	0:40
15	1:50	2:20	-	0:40
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	-
ALL	4:50	5:20	14:40	4:50

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	3:30	2:20	-	3:10
2	3:40	2:10	-	-
3	3:10	2:20	-	-
4	3:30	3:50	2:00	1:50
5	3:10	2:20	-	-
6	4:40	5:00	-	3:10
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	3:10	3:00	-	3:10
11	4:40	4:50	-	-
12	4:50	5:00	12:30	4:50
13	6:20	6:50	15:30	6:20
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	6:20	6:30	6:20	6:20
ALL	6:20	6:50	15:30	6:20

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	2:40	2:20	-	2:50
2	2:40	2:10	-	-
3	2:40	2:20	-	-
4	2:30	2:50	1:20	1:10
5	2:40	2:20	-	-
6	4:40	5:00	-	2:40
7	2:30	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	2:40	2:40	-	-
11	4:40	4:50	-	-
12	4:50	5:00	11:50	4:50
13	5:00	5:20	14:40	5:00
14	2:20	2:30	-	2:20
15	2:20	2:20	-	2:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	5:00	5:00	4:50	5:00
ALL	5:00	5:20	14:40	5:00

TABLE G-3

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	1:50 - 2:50	2:30 - 4:00	-	-
4	1:00 - 1:50	1:10 - 2:40	1:10 - 2:00	1:00 - 1:50
5	2:10 - 3:40	2:30 - 4:00	-	1:50 - 2:50
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:00 - 2:30	1:00 - 2:40	-	1:00 - 2:30
8	0:50 - 2:30	1:00 - 2:10	-	0:50 - 2:30
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	1:50 - 2:50	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:30	-	4:00 - 7:10
12	4:10 - 7:20	4:20 - 7:30	10:50 - 12:40	4:10 - 7:20
13	4:00 - 6:30	4:30 - 6:50	13:20 - 15:20	4:00 - 6:30
14	0:40 - 0:40	0:50 - 0:50	-	-
15	0:50 - 2:30	1:20 - 3:00	-	0:50 - 2:30
16	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20
17	0:40 - 2:10	1:20 - 2:20	0:40 - 1:50	0:40 - 1:50
18	0:40 - 1:40	0:50 - 2:00	-	0:40 - 1:50
19	4:00 - 7:10	4:10 - 7:00	-	2:50 - 4:10
20	3:50 - 7:10	4:10 - 7:00	-	3:50 - 7:10
21	2:40 - 4:30	2:50 - 4:40	2:40 - 4:30	2:40 - 4:30
22	4:00 - 6:30	4:10 - 6:40	4:00 - 6:30	4:00 - 6:30
ALL	4:10 - 7:20	4:30 - 7:30	13:20 - 15:20	4:10 - 7:20

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents, vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-4

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	4:30	4:40	-	4:30
2	4:30	4:40	-	4:30
3	3:30	4:40	-	-
4	2:10	3:10	2:20	2:10
5	4:30	4:40	-	3:20
6	9:00	9:10	-	9:00
7	3:00	3:10	-	3:00
8	3:00	2:30	-	3:00
9	2:00	2:10	-	2:00
10	4:30	3:20	-	4:30
11	9:00	9:10	-	9:00
12	9:00	9:10	15:10	9:00
13	8:00	8:30	18:30	8:00
14	1:40	0:50	-	-
15	3:00	3:20	-	3:00
16	2:50	2:50	2:50	2:50
17	2:30	2:50	2:10	2:10
18	1:50	2:20	-	2:10
19	8:50	8:40	-	5:10
20	8:50	8:40	-	8:50
21	5:30	5:40	5:30	5:30
22	8:00	8:10	8:00	8:00
ALL	9:00	9:10	18:30	9:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-5

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
NORMAL WEATHER

ERPA	Resident Population With Autos From - To	Resident Population Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	2:10 - 3:20	2:30 - 4:00	-	-
4	2:00 - 3:10	2:10 - 3:20	1:10 - 2:00	2:00 - 3:10
5	2:10 - 3:40	2:30 - 4:00	-	2:00 - 3:10
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:50 - 3:00	1:00 - 2:10	-	1:50 - 3:00
8	0:50 - 2:00	1:00 - 1:00	-	0:50 - 2:00
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	2:00 - 3:10	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:20	-	4:00 - 7:10
12	4:00 - 7:10	4:10 - 7:20	10:50 -12:50	4:00 - 7:10
13	4:00 - 6:20	4:20 - 6:50	13:20 -15:20	4:00 - 6:20
14	1:50 - 3:00	2:00 - 3:00	-	1:50 - 3:00
15	1:50 - 3:00	1:20 - 2:30	-	1:50 - 3:00
16	0:40 - 1:50	0:40 - 2:00	0:40 -0:40	0:40 - 1:50
17	0:40 - 1:40	1:10 - 2:00	-	0:40 - 0:40
18	0:40 - 1:40	0:50 - 1:40	-	0:40 - 1:40
19	4:00 - 7:10	4:10 - 7:00	-	3:00 - 4:20
20	3:50 - 7:00	4:10 - 7:00	-	3:50 - 7:00
21	2:30 - 4:10	2:40 - 4:20	0:40 -0:40	2:30 - 4:10
22	4:00 - 6:20	4:00 - 6:30	4:00 -6:20	4:00 - 6:20
ALL	4:00 - 7:10	4:20 - 7:30	13:20 -15:20	4:00 - 7:10

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-6

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	4:30	4:40	-	4:30
2	4:30	4:40	-	4:30
3	4:00	4:40	-	-
4	3:50	4:00	2:20	3:50
5	4:30	4:40	-	4:00
6	8:50	9:10	-	8:50
7	3:40	2:30	-	3:40
8	2:20	2:00	-	2:20
9	2:00	2:20	-	2:00
10	4:30	4:00	-	4:30
11	8:50	9:00	-	8:50
12	8:50	9:00	15:20	8:50
13	7:50	8:20	18:10	7:50
14	3:40	3:30	-	3:40
15	3:40	2:50	-	3:40
16	2:10	2:20	1:30	2:10
17	2:00	2:20	-	1:40
18	2:00	2:00	-	2:00
19	8:50	8:30	-	5:30
20	8:40	8:30	-	8:40
21	5:00	5:20	1:40	5:00
22	7:50	8:00	7:50	7:50
ALL	8:50	9:10	18:10	8:50

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-7

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:50 - 2:50
2	2:00 - 3:00	1:00 - 1:50	-	-
3	1:50 - 2:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	1:50 - 2:50	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:50 - 2:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:50 - 2:50	1:50 - 2:50	-	1:50 - 2:50
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:10 - 10:30	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:30	11:40 - 13:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:30 - 3:50	-	-
20	2:10 - 3:40	2:30 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	2:30 - 4:00	3:00 - 4:30	11:40 - 13:00	2:30 - 4:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-8

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	3:30	2:20	-	3:30
2	3:40	2:10	-	-
3	3:30	2:20	-	-
4	3:30	3:50	2:00	1:50
5	3:30	2:20	-	-
6	4:40	5:00	-	3:30
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	3:30	3:30	-	3:30
11	4:40	4:50	-	-
12	4:50	5:00	12:30	4:50
13	4:50	5:20	15:20	4:50
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	-
ALL	4:50	5:20	15:20	4:50

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-9

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:00 - 2:10	1:10 - 2:00	-	1:00 - 1:50
2	1:00 - 1:50	1:00 - 1:50	-	-
3	1:00 - 2:10	1:10 - 2:00	-	-
4	1:00 - 1:00	1:10 - 1:10	1:10 - 1:10	-
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2:10
7	0:50 - 0:50	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	8:50 -10:00	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00
14	0:40 - 0:40	0:50 - 0:50	-	0:40 - 0:40
15	0:40 - 0:40	1:20 - 1:20	-	0:40 - 0:40
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:00	2:30 - 4:00	-
ALL	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-10

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	2:30	2:20	-	2:10
2	2:10	2:10	-	-
3	2:40	2:20	-	-
4	1:10	2:00	1:20	-
5	2:30	2:20	-	-
6	4:40	5:00	-	2:30
7	1:50	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	2:30	2:30	-	-
11	4:40	4:50	-	-
12	4:50	5:00	11:40	4:50
13	4:50	5:20	14:40	4:50
14	0:40	0:50	-	0:40
15	1:50	2:20	-	0:40
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	-
ALL	4:50	5:20	14:40	4:50

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
   (a) resident population (with and without automobiles);
   (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
   (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-11

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
NORMAL WEATHER

ERPA	Resident Population With Autos From - To	Resident Population Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:40 - 2:30
2	2:00 - 3:00	1:10 - 1:50	-	-
3	1:40 - 2:40	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	1:40 - 2:30	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:40 - 2:40
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:40 - 2:30	1:40 - 2:30	-	1:40 - 2:30
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:20 -10:40	2:20 - 4:00
13	3:10 - 5:10	3:40 - 5:30	11:50 -13:00	3:10 - 5:10
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	3:20 - 5:10	3:20 - 5:10	3:10 -5:10	3:20 - 5:10
ALL	3:20 - 5:10	3:40 - 5:30	11:50 -13:00	3:20 - 5:10

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-12

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	3:30	2:20	-	3:10
2	3:40	2:10	-	-
3	3:10	2:20	-	-
4	3:30	3:50	2:00	1:50
5	3:10	2:20	-	-
6	4:40	5:00	-	3:10
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	3:10	3:00	-	3:10
11	4:40	4:50	-	-
12	4:50	5:00	12:30	4:50
13	6:20	6:50	15:30	6:20
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	6:20	6:30	6:20	6:20
ALL	6:20	6:50	15:30	6:20

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-13

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:10 - 2:10	1:10 - 2:00	-	1:10 - 2:10
2	1:10 - 2:10	1:00 - 1:50	-	-
3	1:10 - 2:20	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 -1:10	1:00 - 1:00
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2:20
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:00 -10:00	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:30	11:20 -12:30	2:30 - 4:00
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2:00
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2:00
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:40 - 4:00	2:40 - 4:10	2:30 -4:00	2:40 - 4:00
ALL	2:40 - 4:00	3:00 - 4:30	11:20 -12:30	2:40 - 4:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-14

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	2:40	2:20	-	2:50
2	2:40	2:10	-	-
3	2:40	2:20	-	-
4	2:30	2:50	1:20	1:10
5	2:40	2:20	-	-
6	4:40	5:00	-	2:40
7	2:30	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	2:40	2:40	-	-
11	4:40	4:50	-	-
12	4:50	5:00	11:50	4:50
13	5:00	5:20	14:40	5:00
14	2:20	2:30	-	2:20
15	2:20	2:20	-	2:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	5:00	5:00	4:50	5:00
ALL	5:00	5:20	14:40	5:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-15

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	4:00 - 6:40	1:10 - 2:00	-	4:00 - 6:40
2	2:00 - 3:00	1:00 - 1:50	-	-
3	4:00 - 6:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	4:00 - 6:40	1:10 - 2:00	-	-
6	4:00 - 6:50	4:20 - 7:10	-	4:00 - 6:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	4:00 - 6:40	4:00 - 6:40	-	4:00 - 6:40
11	2:50 - 5:00	4:20 - 7:10	-	-
12	4:20 - 7:20	4:20 - 7:10	9:40 -11:20	4:10 - 7:00
13	2:30 - 4:00	3:00 - 4:30	12:20 -14:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:50 - 6:40	4:10 - 6:50	-	-
20	3:50 - 6:40	4:10 - 6:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	4:20 - 7:20	4:20 - 7:10	12:20 -14:00	4:10 - 7:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-16

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	8:20	2:20	-	8:20
2	3:40	2:10	-	-
3	8:20	2:20	-	-
4	3:30	3:50	2:00	1:50
5	8:20	2:20	-	-
6	8:20	8:50	-	8:20
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	8:20	8:20	-	8:20
11	6:10	8:50	-	-
12	8:50	8:50	13:30	8:40
13	4:50	5:20	16:30	4:50
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	8:10	8:20	-	-
20	8:10	8:20	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	4:50
ALL	8:50	8:50	16:30	8:40

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-17

EVACUATION TRAVEL TIME ESTIMATES BY ERPA HARBORFEST WEEKEND SCENARIO NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	3:10 - 5:10	1:10 - 2:00	-	3:10 - 5:10
2	1:10 - 2:10	1:00 - 1:50	-	-
3	3:10 - 5:10	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 - 1:10	1:00 - 1:00
5	3:10 - 5:10	1:10 - 2:00	-	-
6	3:10 - 5:10	3:20 - 5:20	-	3:10 - 5:10
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	3:10 - 5:10	3:10 - 5:10	-	-
11	2:20 - 3:50	3:10 - 5:10	-	-
12	4:40 - 6:50	5:00 - 7:10	10:50 -12:50	4:20 - 6:20
13	6:40 -10:30	6:50 -10:50	13:20 -16:40	6:10 -10:10
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2:00
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2:00
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	4:20 - 6:20	4:20 - 6:30	-	-
20	4:10 - 6:20	4:20 - 6:30	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	6:30 -10:30	6:20 -10:20	6:10 -10:10	6:10 -10:10
ALL	6:40 -10:30	6:50 -10:50	13:20 -16:40	6:10 -10:10

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-18

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
ADVERSE WEATHER

	Resident Population			
ERPA	With Autos	Without Autos	Special Facilities	Transients
1	6:30	2:20	-	6:30
2	2:40	2:10	-	-
3	6:30	2:20	-	-
4	2:30	2:50	1:20	1:10
5	6:20	2:20	-	-
6	6:30	6:30	-	6:30
7	2:30	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	6:20	6:20	-	-
11	4:40	6:20	-	-
12	8:20	8:40	15:20	7:50
13	13:00	13:20	20:10	12:40
14	2:20	2:30	-	2:20
15	2:20	2:20	-	2:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	7:50	8:00	-	-
20	7:40	8:00	-	-
21	3:10	3:20	-	-
22	13:00	12:40	12:40	12:40
ALL	13:00	13:20	20:10	12:40

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-19

EVACUATION TRAVEL TIME ESTIMATES
WEEKDAY SCHOOL-IN-SESSION SCENARIO

District	School	ERPA Location	Evacuation Times To The New York State Fairgrounds: Normal Weather	Evacuation Times To The New York State Fairgrounds: Adverse Weather
Oswego	Fitzhugh Park Elementary	12	5:40 - 8:00	9:50
	Kingsford Park Elementary	13	4:00 - 6:20	7:50
	Charles E. Riley Elementary	12	5:40 - 7:40	9:20
	Frederick Leighton Elementary	13	7:00 - 10:30	13:00
	Minetto Elementary	21	3:50 - 6:10	7:30
	Oswego Middle School	13	4:00 - 6:20	7:50
	Oswego High School	13	7:00 - 10:30	13:00
Mexico Academy	Palermo Elementary	-	5:40 - 7:40	9:30
	New Haven Elementary	4	5:40 - 7:40	9:30
	Mexico Elementary	16	5:30 - 7:20	9:10
	Mexico Middle School	16	5:30 - 7:20	9:10
	Mexico High School	16	5:30 - 7:20	9:10
Private	Bishop Cunningham High School	12	5:40 - 7:40	9:20
	St. Paul's Academy	12	5:40 - 7:40	9:20
	St. Mary's School	13	7:00 - 10:30	13:00
	BOCES	17	5:40 - 7:30	9:20

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Normal weather conditions are considered to be clear sky and dry roadway pavement for the above scenario.

(4) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(5) All times have been rounded to the nearest 10 minutes.

(6) Palermo Elementary School is located outside of the EPZ. Evacuation times are consistent with the elementary schools located in Mexico Academy School District.

(7) The location of the schools are listed by ERPA, however, the variations in evacuation times to the New York Fairgrounds for facilities located within the same ERPAs occur because schools are located within different traffic zones which comprise the ERPA.

APPENDIX H

RIDESHARING METHODOLOGY

APPENDIX H

RIDESHARING METHODOLOGY

Experience with both natural and man-made emergencies occurring in communities throughout the country has shown that the great majority of persons in the general population would, in the event of an emergency requiring evacuation, prefer to evacuate by private vehicle with family, neighbors and friends, rather than by some form of mass transportation. Those people with automobiles would use them to self-evacuate, taking along family members, neighbors and coworkers who may themselves not have an automobile.

Ridesharing is defined as the concept whereby those members of the transit dependent portion of the general population who do not own private vehicles would ride with a friend, neighbor or relative who has a vehicle, to a point outside the affected area in the event they are required to evacuate from their homes.

The methodology used to calculate the updated evacuation travel time estimates incorporates the assumption that 50% of the transit dependent population would evacuate by means of ridesharing and therefore would not require any public or emergency transportation resources to evacuate from the affected area.

Using standard and accepted traffic engineering techniques, the number of private vehicles and buses, respectively, using the roadway network in the course of an evacuation must be estimated in order to prepare evacuation time estimates. In preparing the Oswego evacuation time estimate update, it was reasonable to make assumptions on ridesharing, which in turn is used to determine the number of buses which may be required for purposes of servicing the general population. The updated analysis initially started with a determination, using 1990 Census data, of the number of households within each ERPA which did not report ownership of a motor vehicle. Contrasting this data with analogous data derived from the 1980 census as employed in the initial time estimates prepared in 1980 shows an average decline throughout the Oswego EPZ of households not reporting ownership of a vehicle from 10.1% in the 1980 census to 8.9% in the 1990 census. (The 1990 number is an estimate).

The incorporation of the assumption that 50% of the transit dependent population will rideshare is a result of a conservative application of a safety margin to a study which concluded that there would be 66% rideshare, or there would be two persons availing themselves of ridesharing for every person requiring bus transportation. It should be noted that a 12% reduction in permanent resident population without automobiles has occurred over the past seven years within the EPZ. This assumption is based on several factors:

1. Through a telephone survey conducted in 1987 of approximately twenty (20) nuclear sites throughout the country conducted by New York Power Authority and Con Edison representatives for the Indian Point Facility, it was learned that many utilities which are assuming ridesharing in the calculation of their evacuation time estimates assume that 66% or more of the population will rideshare. For example, at Rochester Gas and Electric's Ginna site in upstate New York, which has submitted their time estimates to, and received 350 approval from FEMA, a 50% rideshare assumption is utilized.

2. A survey of 461 household heads residing within the Indian Point EPZ conducted by the firm of Yankelovich, Skelly and White (1980)* showed that 74% of those persons driving their own car would be willing to pick up other persons as necessary. A Roger Seasonwein Associates Inc. survey** of 500 residents in Westchester County (1983) commissioned by Westchester County indicated that only 3% of the population would leave the area by bus, whereas twice that number - 6% of the survey respondents - would effectuate ridesharing with a friend or neighbor. Taken together, these surveys demonstrate that there would be ample opportunity for those seeking a ride to obtain it.

3. Actual historical evacuation experience has shown that ridesharing occurs in very large numbers. The train derailment and resultant tank car explosions which occurred in Mississauga, Canada in 1979 resulted in the evacuation of nearly 217,000 members of the general population. Subsequent surveys of residents who evacuated the area revealed that only 2% used public transit or taxi.*** This means that over 87% of those not using or having their own vehicles evacuated by getting a ride with someone else. It is interesting to note that this occurred despite the absence of any preplanning for such an evacuation.

   An explosion and fire at the Union Carbide Taft Plant near Taft, Louisiana in 1982 necessitated the evacuation of an estimated 16,000 people. Based on 1980 census data, there were an estimated 2,000 people in the evacuated area who did not own cars. Approximately 1,600 to 1,700 of the people without cars (roughly 83%) received rides out of the area with friends and neighbors. Local emergency plans assumed the need for approximately 44 school buses to evacuate those people without cars. However, during the emergency, only three (3) buses were actually needed.****

4. Current literature assumes that ridesharing will occur. Work by Drabek and Stephenson, as cited in studies conducted by Alan M. Voorhees for FEMA, has documented that the transit assistance provided by local authorities may be declined in favor of ridesharing with a friend, neighbor or relative. In these Voorhees studies, evacuation time estimates for eleven (11) of the most densely populated nuclear sites are assessed. Voorhees' analysis includes the assumption that 50% of non-vehicle owning households would be evacuated by friends, relatives or neighbors.*****

5. FEMA has given indication that the use of a ridesharing assumption is acceptable and appropriate.

   KLD Associates, Inc., which on occasion has been contracted by FEMA to perform evacuation related studies, states that in the case of the Seabrook site,

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* A Report on Temporary Housing Needs Related to Evacuation of the Indian Point Power Plant Area, Yankelovich, Skelly and White, Inc., 1980.

** Public Opinion Poll conducted by Roger Seasonwein Associates, Inc., 1983.

*** Mississauga Evacuates: A Report on the Closing of Canada's Ninth Largest City, prepared by NUS Corporation for the Power Authority of the State of New York.

**** Detailed Report on the Evacuation of December 11, 1982, prepared by Environsphere Company for Louisiana Power and Light Company, 1983.

*****National Environmental Studies Project Planning Concepts and Decision Criteria for Sheltering and Evacuation in a Nuclear Power Plant Emergency, AIF/NESP-031, 1985

FEMA has suggested that 80% of the transit dependent population could evacuate by sharing space in their neighbor's private vehicles*. In telephone conversations with the Emergency Planning Manager at the Seabrook site, it was stated that the Regional Assistance Committee (RAC) suggested that Seabrook consider incorporating ridesharing in their evacuation time estimates based on documentation supported by events such as the Mississaugua evacuation. Even though ridesharing was over 80% at Mississaugua, the Seabrook site decided on a conservative factor of 50%. As the result of contentions raised during the Atomic Safety Licensing Board hearings at Seabrook with regard to the validity of the site's evacuation time estimates, FEMA requested the RAC to review the time estimates, specifically evaluating them against the guidance set forth in NUREG-0654. Dr. Thomas Urbanik, a recognized expert in the field, also reviewed the time estimates. The conclusion of the RAC, Dr. Urbanik and FEMA was that the evacuation time estimates (which included a 50% rideshare assumption) sufficiently complied with NUREG-0654 so as to serve as an adequate basis for protective action decision-making.

Based on the foregoing supportive documentation, actual evacuation experience has shown that as much as 87% of the transit dependent population will evacuate an affected area utilizing rideshare arrangements. Personal surveys indicate that ridesharing will occur; i.e., the need for a ride can be met by those willing to provide a ride. It was therefore determined that the best estimate of the transit-dependent population is 33% of the EPZ population from households reporting no automobile ownership in the 1990 census. This ratio of one bus rider to two ridesharers is the same as the ratio found in the Seasonwein survey and is in the mainstream of planning practices nationally. Nonetheless, for the purpose of these evacuation time estimates it was determined that the size of the transit dependent population should be increased by 50% above the base case, resulting in an assumption of 50% (rather than 33%) transit vehicles. In light of this margin, it is concluded that the assumption that 50% of the transit dependent population will rideshare in the event that an evacuation is necessary, is both a valid and conservative assumption.

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* <u>Seabrook Station Evacuation Time Estimates and Traffic Management Plan Update</u>, KLD Associates, Inc., 1986.

APPENDIX I

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

APPENDIX I

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

A. <u>Introduction</u>

This Appendix describes the traffic engineering computer model used to estimate roadway travel times during an evacuation of the JAF/NMP EPZ. The model used in this study has also been applied to the Indian Point (New York), Three Mile Island (Pennsylvania), and Salem/Hope Creek (New Jersey and Delaware) Emergency Planning Zones. To evaluate the computer model used in the aforementioned studies, a separate analysis was conducted using a different model for the purpose of comparing results. The Indian Point EPZ was selected for the comparative study because of the diverse characteristics of its roadway network and population density.

As described later in this Appendix, the comparative study showed that both models provide quite similar estimates of evacuation travel time. Thus, it is concluded that the model used to estimate travel times for the JAF/NMP EPZ can be applied with a high degree of confidence.

The remaining sections of this Appendix discuss the traffic assignment process used for the JAF/NMP EPZ, present the detailed results of the comparative study; and summarize the conclusions drawn from the comparison of traffic models.

B. <u>Static Traffic Assignment Process</u>

1. <u>Inputs</u>

The static traffic assignment process developed to estimate roadway travel times during an evacuation requires three basic types of input. The first type relates to the characteristics of the evacuation roadway network, which is comprised of one-directional links, each having its own attributes. The links are described in terms of their capability to accommodate evacuating traffic (evacuation capacity), length, and free-flow speed (speed limit).

The second type of input required for this assignment process is zonal vehicle trip generation data. The EPZ is disaggregated into traffic zones, and the numbers of trips by each vehicle type (e.g., autos, buses, ambulances) are estimated in terms of passenger car equivalents (PCE's) for each traffic zone. Buses are weighted as the equivalent of two passenger cars in this analysis. In addition, a terminal time for all trip types for each traffic zone is input.

The third input type used in the static assignment process is evacuation path data. Evacuation routes are designated fixed paths extending from the traffic zones to the Sector boundary via specific roadways. Separate paths are developed for each trip type and are expressed in terms of connecting link numbers. Destinations (e.g., reception centers) are defined for each traffic zone and input for the purpose of determining the number of vehicles and passengers expected at each destination. Average vehicle occupancies are used to estimate the number of passengers arriving in vehicles at the destination.

2. Static Assignment Algorithm

A computer program was written to process the above input data and compute roadway travel times for each trip type by traffic zone. A flow chart of the static traffic assignment computer program is included at the end of this Appendix.

Initially, the program calculates the total vehicular demand volume (in PCE's) on each link in the network by aggregating the vehicle trips generated by each traffic zone along the evacuation path. Implicit in this assignment is the assumption that all vehicles from all zones using a given evacuation route are on each link along the designated route concurrently. The assignment process is thus considered "static", because the spatial movement of vehicles across the network is not explicitly recognized as a function of time.

For each link in the network, three additional computations are performed. First, the free-flow speed is calculated as the quotient of the link length and the free flow speed. Second, the total vehicular demand volume is divided by the hourly evacuation capacity (for the appropriate weather condition) of the link to obtain the volume/capacity (V/C) relationship for the link. Finally, the evacuation speed or delay time is computed for each link, depending on whether the V/C ratio is less than or greater than 1.0, respectively. The formula contained in the Federal Highway Administration Traffic Assignment Manual, August 1973, was adopted and modified as follows for use in computing the speed at which evacuees will travel when capacity exceeds demand.

$$\text{Evacuation Speed} = \frac{\text{Free-Flow Speed}}{0.25\left[\dfrac{\text{Demand}}{\text{Capacity}}\right]^4 + 1} \quad \text{(for demand < capacity)}$$

Following these calculations, the model computes the roadway travel time for each traffic zone's evacuation route (or routes since some buses and special vehicles had separate routes) by scanning the links comprising the evacuation route to determine maximum V/C ratio along the route.

When the hourly evacuation capacity exceeds the total demand volume (V/C ratio less than 1.0) for all links along the route, the link evacuation speeds are used to compute link travel time, and the travel times for each link along the path are summed to obtain the traffic zone-to-Sector boundary roadway travel time for the route.

When the total demand volume exceeds the hourly evacuation capacity (V/C ratio greater than 1.0) along any link of a traffic zone's evacuation route, the roadway travel time is represented by the maximum link delay time incurred along the route. Link delay time is calculated as the volume/capacity ratio in hours for each link along the route. The link with the maximum V/C ratio is identified as the bottleneck link for the evacuation route for use in future planning. Other links along the route where the V/C ratio exceeds 1.0 are also identified for planning purposes.

The roadway travel time as determined above is added to the terminal time and the free-flow travel time for each zone trip type to determine the total roadway evacuation travel time. The total roadway evacuation travel time resulting from this analysis represents the time for the last vehicle in the zone to clear the Sector.

3. Outputs

The computer program developed for the static assignment process provides five basic reports which are used in the evacuation planning process. The reports are described below:

a. Summary of link statistics: link number, description, length, free-flow speed and time, vehicular demand volume, evacuation capacity, and volume/capacity ratio.

b. Summary of traffic zone statistics: number of trips, evacuation route, destination, terminal time, free-flow travel time, roadway travel time, total evacuation time, and bottleneck link; for each trip type, sorted in ascending order by total evacuation time.

c. Summary of all bottleneck links and the traffic zones which are routed over them.

d. Summary of all destinations and the estimated number of vehicles (by type) and passengers assigned to each.

e. Distribution of the percent of the total population evacuated as a function of time.

C. Comparison of Static and Dynamic Traffic Assignment Processes

Because of the importance of the assignment process in the overall procedure to estimate evacuation travel times, it was decided to evaluate the static traffic assignment model used in the evacuation planning process. Travel times estimated by the static model were compared with times estimated by a state-of-the-art dynamic traffic assignment model.

The dynamic assignment model used in the comparative analysis is an offspring of the TRANSYT model* presently included in the Federal Highway Administration computer program batteries. The model employs principles of flow continuity and flow dynamics to move traffic on each link in the network towards its ultimate destination. Traffic flow representation changes with time to reflect changes in demand and roadway conditions. Traffic movement on each link in the network is constrained by roadway geometrics, control devices, and other vehicles present on the roadway.

Various types of test routes were selected for this comparison and were located in Rockland and Westchester Counties in the Indian Point EPZ in New York State. Input requirements for both models were basically identical with one exception, which relates to the time varying nature of vehicles entering the evacuation network. The static assignment process assumed a concurrent loading of the entire network; the distribution over time of vehicle trips feeding the network was not addressed by the static model. However, because of the time dependent nature of the dynamic simulation model, it was possible to input trip generation data which varied with time at each load point in the network. This time-based distribution curve used in the comparison of assignment processes was provided by the New York State Office of Disaster Preparedness.

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* The dynamic evacuation model, named DYNEV, was provided by KLD Associates, Inc.

Separate comparative analyses and evaluations of the static and dynamic model results were made using Level of Service D and Level of Sèrvice E evacuation capacities. Table I-1 presents a comparison of the percent of total vehicles (in PCEs) evacuated for each route by-time in the test network. The comparison was made between the static and dynamic assignment results when one or the other reached a time period when the total vehicles traveling the evacuation route had cleared the EPZ boundary. In all cases, the static assignment evacuation reached 100 percent completion either before or at the same time as the dynamic assignment evacuation. The percentages enclosed by parentheses in Table I-1 correspond to static and dynamic evacuation roadway travel times using Level of Service D capacities. Percentages without parentheses correspond to static and dynamic evacuation roadway travel times estimated using Level of Service E capacities.

Examination of Table I-1 shows a 97 percent correlation between the two assignment model results on an aggregate basis for the sample Indian Point roadway network east of the Hudson River in Westchester County. That is, at the time that the static assignment estimated complete evacuation of vehicles beyond the EPZ, the dynamic assignment estimated 97 percent of the vehicles would have cleared the EPZ. On the west side of the Hudson River near Indian Point, where both Levels of Service E and D were analyzed by both models, the two model results were 99 percent and 98 percent, respectively. Overall, for the entire test evacuation network, comparison of the static and dynamic assignment results at Level of Service E indicated a 99 percent correlation. In other words, when the static model estimated the network would be cleared (total vehicle evacuation), the dynamic model estimated 99 percent of the vehicles would have cleared the EPZ boundary. The dynamic assignment results indicated that complete evacuation of all vehicles beyond the EPZ boundary would occur 15 minutes later than the static assignment estimate at Level of Service E.

In addition to the evacuation times generated by each assignment technique, the location of bottlenecks by each methodology was compared. The critical bottleneck links identified by the static model were identified in the dynamic assignment results as well. The dynamic assignment produced the percent of vehicles topped at each link during the evacuation. This statistic was used as a measure of the congestion level on each link. For the identified bottleneck links, the average percentage of stops as indicated by the dynamic mode output was roughly 45 percent higher than on non-critical links, indicating that an increase in congestion was appropriately simulated by the static model on the critical links.

D. Conclusions

The results of the comparative analysis presented in this Appendix indicate that the static traffic assignment model can be applied to highway networks to estimate evacuation roadway travel times with a high degree of confidence.

Under almost identical circumstances, the static assignment model results have proven comparable with those produced by a state-of-the art, complex dynamic assignment model, which simulates the evacuation process within the framework of time. Roadway travel times were estimated and congested roadways identified with a high degree of correlation using the less complex static assignment methodology. A close correlation between assignment procedures exists for varying roadway types, weather conditions, and loading characteristics. Thus the use of the static assignment model to estimate evacuation travel times in the JAF/NMP EPZ is appropriate.

TABLE I-1
COMPARISON OF STATIC AND DYNAMIC ASSIGNMENT RESULTS

Evacuation Route	Total Vehicles Using Evacuation Route	Traffic Assignment Methodology	Percent of Total Vehicles Evacuated During the Following Time Period* 0:45 1:00	1:45 2:00	2:00 2:15	2:15 2:30	2:30 2:45	2:45 3:00	3:00 3:15	3:15 3:30	3:30 3:45	3:45 4:00	4:15 4:30	4:30 4:45	5:30 5:45	5:45 6:00	6:00 6:15	6:15 6:30	7:15 7:30
East of River (Westchester County)																			
Route 6	4,360	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	84	–	100	–	–	–	–	–
Route 120	5	Static	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	33.	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–
Route 9A	8,690	Static	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
Taconic Parkway	5,155	Static	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	92	–	–	–	100	–	–	–	–	–	–	–	–	–	–
Amawalk Road	2,575	Static	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	89	–	100	–	–	–	–	–	–	–	–	–
Total East Routes	20,785	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	97	–	100	–	–	–	–	–
West of River (Rockland County)																			
Palisades Parkway	8,656	Static	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	97	100	–	–	–	(97)	–	(100)	–
Route 9W	3,850	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(87)	(100)
Route 303	3,310	Static	–	100	–	–	(100)	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	98	–	–	(90)	100	(100)	–	–	–	–	–	–	–	–	–	–
Route 45	1,920	Static	–	–	–	100	–	–	–	–	(100)	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	98	–	100	–	–	(100)	–	–	–	–	–	–	–	–
Little Tor Road	3,025	Static	–	–	–	–	–	–	–	–	100	–	–	–	(100)	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	99	100	–	–	(95)	–	(100)	–	–
Route 304	3,655	Static	–	–	–	100	–	–	–	–	–	(100)	–	–	–	–	–	–	–
		Dynamic	–	–	–	99	–	100	–	–	–	(100)	–	–	–	–	–	–	–
Total West Routes	24,415	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(98)	(100)
Total Network Routes	45,200	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	–	–

* Note: Numbers enclosed by parentheses represent the percent of total vehicles along a route evacuated during the time period using Level of Service D capacities.

Numbers not enclosed by parentheses represent the percent of total vehicles along a route evacuated during the time period using Level of Service E capacities.

Static Traffic Assignment Computer Program Flowchart

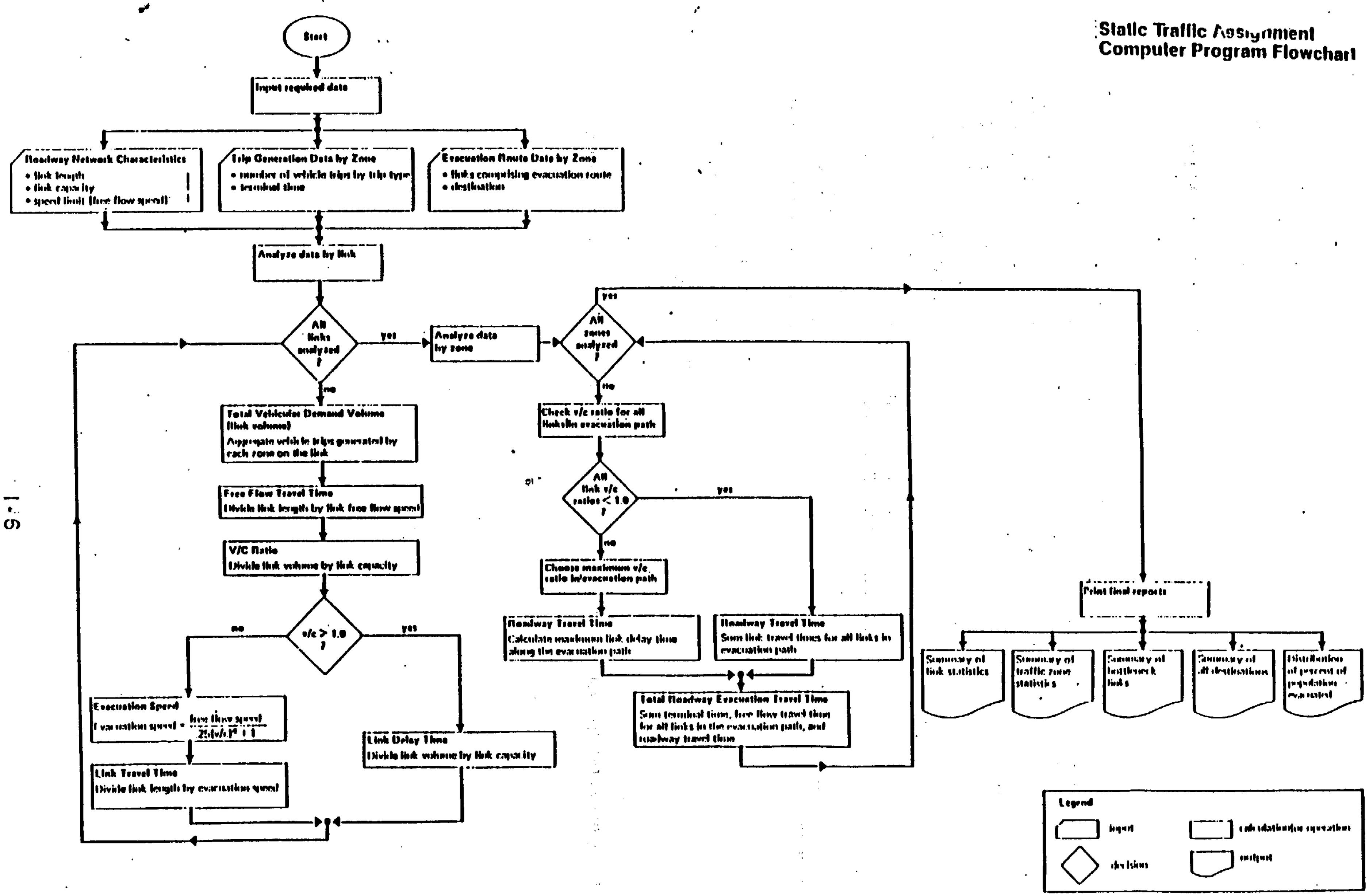


Table of Contents

1 INTRODUCTION

The US Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA) require nuclear power plant licensees and state/local agencies to take necessary actions to prepare for evacuation of populations within a 10-mile radius around nuclear power plants. This area corresponds to a plume exposure pathway referred to as the Emergency Planning Zone (EPZ). Part of these regulatory requirements include the preparation of travel time estimates for the evacuation of the EPZ as outlined in *Criteria for the Preparation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants* (NUREG-0654, FEMA-REP-1: Rev. 1, November 1980 [NUREG-0654]). Specifically, the approach for preparing evacuation time estimates is documented in Appendix 4 of NUREG-0654.

This report is prepared in response to Appendix 4 of NUREG-0654 and represents an update and addition to a report prepared in July 1993 for the Nine Mile Point and James A. FitzPatrick (NMP/JAF) site in Oswego County, New York (PBQD, *Evacuation Travel Time Estimates for the James A. FitzPatrick/Nine Mile Point Emergency Planning Zone,* Rev. July 1993). This previous report presented travel time estimates for eight different evacuation scenarios as follows:

- School-in-Session;
- School-not-in-Session;
- Summer/Holiday Weekend;
- Winter/Holiday Weekend;
- Evening;
- Nighttime;
- A Special Event Scenario for "Classic Weekend" at the Oswego Speedway; and
- A Special Event Scenario for "Harborfest" in the City of Oswego.

This update evaluates an additional Special Event Scenario for venues held at the Oswego County Airport. While the airport is not located within the EPZ, travel routes to and from the facility often coincide with designated evacuation routes. Therefore, traffic generated by event goers at the airport could potentially affect the efficient movement of persons out of the EPZ under current evacuation procedures.

The basis for the Airport Special Event Scenario was developed in response to a planned 2-day concert (7:00 PM Saturday to 11:30 PM on Sunday) at the Oswego County Airport in July 1999. However, the assumptions, methodology, and modeling approach/output would be similar and applicable under any similar type of multi-day venue held at this facility (e.g., festival, air show, etc.).

1.1 Site Location

The JAP/NMF site location is depicted in Figure 1-1. The site is located on the shore of Lake Ontario in the Town of Scriba, Oswego County, New York. The site consists of the Nine Mile Point Nuclear Stations, Units 1 and 2, operated by the Niagara Mohawk Power Corporation and the James A. FitzPatrick Nuclear Power Plant, operated by the New York State Power Authority, . The site is approximately seven miles northeast of the City of Oswego and 36 miles northwest from the City of Syracuse.

The EPZ encompasses a 10-mile radius around the NMP/JAF site. As shown in Figure 1.1, over Lake Ontario, this is comprised of a circle defining the plume exposure pathway. However, over land areas, the perimeter of the 10-mile radius is defined by an irregularly shaped boundary following physical and/or political subdivisions as much as practicable to facilitate recognition by the public.

The Oswego County Airport, the subject of this update of the 1993 report, is located along NYS Rt. 176 in the Town of Volney, New York, immediately northeast of the City of Fulton. While this airport is technically outside the NMP/JAF EPZ, it is within two miles of the 10-mile radius from the site. Given the geography of the Lake Ontario shoreline, regional transportation routes and proximity of adjacent communities that could support residents and visitors in an evacuation, the primary pattern of evacuation would be from north to south, passing in close proximity to the airport.

1.2 General Methodology

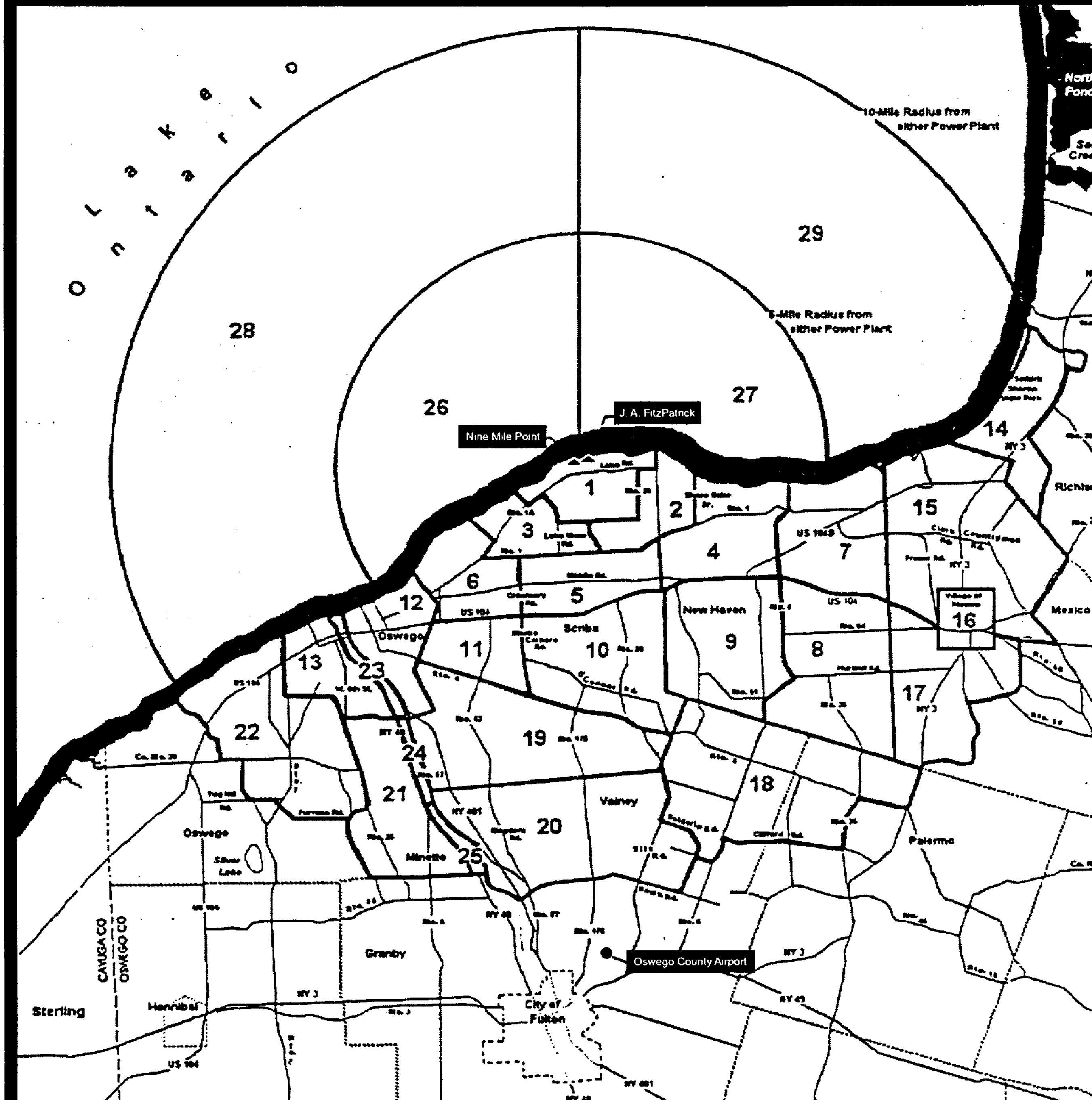
This update includes the use of a computer modeling technique to estimate evacuation travel time estimates. This model was formulated in 1984 and updated in the 1993 evacuation time estimate report to reflect: the 1990 Census data; changes in assumptions regarding long-term construction worker population at the NMP/JAF site; changes in emergency preparedness procedures employed by Oswego County; and changes in the location of various transient and special facilities populations.

The methodology for developing this update included a review of the inputs and assumptions used in 1993 to determine their continued relevance and accuracy, as well as formulation of reasonable assumptions associated with a special event held at the Oswego County Airport. This included:

- Meetings and contacts with county, local, and NMP/JAF personnel regarding significant changes since 1993 in development in the county, distribution of population, and special facilities/transient population locations;

- Review of the latest update of the Oswego County Radiological Emergency Preparedness Plan (REPP) (i.e., December, 1998), which outlines all procedures undertaken during an evacuation of the NMP/JAF EPZ, as well as updates of the locations and characteristics of various types of populations within the EPZ;

Nine Mile Point / J. A. FitzPatrick
Evacuation Travel Time Estimates



3.0 0 3.0
1.5 miles

Figure 1-1
Generalized Location

- On-site review of applicable evacuation routes and review of assumptions regarding lane width and capacity; and

- Discussions with the Oswego County Sheriff's Department and review of the NYS Health Department Mass Gathering Permit information for the July, 1999 concert at the Oswego County Airport to determine appropriate assumptions for anticipated attendance, trip generation, anticipated time periods for arrival and departure of event goers, and route selection to ingress and egress at the airport site.

With this information, evacuation travel time estimates were generated for a series of cases under an Airport Special Event Scenario, using the computer modeling technique formulated for the 1993 report. Each case was run for adverse and normal weather conditions for permanent residents, transients, and persons in special facilities, as specified in NUREG-0654. Specifically, the following cases were analyzed:

- **Case 1**, consisting of a concurrent evacuation of all populations in the EPZ and all attendees at an Airport Special Event at the peak period of event attendance;

- **Case 2**, consisting of an evacuation of all populations in the EPZ during the course of the early departure periods immediately following the end of an Airport Special Event (i.e., Sunday night), in which it was assumed that a portion of the special event traffic is already on the road network when the EPZ evacuation begins; and

- **Case 3**, consisting of an evacuation of all populations within the EPZ during the day following the end of the Airport Special Event (i.e., Monday daytime), in which a portion of the special event traffic is already on the road network when the EPZ evacuation begins.

Following review of the estimated travel times, an additional case (**Case 4**) was formulated and assessed as a potential measure to mitigate travel time delays resulting from the interaction of EPZ evacuation and Airport Special Event traffic.

1.3 Report Format

Following the introduction in Section 1, Section 2 outlines and reviews the continued applicability of the basic parameters, inputs, and limitations used in the computer model for evacuation travel time estimates in the 1993 report. Section 3 discusses the parameters/assumptions involved with the conduct of an Airport Special Event and their implications to estimating evacuation travel times in the EPZ. Section 4 describes the specific components of each case analyzed and presents estimated travel time estimates. Section 5 compares these estimates with 1993 estimates.

2 EVACUATION TRAVEL TIME ESTIMATION MODEL DESCRIPTION

In order to understand the assumptions used to generate evacuation travel time estimates under an Airport Special Event Scenario, it is necessary to summarize the basic parameters used in the 1993 report. This section discusses the geographic areas on which the modeling approach is based, describes the various populations that are included in the model, and discusses the transportation network designated to move persons out of the 10-mile NMP/JAF EPZ during an evacuation. A full discussion of the approach used in the 1993 report in presented in Appendix B.

2.1 Sectors, Emergency Response Planning Areas, and Traffic Zones

2.1.1 Sectors

In order to allow for the estimate and actions to address various evacuation scenarios, the NMP/JAF EPZ described in Section 1 is subdivided into various types of smaller geographic areas. As discussed in Appendix 4 of NUREG-0654, the EPZ is first subdivided into areas referred to as Sectors. These are defined by first delineating areas within approximately two-, five-, and 10-mile radii from the NMP/JAF site. These radii areas are further subdivided into 90-degree quadrants along north-south and east-west axes.

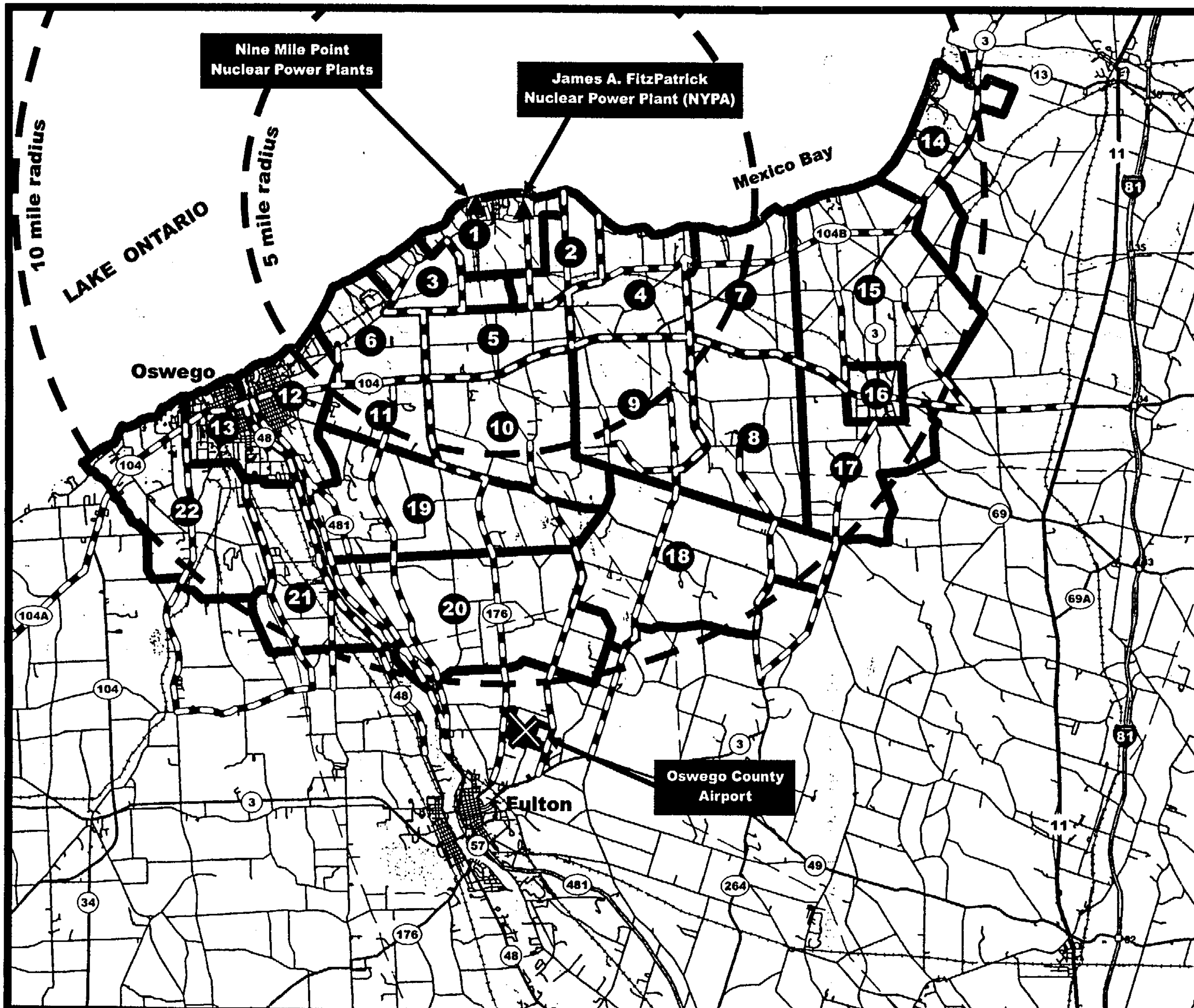
2.1.2 Emergency Response Planning Areas

Sectors are further comprised of smaller units called Emergency Response Planning Areas (ERPAs), which generally follow political and/or physical boundaries. An ERPA is the fundamental planning area identified in the Oswego County REPP. Under the REPP, each ERPA as a unit follows a specific protective response action in the event of an incident at the NMP/JAF site requiring an evacuation. While identification of evacuation travel time estimates by Sector provide a characterization of the time period necessary to clear the 10-mile EPZ during an incident at the NMP/JAF site, in practice, identification of these estimates by ERPA provide the most critical information in formulating procedures necessary to address a given evacuation scenario. Therefore, this report provides evacuation time estimates by ERPA to characterize an Airport Special Event Scenario.

ERPAs used in the 1993 evacuation travel time estimation report and in the current Oswego County REPP are depicted in Figure 2-1. In total, there are 29 designated ERPAs in the NMP/JAF EPZ. However, it should be noted that the figure and subsequent modeling includes only 22 of these areas (i.e., ERPA Nos. 1 through 22). The remaining ERPAs represent over-water areas. Specifically, ERPA Nos. 23, 24, and 25 are defined as areas within the EPZ along the Oswego River, while ERPA Nos. 18, 19, 26, and 27 include areas over Lake Ontario.

Nine Mile Point / J. A. FitzPatrick Evacuation Travel Time Estimates

Figure 2-1
Emergency Response Planning Areas (ERPAs) and Evacuation Routes



LEGEND

- ▲ **Nuclear Power Plant Location**
- ⓯ **Emergency Response Planning Area Designation**
- **Emergency Response Planning Area Boundary**
- **Evacuation Routes**

2.0 0 2.0
1.0 miles

PB

As previously discussed in Section 1, the Oswego County Airport is not located within the EPZ, and thus not located within any of the ERPAs. The nearest ERPA in proximity to the airport is ERPA No. 20, whose southern boundary is located roughly 1.5 miles north of the facility.

2.1.3 Traffic Zones

For modeling purposes, ERPAs are further subdivided into traffic zones. These zones represent population clusters in particular geographic areas, which follow specified evacuation routes leaving the EPZ. In the model, each traffic zone is assigned a primary evacuation route for each mode of travel emanating from that zone. Traffic zone boundaries in the 1993 model were developed to minimize the amount of cross traffic required to access a zone's primary evacuation routes. The primary evacuation routes are depicted in Figure 2-1. It should be noted that individual traffic zones within each ERPA were not displayed to permit readability of the map.

2.2 Populations

The evacuation travel time model used in the 1993 report identified three primary population groups in the NMP/JAF EPZ, as required in NUREG-0654. These population groups include permanent residents, transients, and persons in special facilities. The following sections discuss the characteristics of each population, methods used to estimate these populations in the 1993 report, and rationale used to determine whether these estimates are still reasonable for use in this update for an Airport Special Event Scenario.

2.2.1 Permanent Resident Population

Permanent residents, as defined in Appendix 4 of NUREG-0654, are those persons who reside in the EPZ, including schoolchildren, but excluding persons residing in institutions identified as special facilities in the Oswego County REPP (see Section 2.2.3). Data derived from the 1990 decennial Census of Population, adjusted to exclude institutional population was used for the 1993 report. Specifically, these data were disaggregated to block group data, corresponding to appropriate ERPAs and traffic zones. This was further broken down to households with and without automobiles. This yielded an estimate of 36,450 persons with autos, 3280 persons without autos, or a total of 39,730 permanent residents in the EPZ.

Based upon discussions with NMP/JAF and county/local officials, it was concluded that it was reasonable to continue to use the 1990 Census data as the basis for identifying existing resident population, given that this provides the most detailed breakdown available at this time. The 2000 Census data at the block will likely not be completed for public use until roughly 2002.

2.2.2 Transient Population

The transient population includes employees not residing in the EPZ, people staying at hotels/motels in the EPZ, and visitors to parks and recreational areas within the EPZ. In the 1993 report, the Oswego County Emergency Management Office (EMO) inventoried parks and recreational facilities, such as beaches and campgrounds. Hotel/motel estimates were developed from data from the Oswego Accommodations Guide, using a two person per room estimate for rooms located in the EPZ. Employment within the EPZ was estimated using New York State Department of Labor Employment Statistics.

These estimates yielded a total transient population of 19,005 persons within the EPZ. Following a review of additional background data on transient facilities and discussions with county/local officials, it was determined that no major changes have occurred since 1993 that would require revising this estimate in the model. There have been no major shifts in county employment (e.g., plant openings/closings), or development of any major motels/hotels or recreational facilities that would cause a significant shift in the 1993 estimates.

2.2.3 Special Facilities Population

Special facilities residents include persons in hospitals and other health care facilities, nursing homes, schools (including public and private, day care, nursery, elementary, middle, and high school), universities (i.e., SUNY Oswego), day camps, and correctional facilities. Population in these facilities was estimated at 15,586 in the EPZ in the 1993 report.

The Oswego County EMO maintains inventories of various types of special facilities. EMO officials and the REPP identified some small changes to the inventory of special facilities since 1993, including:

- Expansion of available County Correctional facility beds from 96 to 150; and
- Opening of the Seneca Hill Nursing Facility, a 120-bed facility, on NYS Rt. 481.

Further review of the inventory indicated some concurrent decreases of special facility populations, specifically lower summer student population at SUNY Oswego and the closing of some smaller day care facilities and nursing homes. Therefore, it was determined that the 1993 estimate of special facilities population in the EPZ is still reasonable for modeling purposes.

2.3 Transportation Facilities

As with population estimates used in the 1993 model, the 1993 road network/evacuation route assumptions (e.g., number of lanes, highway capacity, etc.) were reviewed to determine if any significant changes have occurred that would have implications on the modeling results. This was achieved through site reconnaissance on May 18 and June 9, 1999 and through contacts with local/county and state officials. The only identified road projects included reconstruction/repaving projects without increases in capacity. The most recent in the network in the vicinity of the EPZ included the repaving and striping of NYS Rt. 49 through the Town of Hastings, although this road is not within the EPZ. Therefore, it was concluded that the 1993 assumption for the roadway network was sufficient for use in this update.

2.4 Limitations of the Model Related to an Airport Special Event Scenario

The 1993 model used to generate evacuation travel time estimates exhibits some limitations for the development of an Airport Special Event Scenario. These limitations required some adjustments to the typical application of the model. First, because the Oswego County Airport is actually located outside the 10-mile EPZ, it is not possible to specifically assign special event traffic to the roadway network in the model, because the model operates by assigning blocks of traffic to a specific traffic zone within an ERPA. However, given the proximity of the airport to the EPZ, it is obvious that the occurrence of a concurrent evacuation of the NMP/JAF site and the airport would result in impacts to the travel time estimates.

In order to overcome this limitation, it was necessary to create a new traffic zone within the closest ERPA to the airport, in this case ERPA No. 20. All event-related traffic was assigned on applicable roadway links within this newly created zone and designated as transient population. This resulted in an approach that approximates the interaction of evacuation traffic with special event traffic movements. However, use of this technique created some inordinately high evacuation time estimates for ERPA No. 20, because the model assumes that the special event population is in this area, when in reality, it has already cleared the 10-mile EPZ.

Secondly, the traffic assignment process for special event traffic may somewhat overestimate the negative implications of an evacuation occurring at the same time as a special event evacuation or typical departure after its end. This is because the 1993 model uses a "static" assignment process, which assumes a concurrent loading of the entire network; the distribution over time of vehicle trips progressively feeding the network is not addressed. However, comparison of this technique at other sites indicates an almost 97% correspondence between static and dynamic approaches was determined to still be appropriate (see Appendix B).

3 AIRPORT SPECIAL EVENT SCENARIO ASSUMPTIONS

This section describes the basic assumptions that were used to characterize an Airport Special Event Scenario. As stated in Section 1, these assumptions were based upon the event procedures to be implemented for a two-day concert planned in July 1999. However, similar procedures and parameters would be used for other similarly sized and staged events at the Oswego County Airport.

The parameters discussed in the following sections were derived from meeting with the representatives of the Oswego County Sheriff's, meetings/discussions with NMP/JAF, county, and local officials, and review of information contained within the Mass Gathering Permit application submitted by the concert promoter for the July 1999 concert.

3.1 General Overview

The Airport Special Event Scenario involves the conduct of a two-day venue (i.e., Saturday 7:30 PM to Sunday, 11:30 PM) with parking and camping facilities provided on the airport site. In order to facilitate early attendees at the event, the gates will open on Friday, 12:00 noon. The gates will remain open through Friday evening and all day Saturday to accept event goers. The gates will close roughly one half hour before the official start of the event (Saturday, 7:00 PM). From this point until 11:00 PM on Sunday, the gates will be closed for entry/exit except for emergency departure of event goers.

3.2 Attendance and Trip Generation Assumptions

The information contained within the Mass Gathering Permit application for the July 1999 concert event states that the airport will accommodate approximately 65,000 attendees over the two-day event. Notwithstanding, based upon discussions with NMP/JAF and local/county officials, the total attendance that is assumed for this scenario is 100,000 persons. This reflects information on similar events conducted in similarly sized communities in other east coast states. Use of this attendance figure also assumes that a portion of event-goers will not camp on the airport site, but will seek appropriate campsites/lodging in other nearby locations.

Vehicle occupancy rates for this scenario was assumed to average 3.5 persons per vehicle. This rate is consistent with other special event scenarios included in the 1993 evacuation travel time estimates (i.e., for events such as "Harborfest" and "Classic Weekend"). This rate would yield a trip generation assumption of 28,571 vehicles entering and leaving the area for the event.

3.3 Ingress/Egress Assumptions

Figure 3-1 depicts the Oswego County Sheriff's Department suggested regional access routes to and from the Oswego County Airport under this scenario. The suggested routes include:

- A route from the north on I-81 south, to Exit 34 (Rt. 104), then proceeding west along NYS Rt. 104 to NYS Rt. 3, then continuing along Rt. 3 to the airport;
- A route from Oswego south along Rt. 481 and 57 to the airport;
- A route from I-90 to Exit 36 (I-81 North), to NYS Rt.481, then north on Rt. 481, to County Rt. 6, then proceeding north along Rt. 6 to Rt. 3, then Rt. 3 to the airport (note; on Friday evening, this route would shift to I-690, then north along NYS Rt. 48 to Rt. 3 in Fulton); and
- A route from the west along Rt. 104 to Rt. 3, then east along Rt. 3 to the airport.

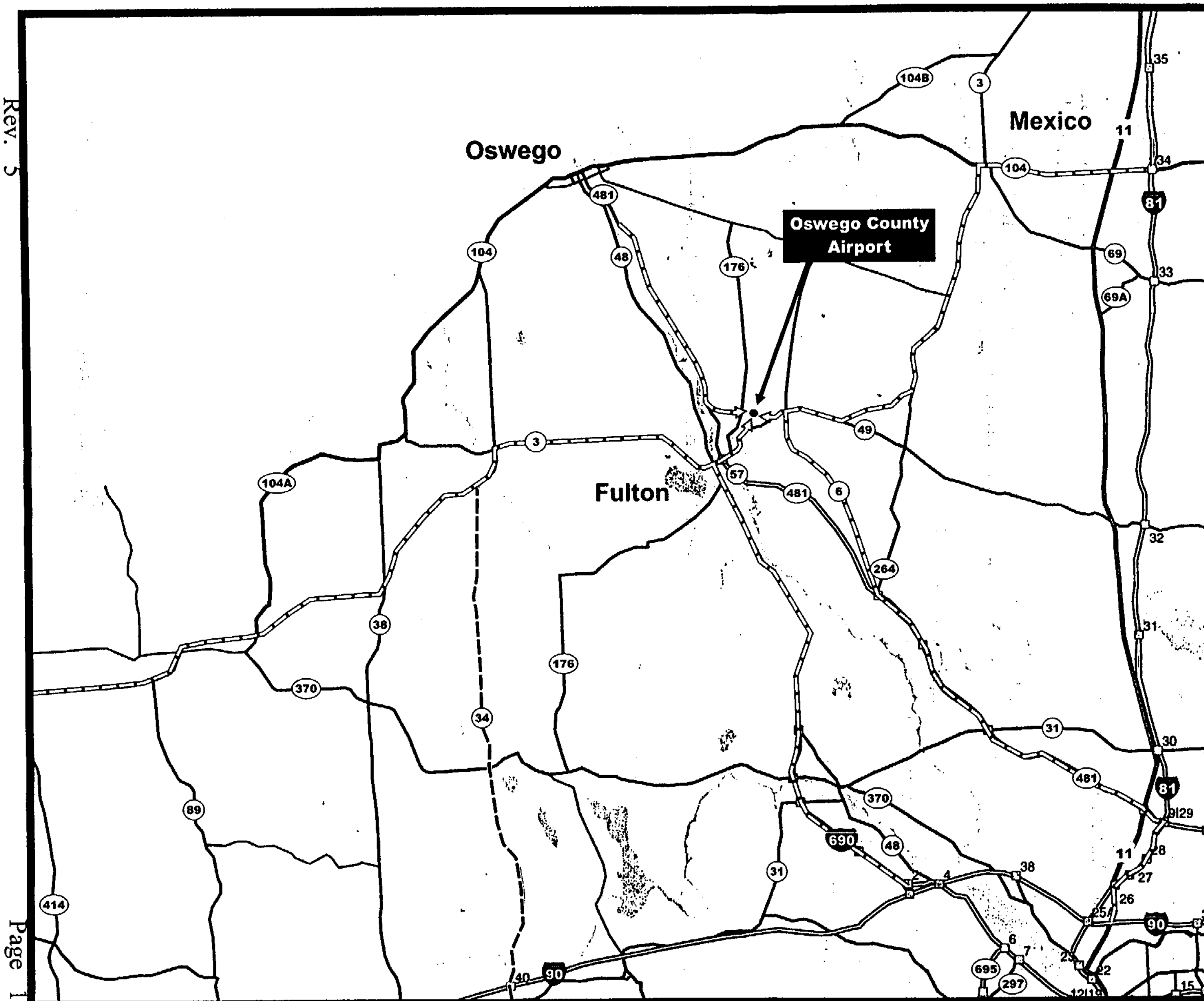
In addition to these routes, one additional route is available from the I-90 at Exit 40 (Weedsport), then north along NYS Rt. 34 to Rt. 3, then east on Rt.3 to the airport. Overall, the Sheriff's Department is discouraging use of this route, yet traffic will not be manually detoured.

While suggested routes to and from the regional road network would be similar for ingress and egress to the Oswego County Airport Facility, access points immediately around the airport would vary for ingress before and egress after the special event (see Figures 3-2 and 3-3). Ingress to the airport would be routed to a single access gate to be located on Howard Road to facilitate payment of admission fees and ticket taking. After the end of the event or during an emergency evacuation, several access points would be utilized, including the main airport gate, Howard Road, Calkins Road, Muckey Road, Baldwin Road, and Weller Road.

Given the nature of the event, an assumption of the progression of traffic into and out of the airport over a five-day period was developed in conjunction with the County Sheriff's Department, based upon information provided by the planned July 1999 event, coupled with information developed for similar events in other east coast communities. These traffic flow assumptions are presented in Tables 3-1 and 3-2. As is shown, the peak ingress period is projected to be in the period between late Friday evening and early Saturday morning. The peak egress period is projected to be between Monday morning and Monday afternoon.

Nine Mile Point / J. A. FitzPatrick Evacuation Travel Time Estimates

Figure 3-1
Suggested Travel Routes to Special Event at Oswego County Airport



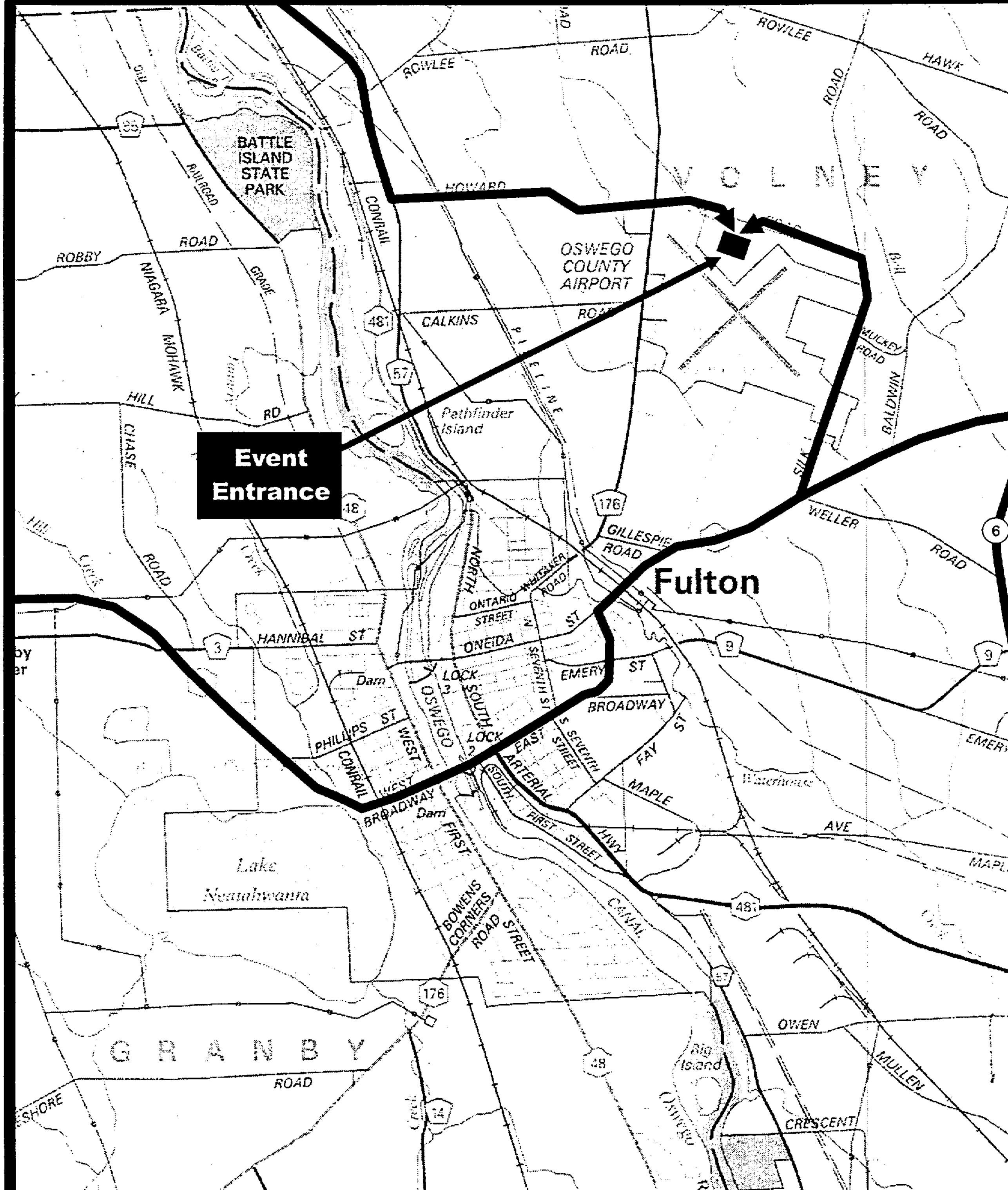
LEGEND

Suggested Route

Available, but Discouraged Route

3.0 0 3.0
1.5 miles

PB



0.5 0 0.5
0.25 miles

Figure 3-2
Ingress Routes to Oswego County Airport During Events

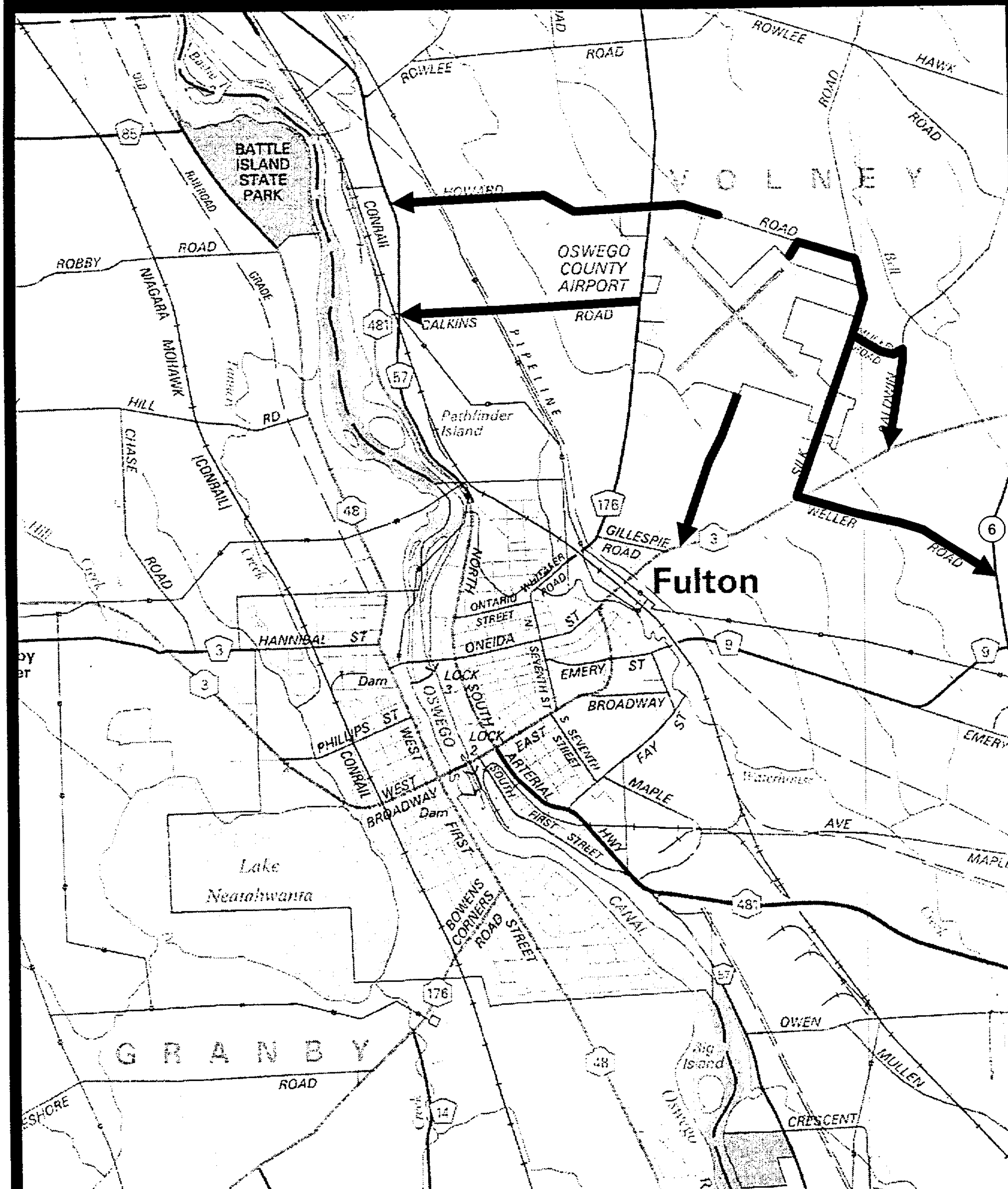


Figure 3-3
Egress Routes from Oswego County Airport During Events

0.5 0 0.5
0.25 miles

Table 3-1
Ingress Distribution Assumptions

Time Period	Number of Auto Trips	Percent of Total
Thursday, 11 PM – Friday, 5 AM	1,429	5%
Friday, 5 AM – Friday, 5 PM	2,857	10%
Friday, 5 PM – Saturday, 1 AM	14,285	50%
Saturday, 1 AM – Saturday, 8 AM	1,429	5%
Saturday, 8 AM – Saturday, 12 Noon	5,714	20%
Saturday 12 Noon – Saturday, 7 PM	2,857	10%
Total	**28,571**	**100%**

Table 3-2
Egress Distribution Assumptions

Time Period	Number of Auto Trips	Percent of Total
Sunday, 11 PM – Monday, 5 AM	10,000	35%
Monday, 5 AM – Monday, 8 AM	1,429	5%
Monday, 8 AM – Monday 5 PM	17,142	60%
Total	**28,571**	**100%**

4 ANALYSIS OF EVACUATION TRAVEL TIMES

This section presents the evacuation travel time estimates for an Airport Special Event Scenario under the three cases described in Section 1.2. As discussed in Section 2.4, for each of the cases, the Airport Special Event traffic was assigned to a newly created traffic zone in ERPA No. 20, and distributed between two designated evacuation routes that pass the Oswego County Airport. These include Calkins Road and Howard to Rt. 57, which pass to the west of the airport and Silk Road, which passes the airport on the east.

Each case includes a series of runs corresponding to potential conditions/time periods in the NMP/JAF EPZ as follows:

- **Nighttime**, when most persons in the general population are in their residences, institutions have minimal staff, and relatively few businesses are operating;
- **Summer Weekend/Holidays**, during which it is assumed that recreational activities predominate, reflected in increased camp attendance and recreational facility usage;
- **Evenings**, which is distinguished from nighttime conditions because of increased staffing levels at institutional facilities and increased activities for the general population (e.g., shopping, entertainment); and
- **Weekday, School-out-of-Session**, which can be characterized as "normal" workday traffic patterns, except for the fact that school-based trips would not occur, replaced by an increase in recreational activities by school children.

For each case described below, evacuation travel time estimates are summarized in terms of the percentage of population being able to clear the 10-mile EPZ. Full runs of individual travel time estimates from each ERPA are presented in Appendix A.

4.1 Case 1: Concurrent Evacuation of EPZ and Airport Special Event

This case consists of a full evacuation of the NMP/JAF EPZ and a concurrent evacuation of the Airport Special Event during its peak attendance (i.e., between Saturday, 7:00 PM and Sunday, 11:00 PM). This event could be the result of simultaneous occurrence of nuclear incident at the NMP/JAF site and a general emergency at the Airport (e.g., fire, explosion) or a general evacuation of the 10-mile EPZ and adjoining areas in the event of a significant nuclear incident.

Figures 4-1, 4-2, and 4-3 illustrate the estimated evacuation travel times for this case under three separate potential times that this type of case could occur (i.e., Evening, Nighttime, and Summer/Holiday Weekend). It is clear that this case would result in the greatest evacuation times to clear the 10-mile EPZ. For example, under an evening timeframe during adverse weather,

Figure 4-1
Case 1 - 100% Evacuation - Evening

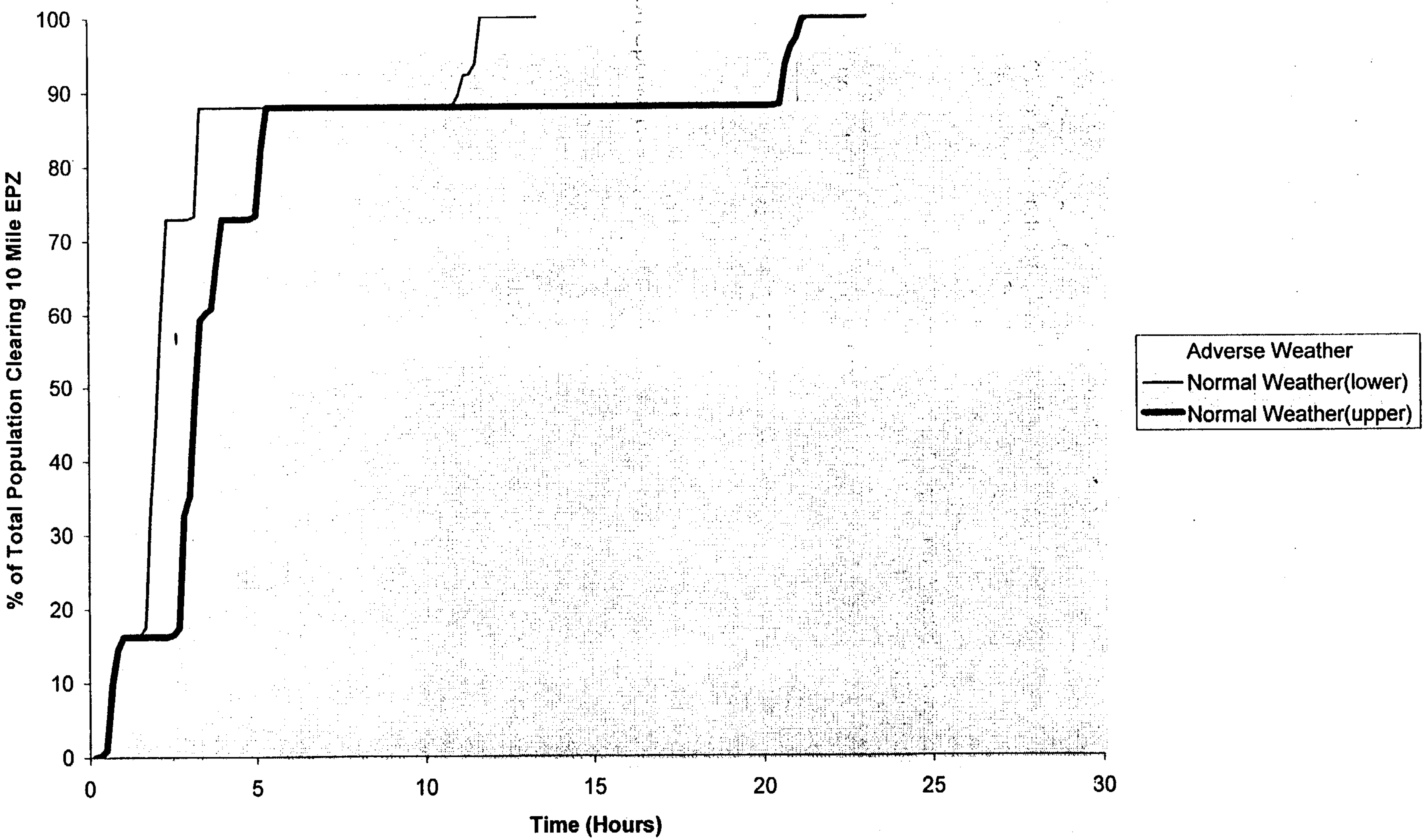


Figure 4-2
Case 1 - 100% Evacuation - Nighttime

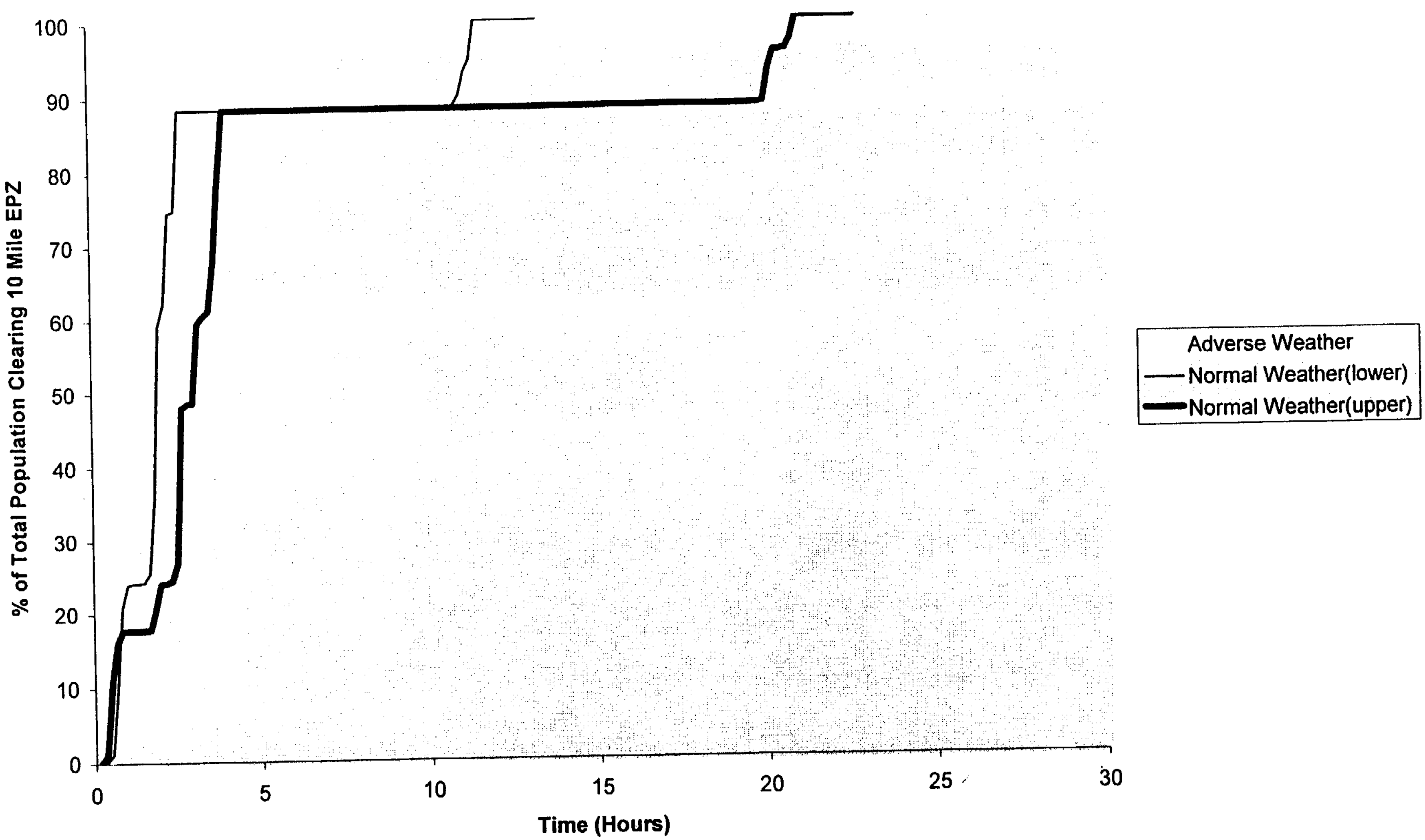
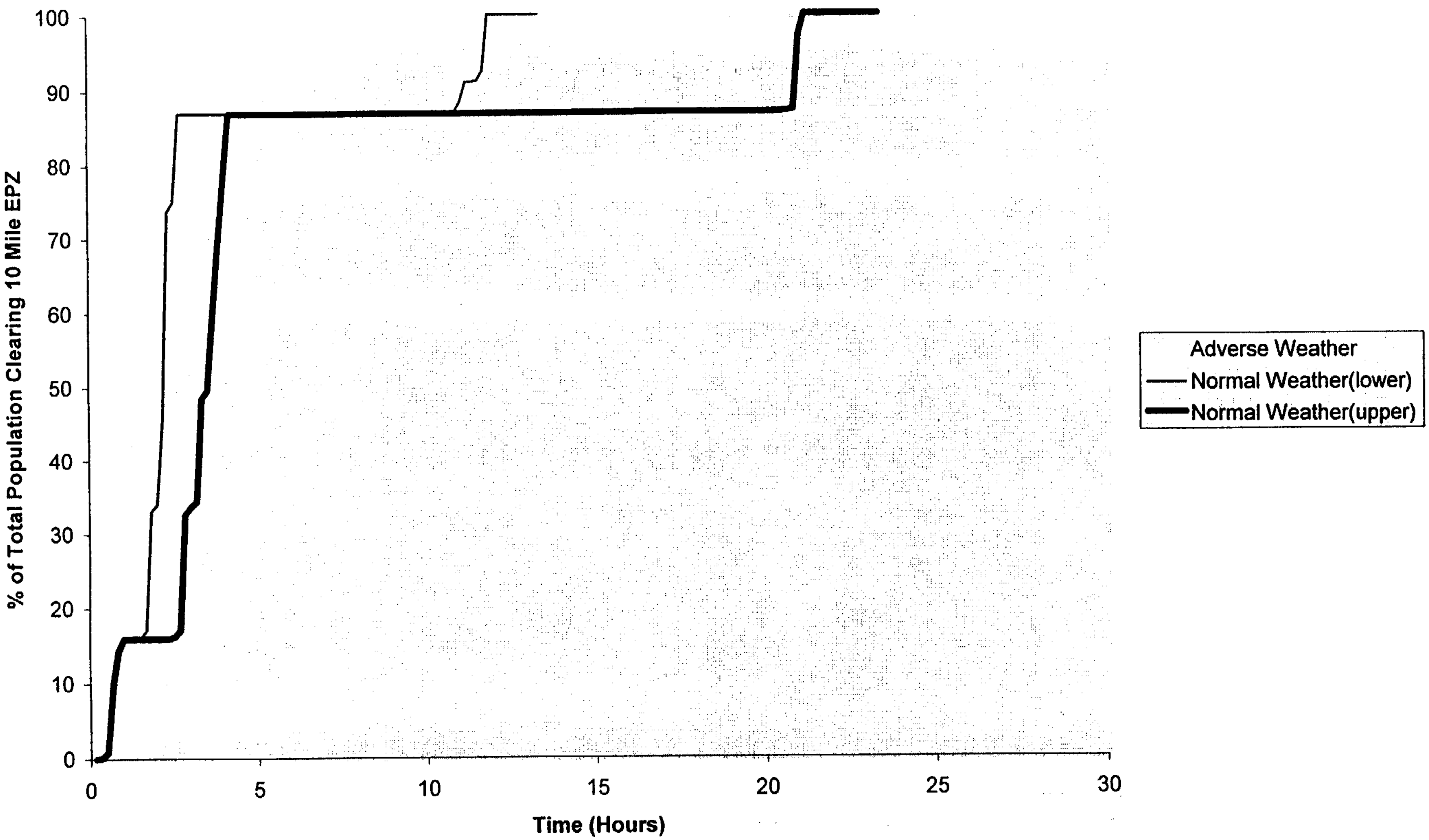


Figure 4-3
Case 1 - 100% Evacuation - Summer/Holiday Weekend



evacuation of roughly 85% of the total EPZ population would occur within 7 hours of the event. However, the last 15% of the EPZ population would require as much as 28 hours to clear the EPZ.

4.2 Case 2: Evacuation of the EPZ Immediately After the End of Airport Special Event

This case consists of a full evacuation of the NMP/JAF EPZ during the period immediately following the end of an Airport Special Event (i.e., between Sunday, 11:00 PM and Monday, 8:00 AM). This case assumes that the Airport Special Event has begun its typical exit procedures discussed in Section 3 and that 40% of event traffic is already on the road network (based upon the assumptions in Table 3-2) when the nuclear incident occurs.

Figures 4-4 and 4-5 illustrate the estimated evacuation travel times for this case under two separate potential times that this type of case could occur (i.e., Nighttime and Weekday, School-out-of-Session). While the least severe among the three cases examined, this case still results in some significantly extended evacuation travel times. Under the School-out-of-Session timeframe, it would take in excess of 14 hours to clear the 10-mile EPZ.

4.3 Case 3: Evacuation of the EPZ the Day Following the End of the Airport Special Event

This case consists of a full evacuation of the NMP/JAF EPZ during the period of the day after the end of an Airport Special Event (i.e., between Monday, 8:00 AM and Monday, 5:00 PM). This case assumes that 40% of event traffic have already exited and cleared from the area over the previous nine-hour period. During this period, the 60% remaining event traffic would be proceeding on the road network (based upon the assumptions in Table 3-2) when the nuclear incident occurs.

Figures 4-6 and 4-7 illustrate the estimated evacuation travel times for this case under two separate potential times that this type of case could occur (i.e., Evening and Weekday, School-out-of-Session). This case would also result in significant time being expended to totally clear the EPZ, although not as great as Case 1. For example, for the evening time frame under adverse weather conditions, over 90% of the population would clear the EPZ in roughly 7 hours, but the balance of the population would require as much as 17 hours.

4.4 Case 4: Potential Re-Route of EPZ Evacuation Pattern

In recognition of the potential implications of the evacuation travel time estimates for three cases examined, a fourth case was formulated to assess whether the effects of concurrent evacuations of the EPZ and an Airport Special Event could be mitigated through selective re-directing of

Rev. 5

Figure 4-4
Case 2 - 40% on Road - Nighttime

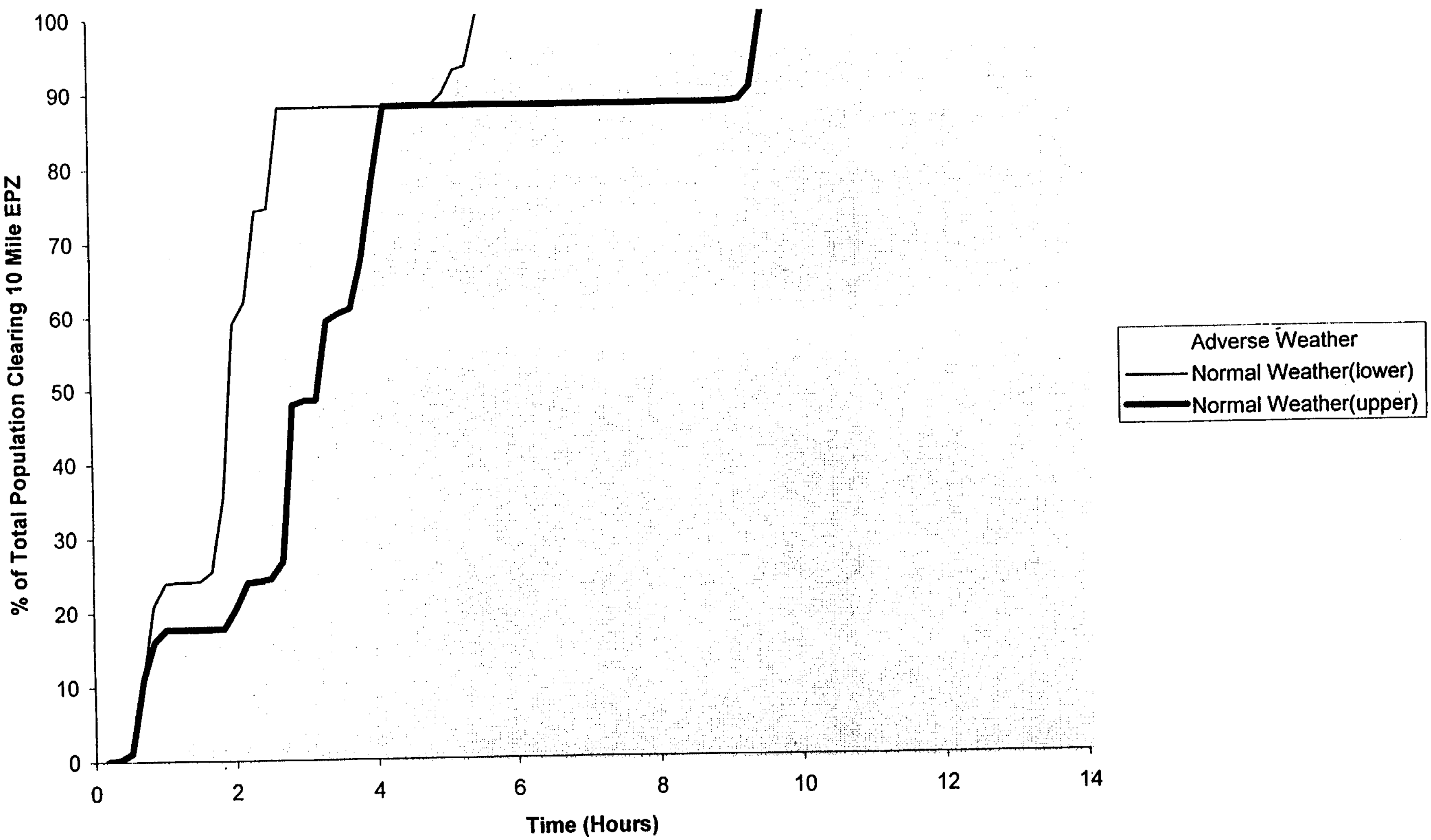


Figure 4-5
Case 2 - 40% on Road - School-Out-of-Session

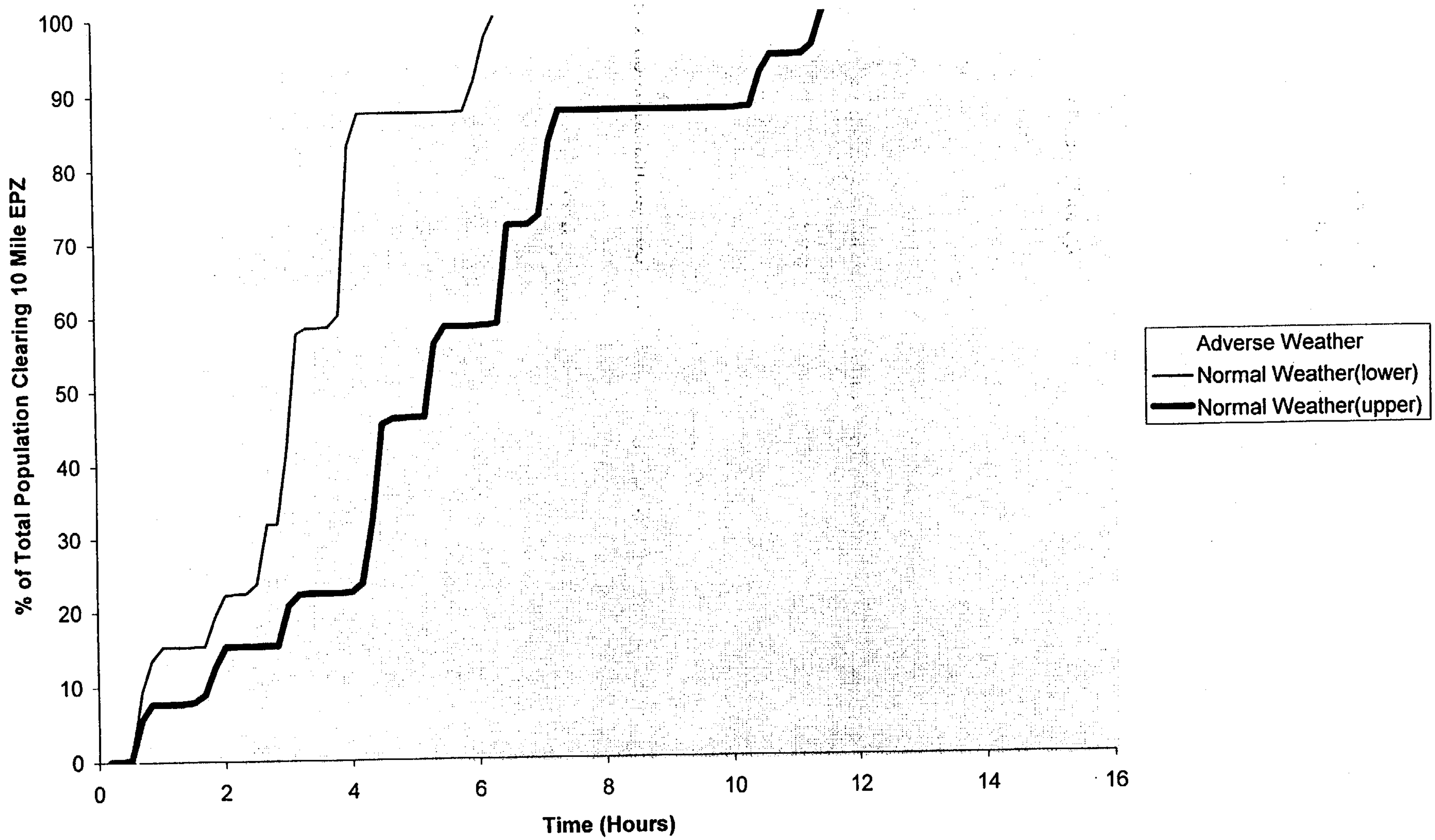


Figure 4-6
Case 3 - 60% on Road - Evening

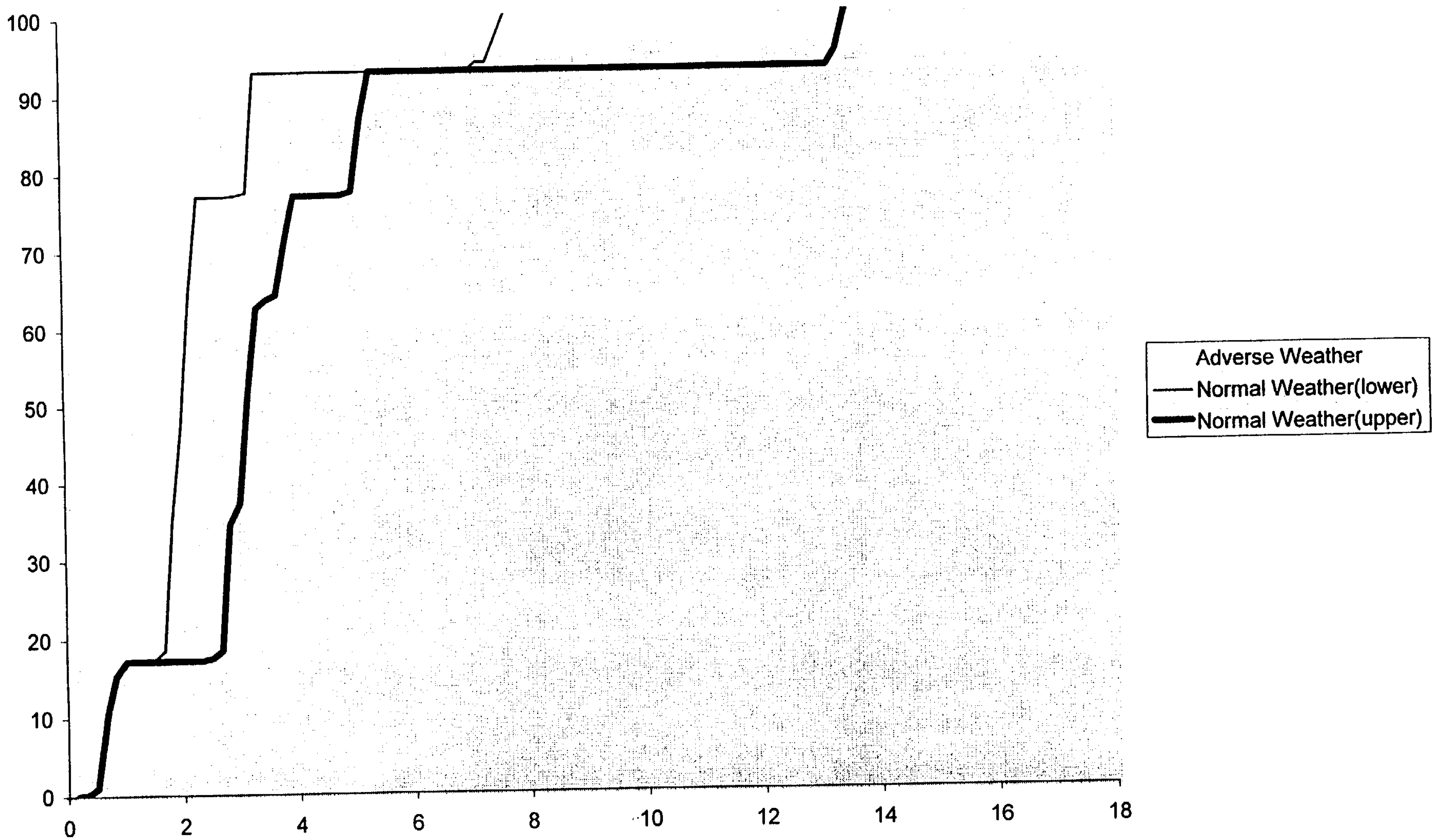
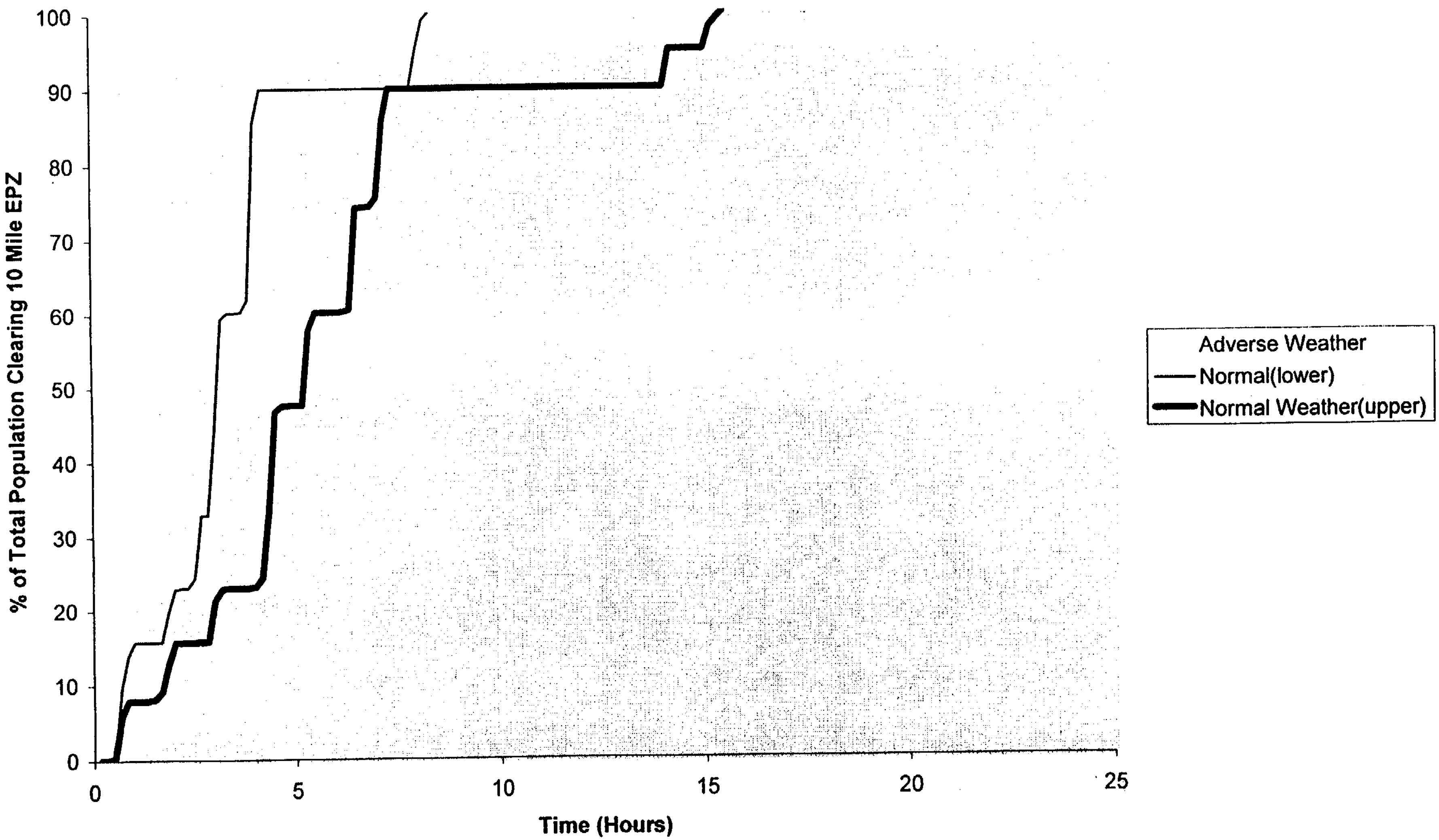


Figure 4-7
Case 3 - 60% on Road - School-out-of-Session



evacuation routes out of the EPZ. The intent of such an approach would be to segregate EPZ and Airport Event traffic to the greatest extent possible.

The assumptions used in the formulation of this case are depicted in Figure 4-7A. As is shown, four designated evacuation routes (Rt. 176, Silk Road, Rt. 6, and Rt. 264) would be re-directed to east along Rt. 3 and Rt. 49 through the positioning of police roadblocks at key locations as follows:

- Rt. 176 and Rowlee Road;
- Silk Road and Rowlee/Hawk Roads;
- Baldwin and Hawk Roads;
- Rt. 6 and Rt. 3; and
- Rt. 264 and Rt. 49.

The Rt. 49 corridor is particularly suited for a re-route of EPZ evacuation traffic, given that it has recently been repaved and striped. It provides a direct connection to I-81 south, where traffic could then be directed to staging areas in Syracuse. This would allow Airport Special Event traffic more flexibility in route selection and flow.

Figures 4-8, 4-9, and 4-10 depict the evacuation travel time estimates of Case 1 (100% Evacuation of both EPZ and Airport Special Event) using the Rt. 49 re-route to segregate the two types of traffic. As is shown, for all time periods examined (i.e., Evening, Nighttime, and Summer/Holiday Weekend) the EPZ could be almost 100% cleared in roughly 6 to 7 hours.

4.5 Estimate of Critical Bottlenecks

One of the key factors used to determine where to place traffic control and emergency personnel and where to specify key backup routes is information from the computer assignment model that identifies critical bottlenecks along each evacuation route in the network. These links represent the locations of potential maximum delays. Figure 4-11 depicts the critical bottlenecks under Case 1 and is generally characteristic of all cases examined. Not surprisingly, these bottlenecks are primarily centered where evacuation routes feed into areas around the Oswego County Airport during an Airport Special Event Scenario.

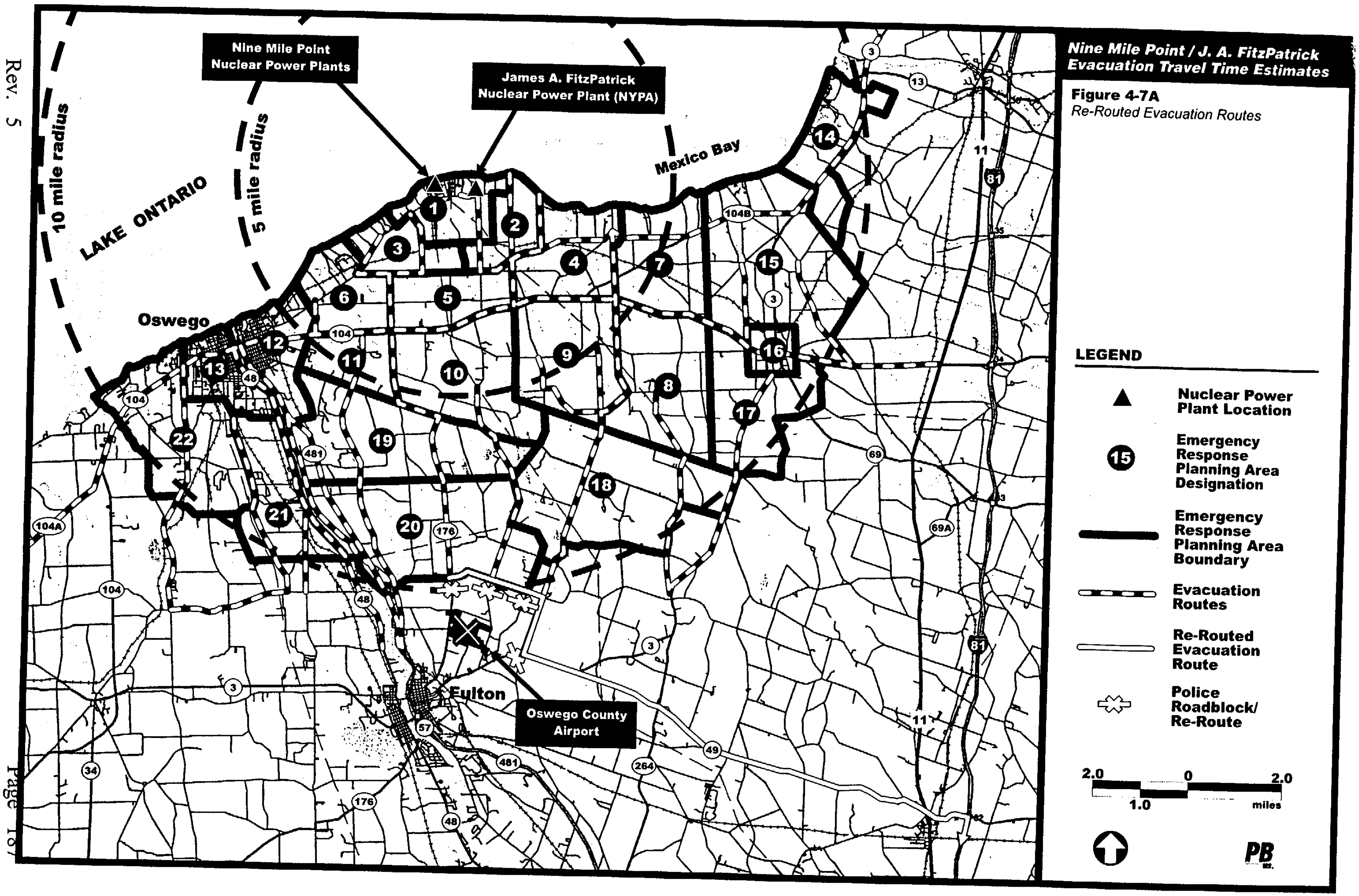


Figure 4-7A
Re-Routed Evacuation Routes

Figure 4-8
Case 4 - 100% Evacuation - Re-Route - Evening

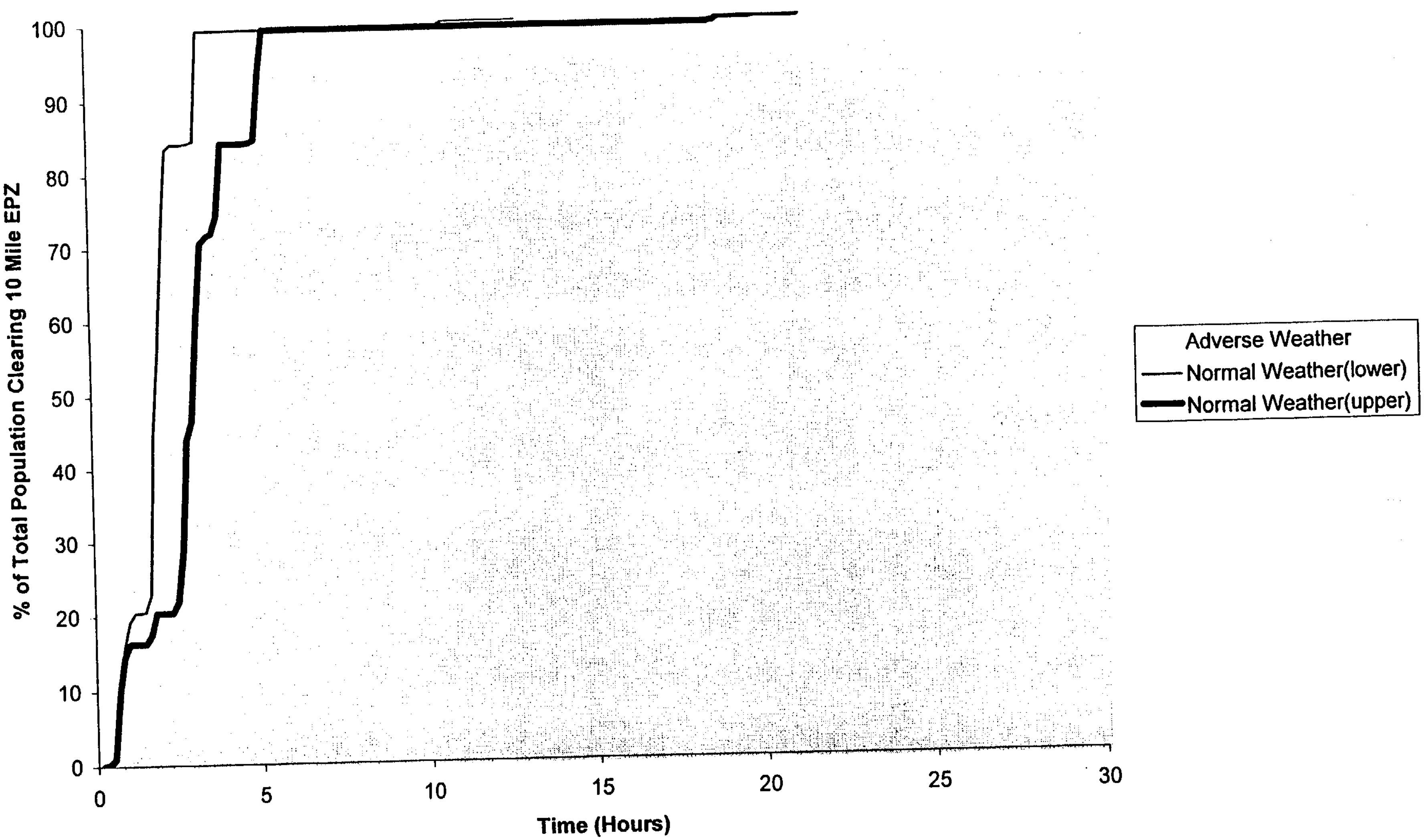


Figure 4-9
Case 4 - 100% Evacuation - Re-Route - Nighttime

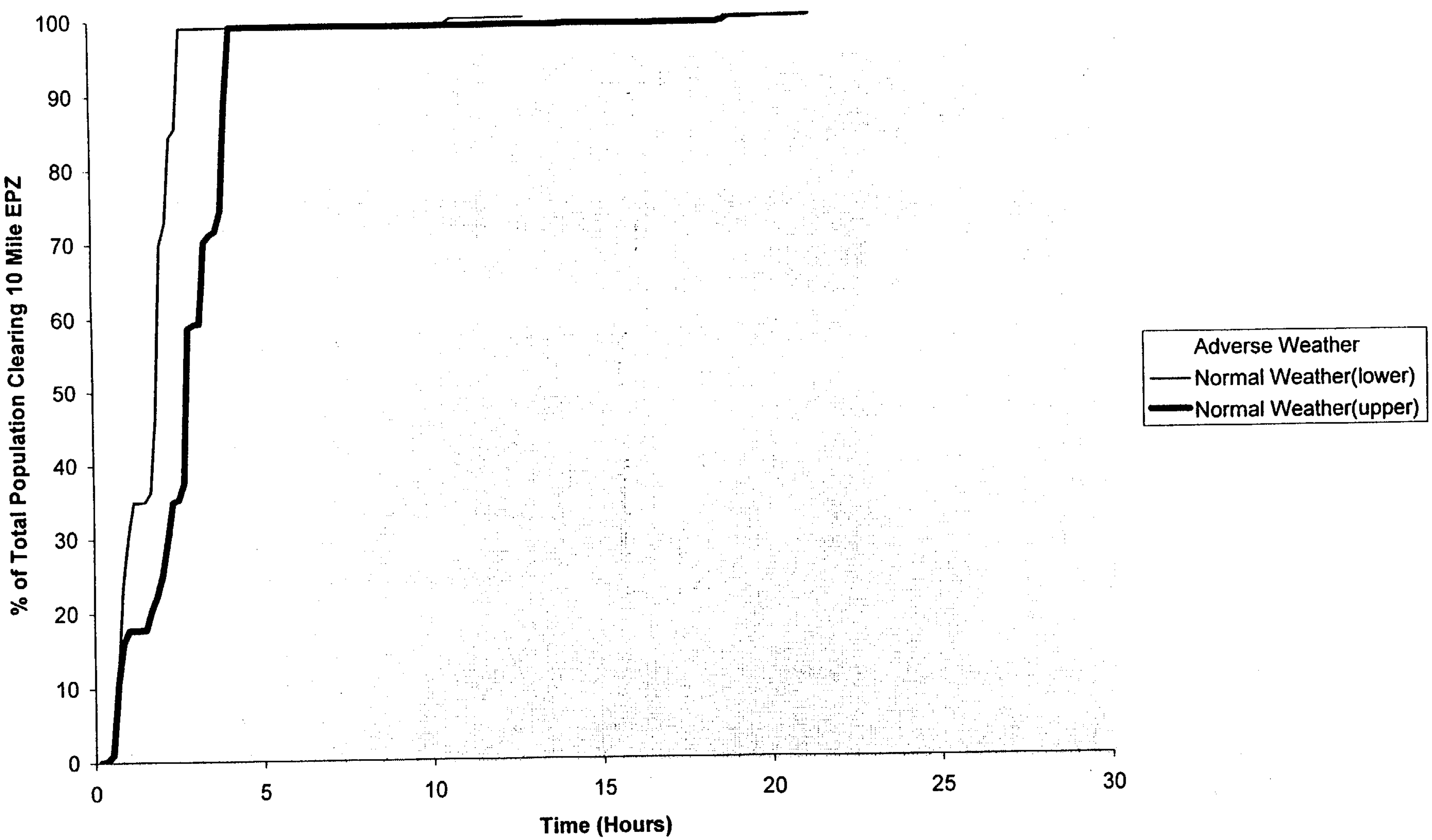
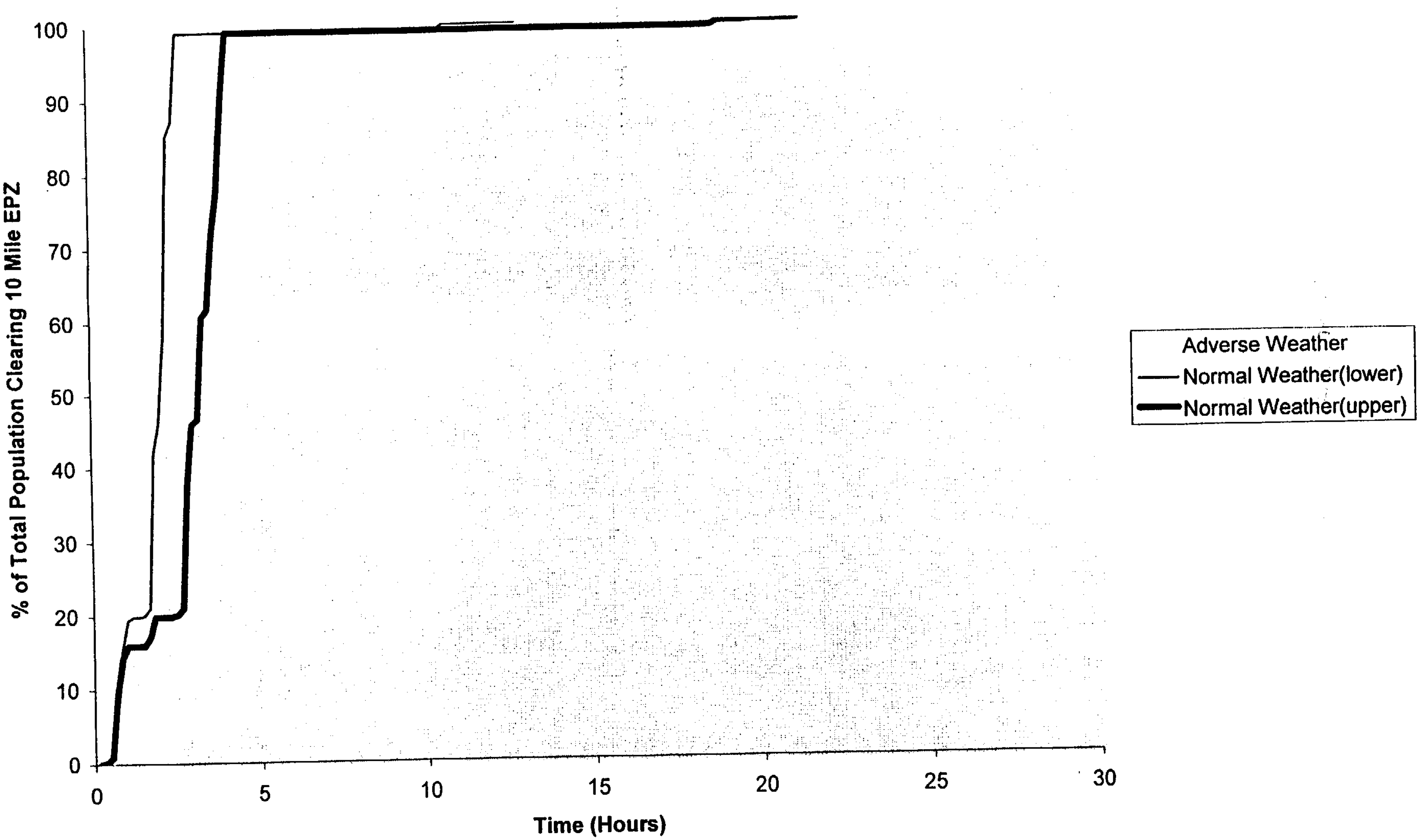


Figure 4-10
Case 4 - 100% Evacuation - Re-Route - Summer/Holiday Weekend



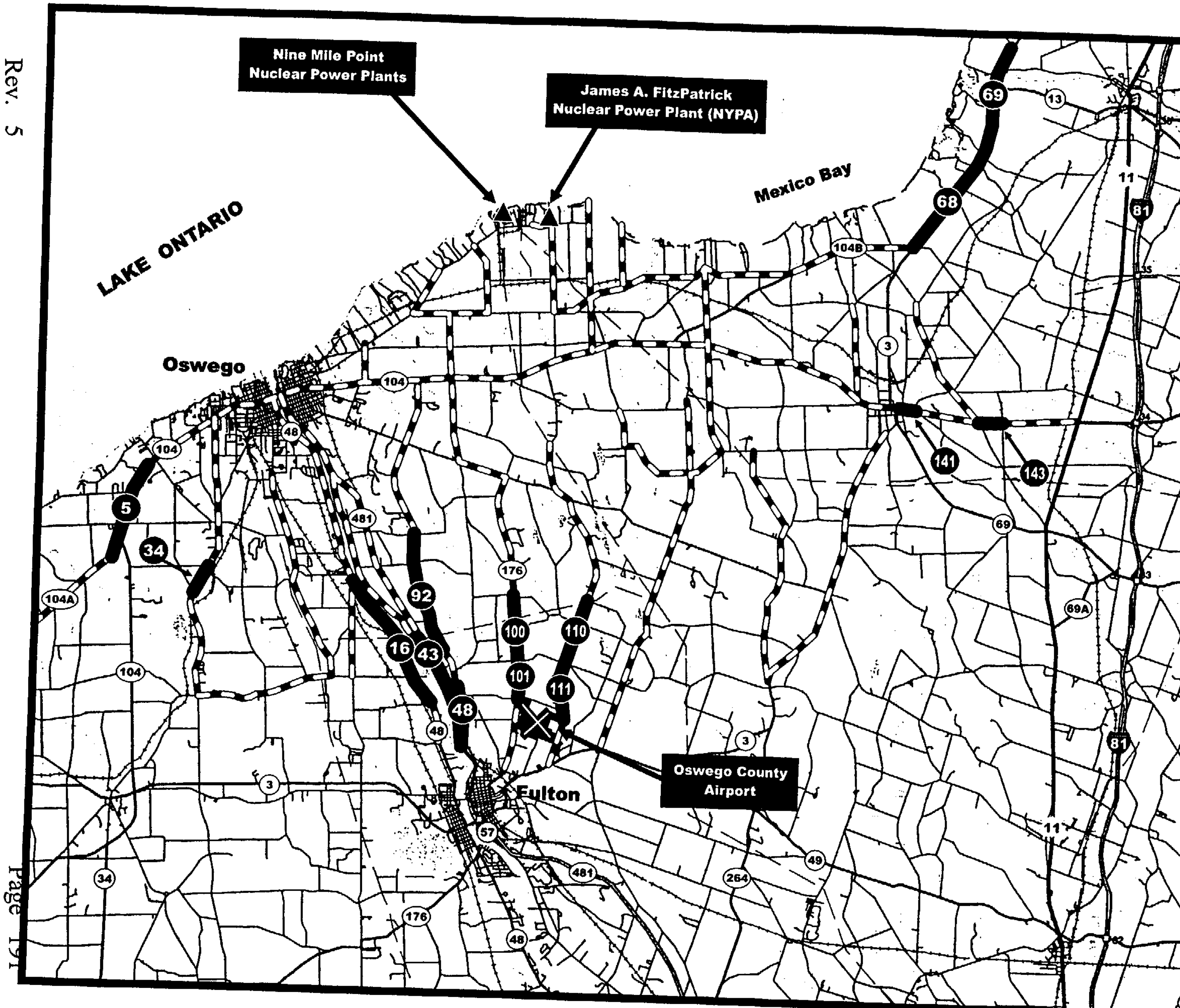


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Figure 4-11
Critical Bottlenecks
Case 1 - 100% Evacuation of EPZ and Airport Event.

LEGEND

- ▲ Nuclear Power Plant Location
- 68 Evacuation Route Link Designation
- Evacuation Route Link Experiencing Critical Bottleneck
- Evacuation Routes

2.0 0 2.0
1.0 miles

PB

APPENDIX A

EVACUATION TRAVEL TIMES BY EMERGENCY RESPONSE PLANNING AREA

EVACUATION TRAVEL TIMES
BY EMERGENCY RESPONSE PLANNING AREAS

This appendix includes evacuation travel time estimates by ERPA for a simultaneous full-EPZ evacuation during a special event at the Oswego County Airport. Evacuation travel time estimates are presented for the following scenarios, weather conditions, and population groups:

- Scenarios
  School-not-in Session
  Weekend/Holiday Summer
  Evening
  Nighttime

- Weather Conditions
  Normal
  Adverse

- Population Groups
  Resident Population with Autos
  Resident Population without Autos
  Special Facilities Population
  Transient Population

A total of 20 tables are included in this appendix. A range of values depict the lower and upper bound limits of the evacuation times for normal weather and dry roadway conditions to a light rain which results in wet pavement. Evacuation travel time estimates for adverse weather approximate travel conditions during severe hail storms or thunderstorms.

A suggested approach to read the table in this appendix is outlined below:

Step 1 Determine the appropriate case and scenario (i.e., 100% Evacuation-Evening).

Step 2 Determine the approximate weather condition:

Lower bound normal weather conditions – dry pavement.
Upper bound normal weather conditions – wet pavement.
Adverse weather conditions – pavement conditions during a thunderstorm/hailstorm.

Step 3 For lower bound normal weather ETTE tables, read the left of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ.

For upper bound normal weather ETTE tables, read the right of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ.

Adverse weather ETTEs are documented on separate tables for each scenario.

A possible evacuation scenario is detailed as follows:

A full EPZ evacuation scenario has been ordered on a Saturday at 6:00 PM in July. An evacuation of a special event at the Oswego County Airport is also occurring. The weather conditions are observed to be poor (heavy rain, thunderstorm, hailstorm, or heavy fog) and the forecast is that these weather conditions will continue over the next two days. (See Table A-1 for ETTEs).

Q. How long will it take for the permanent resident population with autos to:
- Fully evacuate ERPA 5? A. 26:20

Q. How long will it take for the permanent resident population without autos to:
- Fully evacuate ERPA 16? A. 1:30

Q. How long will it take for the special facilities population to:
- Fully evacuate ERPA 4? A. 2:00
- Fully evacuate the EPZ? A. 4:10 (Multiple wave evacuation substantially increase special facility evacuation times.)

Q. How long will it take for the transient population to:
- Fully evacuate ERPA 4? A. 1:50 (Transient population can evacuate more quickly than permanent resident population in the same ERPA. This typically occurs when the transient population is located in a traffic zone closer to the EPZ boundary).
- Fully evacuate ERPA 14? A. 3:20 (Transient population and permanent resident population typically require the same time to evacuate an ERPA when the population dispersion of each is similar throughout the ERPA.
- Fully evacuate ERPA 22? A. 6:20

NOTES FOR EVACUATION TRAVEL TIME ESTIMATES BY ERPA

NORMAL WEATHER

1. The evacuation travel time ranges presented in this table are based on operations strategies indicated in the evacuation implementation procedures.

   Lower bound evacuation travel times (shorter times) can be anticipated when:

   a. Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents, vehicle breakdowns, and highway construction, do not occur.

   b. A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, al buses stationed to begin their initial runs) is attained.

   c. An informed and cooperative public follow directions as instructed.

   d. Dry roadway conditions exist.

   Upper bound evacuation travel times (longer times) are representative of a situation where:

   a. Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result.

   b. A low state of operations readiness results from minimal mobilization of the emergency workforce.

   c. A low degree of cooperation from the public occurs.

   d. A light rain results in wet pavement.

2. The evacuation travel time ranges are indicated as hours: minutes, and include 20 minutes of public preparation time.

3. The population subgroups indicated in this table are:

   a. Resident population (with and without automobiles).

   b. Special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, resident facilities such as group homes, convents, and monasteries).

   c. Transient (employees, visitors to parks, resident and day camps, hotels, and motels).

4. Gaps in this table indicate that there is no special facility or transient population in the given ERPA.

5. The evacuation travel time ranges presented in the table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA is a staged evacuation and will not exceed the travel time range indicated in this table.

6. All times have been rounded to the nearest 10 minutes.

7. Special facility evacuation travel times include time for multi-wave trips to evacuate the population which requires transport by ambulance.

NOTES FOR EVACUATION TRAVEL TIME ESTIMATES BY ERPA

ADVERSE WEATHER

1. The evacuation travel time ranges presented in this table are based on operational strategies indicated in the evacuation implementation procedures.
2. The evacuation travel time ranges are indicated as hours: minutes, and include 20 minutes of public preparation time.
3. Adverse weather conditions are considered to be a slippery roadway surface and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).
4. The population subgroups indicated in this table are:
   a. Resident population (with and without automobiles).
   b. Special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, resident facilities such as group homes, convents, and monasteries).
   c. Transient (employees, visitors to parks, resident and day camps, hotels, and motels).
5. Gaps in the table indicate that there is no special facility or transient population in the given ERPA.
6. The evacuation travel time ranges presented in the table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA is a staged evacuation and will not exceed the travel time range indicated in this table.
7. All times have been rounded to the nearest 10 minutes.
8. Special facility evacuation travel times include time for multi-wave trips to evacuate the population which requires transport by ambulance.

TABLE A-1

CASE 1 – 100% EVACUATION – EVENING

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	26:20	26:20		26:20
2	26:20	26:10		
3	25:50	25:50		
4	3:30	3:30	2:00	1:50
5	26:20	26:10		
6	25:40	4:40		25:40
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	26:20	25:20		25:40
11	4:40	4:30		
12	4:50	4:40	3:50	4:50
13	6:20	6:30	4:10	6:20
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:40	1:20		
19	26:10	26:10		
20*	26:10	26:10		28:40
21	3:10	3:00		
22	6:20	6:10	6:20	6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-2
CASE 1 – 100% EVACUATION – EVENING
NORMAL WEATHER
EVACUATION TRAVEL TIME SUMMARY
IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:30 – 21:10	11:30 – 21:10		11:30 – 21:10
2	11:10 – 21:10	10:50 – 20:50		
3	11:30 – 20:40	11:30 – 20:40		
4	1:50 – 2:50	1:50 – 2:50	1:10 – 1:10	1:00 – 1:00
5	11:30 – 21:10	11:00 – 21:00		
6	11:30 – 20:40	2:10 – 3:50		11:30 – 20:40
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	11:30 – 21:10	11:10 – 20:20		11:30 – 20:40
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	2:20 – 3:10	2:20 – 3:50
13	3:20 – 5:10	3:20 – 5:10	2:10 – 3:30	3:20 – 5:10
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	11:30 –21:00	11:30 – 21:00		
20*	11:30 – 21:00	11:20 – 21:00		14:00 – 23:30
21	1:40 – 2:40	1:30 – 2:30		
22	3:20 – 5:10	3:00 – 5:00	3:10 – 5:10	3:20 – 5:10

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-3

CASE 1 – 100% EVACUATION – NIGHTTIME

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	26:20	26:20		26:20
2	26:10	26:00		
3	25:20	25:20		
4	2:30	2:30	1:20	1:10
5	26:10	26:10		
6	25:20	4:40		25:20
7	2:30	1:40		
8	1:50	0:40		
9	0:50	0:40		
10	26:10	25:00		
11	4:40	4:30		
12	4:50	4:40	20:20	4:50
13	5:00	5:00	23:20	5:00
14	2:20	2:10		2:20
15	2:20	2:00		2:20
16	1:40	1:30		
17	1:40	1:30		
18	0:40	0:30		
19	26:00	26:00		
20*	26:00	26:00		28:30
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-4

CASE 1 – 100% EVACUATION – NIGHTTIME

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:20 – 21:10	11:20 – 21:10		11:20 – 21:10
2	11:00 – 21:10	10:50 – 20:50		
3	11:20 – 20:20	11:20 – 20:20		
4	1:00 – 2:10	0:50 – 2:00	1:10 – 1:10	1:00 – 1:00
5	11:20 – 21:00	11:00 – 21:00		
6	11:20 – 20:20	2:10 – 3:50		11:20 – 20:20
7	0:50 – 2:00	0:30 – 0:30		
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	11:20 – 21:00	11:00 – 20:00		
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	13:30 – 16:40	2:20 – 3:50
13	2:30 – 4:00	2:40 – 4:10	16:10 – 19:20	2:30 – 4:00
14	0:40 – 2:00	0:30 – 1:40		0:40 – 2:00
15	0:40 – 2:00	1:00 – 1:00		0:40 – 2:00
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	11:20 – 20:50	11:20 – 20:50		
20*	11:20 – 20:50	11:10 – 21:00		13:50 – 23:30
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-5

CASE 1 – 100% EVACUATION – SUMMER/HOLIDAY WEEKEND

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	26:20	26:20		26:20
2	26:20	26:00		
3	26:10	26:10		
4	3:30	3:30	2:00	1:50
5	26:10	26:10		
6	26:10	4:40		26:10
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	26:10	25:40		26:00
11	4:40	4:30		
12	4:50	4:40	20:50	4:50
13	5:00	5:00	23:50	5:00
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:40	1:20		
19	26:00	26:00		
20*	26:00	26:00		28:30
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-6

CASE 1 – 100% EVACUATION – SUMMER/HOLIDAY WEEKEND

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:40 – 21:10	11:40 – 21:10		11:40 – 21:10
2	11:10 – 21:10	10:50 – 20:50		
3	11:40 – 21:00	11:40 – 21:00		
4	1:50 – 2:50	1:50 – 2:50	1:10 – 1:10	1:00 – 1:00
5	11:40 – 21:00	11:00 – 21:00		
6	11:40 – 21:00	2:10 – 3:50		11:40 – 21:00
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	11:40 – 21:00	11:20 – 20:40		11:40 – 21:00
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	13:50 – 17:10	2:20 – 3:50
13	2:30 – 4:00	2:40 – 4:10	16:30 – 19:50	2:30 – 4:00
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	11:40 – 21:00	11:40 – 21:00		
20*	11:40 – 21:00	11:30 – 21:00		14:10 – 23:30
21	1:40 – 2: 40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-7
CASE 2 – 40% EVACUATION –NIGHTTIME
ADVERSE WEATHER
EVACUATION TRAVEL TIME SUMMARY
IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:50	11:50		11:50
2	11:40	11:30		
3	11:50	11:50		
4	2:30	2:30	1:20	1:10
5	11:40	11:40		
6	11:50	4:40		11:50
7	2:30	1:40		
8	1:50	0:40		
9	0:50	0:40		
10	11:40	11:20		
11	4:40	4:30		
12	4:50	4:40	15:00	4:50
13	5:00	5:00	18:00	5:00
14	2:20	2:10		2:20
15	2:20	2:00		2:20
16	1:40	1:30		
17	1:40	1:30		
18	0:40	0:30		
19	11:40	11:40		
20*	11:40	11:30		11:10
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-8
CASE 2 – 40% EVACUATION –NIGHTTIME
NORMAL WEATHER
EVACUATION TRAVEL TIME SUMMARY
IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	5:30 – 9:30	5:30 – 9:30		5:30 – 9:30
2	5:10 – 9:30	4:50 – 9:10		
3	5:30 – 9:30	5:30 – 9:30		
4	1:00 – 2:10	0:50 – 2:00	1:10 – 1:10	1:00 – 1:00
5	5:30 – 9:30	5:00 – 9:20		
6	5:30 – 9:30	2:10 – 3:50		5:30 – 9:30
7	0:50 – 2:00	0:30 – 0:30		
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	5:30 – 9:30	5:10 – 9:10		
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	10:30 – 12:30	2:20 – 3:50
13	2:30 – 4:00	2:40 – 4:10	13:10 – 15:10	2:30 – 4:00
14	0:40 – 2:00	0:30 – 1:40		0:40 – 2:00
15	0:40 – 2:00	1:00 – 1:00		0:40 – 2:00
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	5:20 – 9:20	5:20 – 9:20		
20*	5:20 – 9:20	5:10 – 9:20		4:50 – 8:50
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-9

CASE 2 – 40% EVACUATION – SCHOOL OUT-OF-SESSION

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	14:20	14:20		14:20
2	14:10	14:00		14:10
3	13:00	13:00		
4	3:50	3:40	2:20	3:50
5	14:10	14:10		13:00
6	13:00	8:40		13:00
7	3:40	2:10		3:40
8	2:20	1:40		2:20
9	2:00	2:00		2:00
10	14:10	12:40		14:10
11	8:50	8:40		8:50
12	8:50	8:40	18:30	8:50
13	8:00	8:00	21:30	8:00
14	3:40	3:10		3:40
15	3:40	2:30		3:40
16	2:10	2:00	1:30	2:10
17	2:00	2:00		1:40
18	2:00	1:40		2:00
19	14:00	14:00		12:50
20*	14:00	14:00		14:00
21	5:00	5:00	1:40	5:00
22	8:00	7:40	7:50	7:50

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-10

CASE 2 – 40% EVACUATION – SCHOOL OUT-OF-SESSION

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	6:10 – 11:30	6:10 – 11:30		6:10 – 11:30
2	6:10 – 11:30	6:00 – 11:10		6:10 – 11:30
3	6:00 – 10:30	6:00 – 10:30		
4	2:00 – 3:10	1:50 – 3:00	1:10 – 2:00	2:00 – 3:10
5	6:10 – 11:30	6:00 – 11:20		6:00 – 10:30
6	6:00 – 10:30	3:50 – 7:00		6:00 – 10:30
7	1:50 – 3:00	0:40 – 1:50		1:50 – 3:00
8	0:50 – 2:00	0:40 – 0:40		0:50 – 2:00
9	0:50 – 1:40	0:40 – 1:40		0:50 – 1:40
10	6:10 – 11:20	5:40 – 10:10		6:10 – 11:20
11	4:00 – 7:10	3:50 – 7:00		4:00 – 7:10
12	4:00 – 7:10	3:50 – 7:00	12:30 – 15:20	4:00 – 7:10
13	4:00 – 6:30	4:00 – 6:30	15:10 – 18:00	4:00 – 6:30
14	1:50 – 3:00	1:40 – 2:40		1:50 – 3:00
15	1:50 – 3:00	1:00 – 2:10		1:50 – 3:00
16	0:40 – 1:50	0:20 – 1:40	0:40 – 0:40	0:40 – 1:50
17	0:40 – 1:40	0:50 – 1:40		0:40 – 0:40
18	0:40 – 1:40	0:30 – 1:20		0:40 – 1:40
19	6:00 – 11:20	6:00 – 11:20		5:50 – 10:20
20*	6:00 – 11:20	6:00 – 11:20		6:00 – 11:20
21	2:30 – 4:10	2:20 – 4:00	0:40 – 0:40	2:30 – 4:10
22	4:00 – 6:30	3:40 – 6:10	4:00 – 6:20	4:00 – 6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-11

CASE 3 – 60% EVACUATION – EVENING

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	16:40	16:40		16:40
2	16:40	16:20		3:30
3	16:40	16:40		
4	3:30	3:30	2:00	1:50
5	16:40	16:30		
6	16:40	4:40		16:40
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	16:40	16:20		16:40
11	4:40	4:30		
12	4:50	4:40	3:50	4:50
13	6:20	6:30	4:10	6:20
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:40	1:20		
19	16:30	16:30		
20*	16:30	16:30		16:00
21	3:10	3:00		
22	6:20	6:10	6:20	6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-12

CASE 3 – 60% EVACUATION – EVENING

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	7:40 – 13:30	7:40 – 13:30		7:40 – 13:30
2	7:10 – 13:30	7:00 – 13:10		
3	7:40 – 13:30	7:40 – 13:30		
4	1:50 – 2:50	1:50 – 2:50	1:10 – 1:10	1:00 – 1:00
5	7:40 – 13:30	7:00 – 13:20		
6	7:40 – 13:30	2:10 – 3:50		7:40 – 13:30
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	7:40 – 13:30	7:20 – 13:00		7:40 – 13:30
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	2:20 – 3:10	2:20 – 3:50
13	3:20 – 5:10	3:20 – 5:10	2:10 – 3:30	3:20 – 5:10
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	7:30 – 13:20	7:30 – 13:20		
20*	7:30 – 13:20	7:20 – 13:20		7:00 – 12:50
21	1:40 – 2:40	1:30 – 2:30		
22	3:20 – 5:10	3:00 – 5:00	3:10 – 5:10	3:20 – 5:10

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-13

CASE 3 – 60% EVACUATION – SCHOOL OUT-OF-SESSION

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	19:10	19:10		19:10
2	19:00	18:50		19:00
3	17:40	17:40		
4	3:50	3:40	2:20	3:50
5	19:00	19:00		17:30
6	17:30	8:40		17:30
7	3:40	2:10		3:40
8	2:20	1:40		2:20
9	2:00	2:00		2:00
10	19:00	17:10		19:00
11	8:50	8:40		8:50
12	8:50	8:40	20:20	8:50
13	8:00	8:00	23:20	8:00
14	3:40	3:10		3:40
15	3:40	2:30		3:40
16	2:10	2:00	1:30	2:10
17	2:00	2:00		1:40
18	2:00	1:40		2:00
19	18:50	18:50		17:20
20*	18:50	18:50		18:50
21	5:00	5:00	1:40	5:00
22	8:00	7:40	7:50	7:50

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-14

CASE 3 – 60% EVACUATION – SCHOOL OUT-OF-SESSION

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	8:10 – 15:20	8:10 – 15:20		8:10 – 15:20
2	8:10 – 15:20	7:50 – 15:00		8:10 – 15:20
3	8:00 – 14:10	8:00 – 14:10		
4	2:00 – 3:10	1:50 – 3:00	1:10 – 2:00	2:00 – 3:10
5	8:10 – 15:20	8:00 – 15:10		8:00 – 14:10
6	8:00 – 14:10	3:50 – 7:00		8:00 – 14:10
7	1:50 – 3:00	0:40 – 1:50		1:50 – 3:00
8	0:50 – 2:00	0:40 – 0:40		0:50 – 2:00
9	0:50 – 1:40	0:40 – 1:40		0:50 – 1:40
10	8:10 – 15:20	7:40 – 13:50		8:10 – 15:20
11	4:00 – 7:10	3:50 – 7:00		4:00 – 7:10
12	4:00 – 7:10	3:50 – 7:00	13:30 – 16:40	4:00 – 7:10
13	4:00 – 6:30	4:00 – 6:30	16:10 – 19:20	4:00 – 6:30
14	1:50 – 3:00	1:40 – 2:40		1:50 – 3:00
15	1:50 – 3:00	1:00 – 2:10		1:50 – 3:00
16	0:40 – 1:50	0:20 – 1:40	0:40 – 0:40	0:40 – 1:50
17	0:40 – 1:40	0:50 – 1:40		0:40 – 0:40
18	0:40 – 1:40	0:30 – 1:20		0:40 – 1:40
19	8:00 – 15:10	8:00 – 15:10		7:50 – 14:00
20*	8:00 – 15:10	8:00 – 15:10		8:00 – 15:10
21	2:30 – 4:10	2:20 – 4:00	0:40 – 0:40	2:30 – 4:10
22	4:00 – 6:30	3:40 – 6:10	4:00 – 6:20	4:00 – 6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-15

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE EVENING

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	3:30	3:30		3:30
2	3:40	1:50		
3	3:10	3:10		
4	3:30	3:30	1:50	1:40
5	3:10	2:00		
6	4:40	4:40		3:10
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	3:10	2:40		3:10
11	4:40	4:30		
12	4:50	4:40	3:50	4:50
13	6:20	6:30	4:10	6:20
14	3:20	3:00		3:20
15	3:20	2:00		
16	1:40	1:30		
17	1:40	1:30		
18	1:30	1:20		
19	4:40	4:40		
20*	4:30	24:50		27:10
21	3:10	3:00		
22	6:20	6:10	6:20	6:20

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

TABLE A-16

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE EVENING

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	1:50 – 3:00	1:50 – 3:00		1:50 – 3:00
2	2:00 – 3:00	0:50 – 1:30		
3	1:40 – 2:40	1:40 – 2:40		
4	1:50 – 2:50	1:50 – 2:50	1:00 – 1:00	0:50 – 0:50
5	1:40 – 2:30	0:50 – 1:40		
6	2:20 – 3:50	2:10 – 3:50		1:40 – 2:40
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:40 – 0:40	0:40 – 0:40		
10	1:40 – 2:30	1:20 – 2:10		1:40 – 2:30
11	2:20 – 3:50	2:10 – 3:40		
12	2:20 – 4:00	2:10 – 3:50	2:20 – 3:10	2:20 – 4:00
13	3:20 – 5:10	3:20 – 5:10	2:10 – 3:30	3:20 – 5:10
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	2:20 – 3:50	2:20 – 3:50		
20*	2:10 – 3:40	10:20 – 19:50		13:00 – 22:20
21	1:40 – 2:40	1:30 – 2:30		
22	3:20 – 5:10	3:00 – 5:00	3:10 – 5:10	3:20 – 5:10

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

TABLE A-17

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE NIGHTTIME

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	2:40	2:40		2:40
2	2:40	1:50		
3	2:40	2:40		
4	2:30	2:30	1:10	1:00
5	2:40	2:00		
6	4:40	4:40		2:40
7	2:30	1:40		
8	1:50	0:40		
9	0:50	0:40		
10	2:40	2:20		
11	4:40	4:30		
12	4:50	4:40	20:20	4:50
13	5:00	5:00	23:20	5:00
14	2:20	2:10		2:20
15	2:20	2:00		2:20
16	1:40	1:30		
17	1:40	1:30		
18	0:40	0:30		
19	4:40	4:40		
20*	4:30	24:50		27:10
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

TABLE A-18

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE NIGHTTIME

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	1:10 – 2:10	1:10 – 2:10		1:10– 2:10
2	1:10 – 2:10	0:50 – 1:30		
3	1:10 – 2:20	1:10 – 2:20		
4	1:00 – 2:10	0:50 – 2:00	1:00 – 1:00	0:50 – 0:50
5	1:00 – 2:10	0:50 – 1:40		
6	2:20 – 3:50	2:10 – 3:50		1:10 – 2:20
7	0:50 – 2:00	0:30 – 0:30		
8	0:50 – 0:50	0:40 – 0:40		
9	0:40 – 0:40	0:40 – 0:40		
10	1:00 – 2:10	0:30 – 1:50		
11	2:20 – 3:50	2:10 – 3:40		
12	2:20 – 4:00	2:10 – 3:50	13:30 – 16:40	2:20 – 4:00
13	2:30 – 4:00	2:40 – 4:10	16:10 – 19:20	2:30 – 4:00
14	0:40 – 2:00	0:30 – 1:40		0:40 – 2:00
15	0:40 – 2:00	1:00 – 1:00		0:40 – 2:00
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	2:20 – 3:50	2:20 – 3:50		
20*	2:10 – 3:40	10:20 – 19:50		13:00 – 22:20
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel times for the existing ERPA population.

TABLE A-19

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE

SUMMER/HOLIDAY WEEKEND

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	3:30	3:30		3:30
2	3:40	1:50		
3	3:30	3:30		
4	3:30	3:30	1:50	1:40
5	3:30	2:00		
6	4:40	4:40		3:30
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	3:30	3:10		3:30
11	4:40	4:30		
12	4:50	4:40	20:50	4:50
13	5:00	5:00	23:50	5:00
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:30	1:20		
19	4:40	4:40		
20*	4:30	24:50		27:10
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

TABLE A-20

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE

SUMMER/HOLIDAY WEEKEND

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	1:50 – 3:00	1:50 – 3:00		1:50 – 3:00
2	2:00 – 3:00	0:50 – 1:30		
3	1:50 – 2:50	1:50 – 2:50		
4	1:50 – 2:50	1:50 – 2:50	1:00 – 1:00	0:50 – 0:50
5	1:50 – 2:50	0:50 – 1:40		
6	2:20 – 3:50	2:10 – 3:50		1:50 – 2:50
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:40 – 0:40	0:40 – 0:40		
10	1:50 – 2:50	1:30 – 2:30		1:50 – 2:50
11	2:20 – 3:50	2:10 – 3:40		
12	2:20 – 4:00	2:10 – 3:50	13:50 – 17:10	2:20 – 4:00
13	2:30 – 4:00	2:40 – 4:10	16:30 – 19:50	2:30 – 4:00
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	2:20 – 3:50	2:20 – 3:50		
20*	2:10 – 3:40	10:20 – 19:50		13:00 – 22:20
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

APPENDIX B

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

A. Introduction

This Appendix describes the traffic engineering computer model used to estimate roadway travel times during an evacuation of the JAF/NMP EPZ. The model used in this study has also been applied to the Indian Point (New York), Three Mile Island (Pennsylvania), and Salem/Hope Creek (New Jersey and Delaware) Emergency Planning Zones. To evaluate the computer model used in the aforementioned studies, a separate analysis was conducted using a different model for the purpose of comparing results. The Indian Point EPZ was selected for the comparative study because of the diverse characteristics of its roadway network and population density.

As described later in this Appendix, the comparative study showed that both models provide quite similar estimates of evacuation travel time. Thus, it is concluded that the model used to estimate travel times for the JAF/NMP EPZ can be applied with a high degree of confidence.

The remaining sections of this Appendix discuss the traffic assignment process used for the JAF/NMP EPZ, present the detailed results of the comparative study; and summarize the conclusions drawn from the comparison of traffic models.

B. Static Traffic Assignment Process

1. Inputs

The static traffic assignment process developed to estimate roadway travel times during an evacuation requires three basic types of input. The first type relates to the characteristics of the evacuation roadway network, which is comprised of one-directional links, each having its own attributes. The links are described in terms of their capability to accommodate evacuating traffic (evacuation capacity), length, and free-flow speed (speed limit).

The second type of input required for this assignment process is zonal vehicle trip generation data. The EPZ is disaggregated into traffic zones, and the numbers of trips by each vehicle type (e.g., autos, buses, ambulances) are estimated in terms of passenger car equivalents (PCE's) for each traffic zone. Buses are weighted as the equivalent of two passenger cars in this analysis. In addition, a terminal time for all trip types for each traffic zone is input.

The third input type used in the static assignment process is evacuation path data. Evacuation routes are designated fixed paths extending from the traffic zones to the Sector boundary via specific roadways. Separate paths are developed for each trip type and are expressed in terms of connecting link numbers. Destinations (e.g., reception centers) are defined for each traffic zone and input for the purpose of determining the number of vehicles and passengers expected at each destination. Average vehicle occupancies are used to estimate the number of passengers arriving in vehicles at the destination.

2. Static Assignment Algorithm

A computer program was written to process the above input data and compute roadway travel times for each trip type by traffic zone. A flow chart of the static traffic assignment computer program is included at the end of this Appendix.

Initially, the program calculates the total vehicular demand volume (in PCE's) on each link in the network by aggregating the vehicle trips generated by each traffic zone along the evacuation path. Implicit in this assignment is the assumption that all vehicles from all zones using a given evacuation route are on each link along the designated route concurrently. The assignment process is thus considered "static", because the spatial movement of vehicles across the network is not explicitly recognized as a function of time.

For each link in the network, three additional computations are performed. First, the free-flow speed is calculated as the quotient of the link length and the free flow speed. Second, the total vehicular demand volume is divided by the hourly evacuation capacity (for the appropriate weather condition) of the link to obtain the volume/capacity (V/C) relationship for the link. Finally, the evacuation speed or delay time is computed for each link, depending on whether the V/C ratio is less than or greater than 1.0, respectively. The formula contained in the Federal Highway Administration <u>Traffic Assignment Manual</u>, August 1973, was adopted and modified as follows for use in computing the speed at which evacuees will travel when capacity exceeds demand.

$$\text{Evacuation Speed} = \frac{\text{Free-Flow Speed}}{0.25\left(\frac{\text{Demand}}{\text{Capacity}}\right)^{4} + 1} \quad \text{(for demand < capacity)}$$

Following these calculations, the model computes the roadway travel time for each traffic zone's evacuation route (or routes since some buses and special vehicles had separate routes) by scanning the links comprising the evacuation route to determine maximum V/C ratio along the route.

When the hourly evacuation capacity exceeds the total demand volume (V/C ratio less than 1.0) for all links along the route, the link evacuation speeds are used to compute link travel time, and the travel times for each link along the path are summed to obtain the traffic zone-to-Sector boundary roadway travel time for the route.

When the total demand volume exceeds the hourly evacuation capacity (V/C ratio greater than 1.0) along any link of a traffic zone's evacuation route, the roadway travel time is represented by the maximum link delay time incurred along the route. Link delay time is calculated as the volume/capacity ratio in hours for each link along the route. The link with the maximum V/C ratio is identified as the bottleneck link for the evacuation route for use in future planning. Other links along the route where the V/C ratio exceeds 1.0 are also identified for planning purposes.

The roadway travel time as determined above is added to the terminal time and the free-flow travel time for each zone trip type to determine the total roadway evacuation travel time. The total roadway evacuation travel time resulting from this analysis represents the time for the last vehicle in the zone to clear the Sector.

3. Outputs

The computer program developed for the static assignment process provides five basic reports which are used in the evacuation planning process. The reports are described below:

a. Summary of link statistics: link number, description, length, free-flow speed and time, vehicular demand volume, evacuation capacity, and volume/capacity ratio.

b. Summary of traffic zone statistics: number of trips, evacuation route, destination, terminal time, free-flow travel time, roadway travel time, total evacuation time, and bottleneck link; for each trip type, sorted in ascending order by total evacuation time.

c. Summary of all bottleneck links and the traffic zones which are routed over them.

d. Summary of all destinations and the estimated number of vehicles (by type) and passengers assigned to each.

e. Distribution of the percent of the total population evacuated as a function of time.

C. Comparison of Static and Dynamic Traffic Assignment Processes

Because of the importance of the assignment process in the overall procedure to estimate evacuation travel times, it was decided to evaluate the static traffic assignment model used in the evacuation planning process. Travel times estimated by the static model were compared with times estimated by a state-of-the-art dynamic traffic assignment model.

The dynamic assignment model used in the comparative analysis is an offspring of the TRANSYT model* presently included in the Federal Highway Administration computer program batteries. The model employs principles of flow continuity and flow dynamics to move traffic on each link in the network towards its ultimate destination. Traffic flow representation changes with time to reflect changes in demand and roadway conditions. Traffic movement on each link in the network is constrained by roadway geometrics, control devices, and other vehicles present on the roadway.

Various types of test routes were selected for this comparison and were located in Rockland and Westchester Counties in the Indian Point EPZ in New York State. Input requirements for both models were basically identical with one exception, which relates to the time varying nature of vehicles entering the evacuation network. The static assignment process assumed a concurrent loading of the entire network; the distribution over time of vehicle trips feeding the network was not addressed by the static model. However, because of the time dependent nature of the dynamic simulation model, it was possible to input trip generation data which varied with time at each load point in the network. This time-based distribution curve used in the comparison of assignment processes was provided by the New York State Office of Disaster Preparedness.

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* The dynamic evacuation model, named DYNEV, was provided by KLD Associates, Inc.

Separate comparative analyses and evaluations of the static and dynamic model results were made using Level of Service D and Level of Service E evacuation capacities. Table I-1 presents a comparison of the percent of total vehicles (in PCEs) evacuated for each route by time in the test network. The comparison was made between the static and dynamic assignment results when one or the other reached a time period when the total vehicles traveling the evacuation route had cleared the EPZ boundary. In all cases, the static assignment evacuation reached 100 percent completion either before or at the same time as the dynamic assignment evacuation. The percentages enclosed by parentheses in Table I-1 correspond to static and dynamic evacuation roadway travel times using Level of Service D capacities. Percentages without parentheses correspond to static and dynamic evacuation roadway travel times estimated using Level of Service E capacities.

Examination of Table I-1 shows a 97 percent correlation between the two assignment model results on an aggregate basis for the sample Indian Point roadway network east of the Hudson River in Westchester County. That is, at the time that the static assignment estimated complete evacuation of vehicles beyond the EPZ, the dynamic assignment estimated 97 percent of the vehicles would have cleared the EPZ. On the west side of the Hudson River near Indian Point, where both Levels of Service E and D were analyzed by both models, the two model results were 99 percent and 98 percent, respectively. Overall, for the entire test evacuation network, comparison of the static and dynamic assignment results at Level of Service E indicated a 99 percent correlation. In other words, when the static model estimated the network would be cleared (total vehicle evacuation), the dynamic model estimated 99 percent of the vehicles would have cleared the EPZ boundary. The dynamic assignment results indicated that complete evacuation of all vehicles beyond the EPZ boundary would occur 15 minutes later than the static assignment estimate at Level of Service E.

In addition to the evacuation times generated by each assignment technique, the location of bottlenecks by each methodology was compared. The critical bottleneck links identified by the static model were identified in the dynamic assignment results as well. The dynamic assignment produced the percent of vehicles topped at each link during the evacuation. This statistic was used as a measure of the congestion level on each link. For the identified bottleneck links, the average percentage of stops as indicated by the dynamic mode output was roughly 45 percent higher than on non-critical links, indicating that an increase in congestion was appropriately simulated by the static model on the critical links.

D. Conclusions

The results of the comparative analysis presented in this Appendix indicate that the static traffic assignment model can be applied to highway networks to estimate evacuation roadway travel times with a high degree of confidence.

Under almost identical circumstances, the static assignment model results have proven comparable with those produced by a state-of-the art, complex dynamic assignment model, which simulates the evacuation process within the framework of time. Roadway travel times were estimated and congested roadways identified with a high degree of correlation using the less complex static assignment methodology. A close correlation between assignment procedures exists for varying roadway types, weather conditions, and loading characteristics. Thus the use of the static assignment model to estimate evacuation travel times in the JAF/NMP EPZ is appropriate.

TABLE I-1

COMPARISON OF STATIC AND DYNAMIC ASSIGNMENT RESULTS

Evacuation Route	Total Vehicles Using Evacuation Route	Traffic Assignment Methodology	Percent of Total Vehicles Evacuated During the Following Time Period* 0:45 1:00	1:45 2:00	2:00 2:15	2:15 2:30	2:30 2:45	2:45 3:00	3:00 3:15	3:15 3:30	3:30 3:45	3:45 4:00	4:15 4:30	4:30 4:45	5:30 5:45	5:45 6:00	6:00 6:15	6:15 6:30	7:15 7:30
East of River (Westchester County)																			
Route 6	4,360	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	84	–	100	–	–	–	–	–
Route 120	5	Static	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	33	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–
Route 9A	8,690	Static	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
Taconic Parkway	5,155	Static	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	92	–	–	–	100	–	–	–	–	–	–	–	–	–	–
Amawalk Road	2,575	Static	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	89	–	100	–	–	–	–	–	–	–	–	–
Total East Routes	20,785	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	97	–	100	–	–	–	–	–
West of River (Rockland County)																			
Palisades Parkway	8,655	Static	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	97	100	–	–	–	(97)	–	(100)	–
Route 9W	3,850	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(87)	(100)
Route 303	3,310	Static	–	100	–	–	(100)	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	98	–	–	(90)	100	(100)	–	–	–	–	–	–	–	–	–	–
Route 45	1,920	Static	–	–	–	100	–	–	–	–	(100)	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	98	–	100	–	–	(100)	–	–	–	–	–	–	–	–
Little Tor Road	3,025	Static	–	–	–	–	–	–	–	–	100	–	–	–	(100)	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	99	100	–	–	(95)	–	(100)	–	–
Route 304	3,655	Static	–	–	–	100	–	–	–	–	–	(100)	–	–	–	–	–	–	–
		Dynamic	–	–	–	99	–	100	–	–	–	(100)	–	–	–	–	–	–	–
Total West Routes	24,415	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(98)	(100)
Total Network Routes	45,200	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	–	–

* Note: Numbers enclosed by parentheses represent the percent of total vehicles along a route evacuated during the time period using Level of Service D capacities.

Numbers not enclosed by parentheses represent the percent of total vehicles along a route evacuated during the time period using Level of Service E capacities.

Static Traffic Assignment Computer Program Flowch