
Evacuation Transportation Management

Task Four Interview and Survey Results



June 26, 2006

Notice

This document is disseminated under the sponsorship of the department of transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof. This report does not constitute a standard, specification, or regulation. The United States Government does not endorse products or manufacturers. Trade and manufacturers' names appear in this report only because they are considered essential to the object of the document.

1. Report No. FHWA-HOP-08-016		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Interview and Survey Results: Assessment of the State of the Practice and State of the Art in Evacuation Transportation Management				5. Report Date June 2006	
				6. Performing Organization Code	
7. Author(s) Pierre Pretorius, Susan Anderson, Kwasi Akwabi, Brent Crowther, Queenie Ye, Nancy Houston, Andrea Vann Easton				8. Performing Organization Report No.	
9. Performing Organization Name and Address Kimley-Horn and Associates, Inc. 7878 N. 16 th Street, Suite 300 Phoenix, Arizona 85020 Booz Allen Hamilton 8283 Greensboro Drive McLean, Virginia 22102				10. Work Unit No. (TRIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address Federal Highway Administration U.S. Department of Transportation 1200 New Jersey Avenue, SE Washington, DC 20590				13. Type of Report and Period Covered Final Report	
				14. Sponsoring Agency Code HOTO, FHWA	
15. Supplementary Notes Kimberly Vasconez, FHWA, Office of Operations, Contracting Officer's Technical Representative (COTR). Document was prepared by Booz Allen Hamilton under contract to FHWA.					
16. Abstract Much of what is known about evacuations is based on preparations for incidents, such as hurricanes, for which there is advance warning. With advance warning, evacuations can be planned and managed using procedures and systems that have been developed as a result of extensive and methodical pre-planning. This approach, however, does not adequately support management of incidents when there is no advance warning or when conditions are changing rapidly. Evacuations in response to these types of incidents tend to be monitored, but not well managed. Because the Federal Highway Administration (FHWA) recognized the importance of and need for new tools and processes to help agencies plan for and manage evacuations where there is little or no advanced warning, they initiated a project to assess the state of the practice and state of the art in evacuation transportation management. The purpose of this report is to document emergency evacuation plans and practices employed by transportation management organizations in several large metropolitan areas in the United States. This document discusses specific practices with regard to management through the use of Intelligent Transportation Systems (ITS) and related traffic management tools such as CCTV cameras, Dynamic Message Signs (DMS), Highway Advisory Radio (HAR), 511 systems, websites, interconnected traffic signal systems, High Occupancy Vehicle (HOV) lanes, and traffic signal priority for transit. Interview results for 14 public and private transportation agencies from five large metropolitan areas are documented in this report.					
17. Key Words Evacuations, No-notice evacuations, Intelligent Transportation Systems (ITS), Traffic Management Tools			18. Distribution Statement No restrictions.		
19. Security Classified (of this report) Unclassified.		20. Security Classified (of this page) Unclassified.		21. No. of Pages 82	22. Price

TABLE OF CONTENTS

1. INTRODUCTION.....	1
1.1 Purpose of White Paper	1
1.2 Agency Descriptions.....	1
Charleston, South Carolina	2
Jacksonville, Florida	2
Phoenix, Arizona.....	2
Portland, Oregon.....	3
San Francisco, California.....	3
1.3 Interview Methods	4
2. PLANS AND PRACTICES.....	5
2.1 Harvey Ball System	5
2.2 Plans and Practices by Region	7
Charleston, South Carolina	7
Jacksonville, Florida	8
Phoenix, Arizona.....	9
Portland, Oregon.....	9
San Francisco, California.....	10
3. EXPERIENCES AND RECOMMENDATIONS.....	12
3.1 Lessons Learned.....	12
3.2 Recommendations for Best Practices.....	12
4. APPENDIX.....	14

LIST OF TABLES

Table 2-1: Harvey Ball System.....	5
Table 2-2: Survey Results.....	6
Table 2-3: List of Desirable Elements	7

1. INTRODUCTION

This white paper is developed in fulfillment of Task 4 of the *Assessment of State of the Practice and State of the Art in Evacuation Transportation Management* study being conducted by the Federal Highway Administration (FHWA).

Much of what is known about evacuations is based on experience with hurricanes. Other types of incidents, such as hazmat situations and nuclear plant accidents, have very different characteristics because there is no advance notice. In some cases, evacuations are monitored rather than managed—they simply “happen.” Understanding these transportation characteristics during no-notice evacuations and the current practices that are being used in managing all aspects of transportation during evacuations is essential to improving practices and developing new tools and technologies that support better outcomes.

The purpose of the *Assessment of State of the Practice and State of the Art in Evacuation Transportation Management* study is to assess what is known about planning and management of transportation during evacuations of all types. The study will provide initial guidance that agencies can use in their planning efforts as well as input to the work to be performed later to develop tools for real-time management of evacuations.

1.1 Purpose of White Paper

The purpose of this white paper is to document emergency evacuation plans and practices employed by transportation management organizations in several large metropolitan areas within the United States. This document discusses specific management practices using intelligent transportation systems (ITS) and related traffic management tools such as closed caption television (CCTV) cameras, dynamic message signs (DMS), highway advisory radio (HAR), 511 systems, Web sites, interconnected traffic signal systems, high occupancy vehicle (HOV) lanes, and traffic signal priority for transit. This white paper documents interview results for 14 public and private transportation agencies from five large metropolitan areas. A total of 17 agencies were identified as ideal candidates for these interviews, but only 14 participated. The purpose of the interviews was to assess the state of the practice and state of the art in evacuation transportation management in different parts of the country in order to identify new tools and processes to help agencies plan for and manage evacuations where there is little or no advance warning. Thus, this document provides an analysis of some of the emergency evacuation plans and practices being employed by transportation management organizations within the United States.

1.2 Agency Descriptions

Fourteen public and private transportation agencies from five large metropolitan areas were interviewed. These agencies are listed below.

Charleston, South Carolina

South Carolina Department of Transportation (SCDOT)

SCDOT manages all of the highways and freeways throughout the State of South Carolina.

South Carolina Emergency Management Division (SCEMD)

SCEMD consists of six sections—the Director’s Office, Public Information, Preparedness and Recovery, Response and Operations, Critical Incident Management Group, and Administrative Services. The Preparedness and Recovery section of SCEMD is responsible for the development, coordination, and maintenance of emergency plans, which include the South Carolina Emergency Operations Plan, Hurricane Plan, Earthquake Plan, and selected other natural hazard plans.

Jacksonville, Florida

City of Jacksonville Department of Public Works – Traffic Engineering

The City of Jacksonville Traffic Engineering Division is responsible for a number of traffic engineering services including street marking and signing, traffic signals, and other operations relating to traffic control devices.

Florida Department of Transportation (FDOT)

FDOT maintains a highway system of over 40,000 lane miles and 6,381 bridges. FDOT also supports other transportation-related facilities including 800 aviation facilities, 29 fixed-route transit systems, 14 seaports, and 2,707 railway miles.

Jacksonville Port Authority

The Jacksonville Port Authority owns three marine terminals and one passenger cruise terminal in Jacksonville, Florida. The Jacksonville Port Authority develops, manages, and markets these publicly owned facilities to promote the growth of maritime and related industries in Jacksonville.

The Jacksonville Port Authority was not able to participate in the survey.

Phoenix, Arizona

Arizona Department of Transportation (ADOT)

ADOT is responsible for managing and maintaining the state’s highway and freeway system. ADOT also manages the Motor Vehicles Department and publishes a travel magazine called *Arizona Highways Magazine*.

ADOT was not able to participate in the survey, although it did provide some information pertaining to its evacuation transportation management operations.

Maricopa County Department of Transportation (MCDOT)

MCDOT consists of seven divisions whose responsibilities range from conducting public meetings, to transportation planning, to right-of-way acquisition and management. MCDOT, along with the Arizona Department of Transportation, is also responsible for leading the AZTech

partnership of public and private agencies using ITS to improve overall transportation operations throughout Maricopa County.

Valley Metro/Regional Public Transportation Authority (RPTA)

Valley Metro/RPTA manages a number of transit-related services and is responsible for regional transit planning, transit public information, management and operation of regional bus and dial-a-ride services, the Regional Ridesharing program, a regional vanpool program, and elements of the countywide Trip Reduction program and Clean Air Campaign.

Valley Metro was not able to participate in the survey.

Portland, Oregon

City of Portland Office of Transportation

The City of Portland Office of Transportation maintains over \$5 billion in infrastructure facilities from streets and structures to traffic signals and streetlights throughout the state's largest urban area.

Oregon Department of Transportation (ODOT)

ODOT is responsible for developing programs related to Oregon's system of highways, roads, and bridges and railways, public transportation services, transportation safety programs, driver and vehicle licensing, and carrier regulation.

Oregon Emergency Management

In the State of Oregon, the Governor is responsible for maintaining an emergency services system; the purpose of the Office of Emergency Management is to execute the Governor's responsibility. The Office of Emergency Management is responsible for coordinating and facilitating emergency planning, preparedness, response, and recovery activities with the state and local emergency services agencies and organizations.

Tri-County Metropolitan Transportation District of Oregon (TriMet)

TriMet is a public transit system consisting of buses, light rail, and streetcars that operate in the Portland/tri-county (Multnomah County, Clackamas County, and Washington County) areas.

San Francisco, California

Alameda Contra-Costa Transit District (AC Transit)

AC Transit is a modern bus system owned by the citizens of the East Bay. AC Transit serves the cities of the East Bay from Richmond to Fremont.

San Francisco Bay Area Rapid Transit (BART)

BART is a public transit rail system consisting of five lines that serve a number of cities throughout the San Francisco Bay area. The State of California created a special governmental agency called the San Francisco Bay Area Rapid Transit District. BART has its own police force and is governed by an elected Board of Directors.

California Department of Transportation (Caltrans)

Caltrans is responsible for more than 45,000 miles of California's highway and freeway lanes. Caltrans has six primary programs—Aeronautics, Highway Transportation, Mass Transportation, Transportation Planning, Administration, and the Equipment Service Center.

San Francisco Municipal Transportation Agency Department of Parking and Traffic

The Department of Parking and Traffic is an agency dedicated to enhancing the quality of life for the residents of San Francisco by encouraging the efficient movement of people and goods throughout the city. The organization works to improve traffic safety, management, and awareness while supporting public transit and offering parking opportunities in San Francisco neighborhoods.

Metropolitan Transportation Commission (MTC)

The MTC is the transportation planning, coordinating, and financing agency for nine counties in the San Francisco Bay area. The MTC serves as the regional transportation planning agency and the region's metropolitan planning organization.

1.3 Interview Methods

The first step in the interview process was to identify regions of interest for possible interviews. The criteria for candidate regions were notable presence of a potential threat that could force a mass evacuation or the occurrence of a large-scale special event (past or future) in the region. The goal was to identify, and interview, agencies within these regions that were likely to have existing evacuation plans or plans in development.

After selection of the five regions discussed in the previous section, which agencies to interview within those five regions had to be determined. Candidate agencies were divided into two groups—first-tier agencies (those that are expected to have strong familiarity with evacuation transportation management and may include multi-agency organizations) and second-tier agencies (those that may play a more supportive role in providing information or managing a single component of the transportation system). Three to five agencies were selected from each region to address both traffic and transit issues.

After all of the key agencies had been identified, one person associated with the evacuation planning efforts within each agency was identified to participate in a phone interview. Questions were provided to each interviewee prior to the interview and, in some cases, the interviewee provided some of their agency's emergency evacuation documentation as reference material to facilitate the task. The phone interviews lasted between 30 minutes and 1.5 hours. At the end of the interview, the answers were summarized and sent to the interviewee for review and concurrence. See the **Appendix** for final interview documents.

2. PLANS AND PRACTICES

The evacuation transportation management plans and practices of each agency/region were compared against a list of desirable elements using “Harvey Ball” ratings.

2.1 Harvey Ball System

The Harvey Ball rating system was used to indicate the degree to which each element in a list of desirable elements has been implemented or considered by each agency. It should be noted that the determination of ratings was somewhat subjective, but the purpose of the analysis was to compile the ratings for all agencies in order to make qualitative observations of trends.

Table 2-1: Harvey Ball System

Harvey Ball System	
N/A	Not Addressed in Interview
○	Not Considered in Plans or Implemented in Practice
1	Some Consideration Given but Not Implemented
2	Minimally Implemented
3	Moderately Implemented
4	Fully Implemented

Table 2-2 shows the Harvey Ball ratings for each agency that participated in the questionnaire along with the corresponding list of desirable elements. This list of desirable elements consists of 16 specific plans and practices considered essential to developing a well-rounded emergency evacuation plan. **Table 2-3** shows the list next to a number that corresponds to the question from the survey that addresses that particular key element.

Table 2-2: Survey Results

		Integration of transportation into general emergency plans	Tailoring of plans to address all types of evacuation and special event scenarios	Use of modeling tools to estimate capacity needs and availability	Pre-established evacuation routes and traffic control practices	Use of transit services and resources, including for special needs evacuees	Use of ITS components	Appropriate role of transportation agencies in resource and materials management and coordination, including resource staging	Use of an incident command system (ICS), and integration of transportation into the system	Coordination between TMCs, transit agencies, and EOCs	Coordination among other agencies	Procedures for identifying and delegating management activities	Protocols for communications between agencies	Protocols for communications with evacuees	Appropriate testing/training practices	Incorporation of lessons learned in exercises and evacuation into plans and practices	Incorporation of lessons learned in exercises and evacuations into future training
Charleston, SC	South Carolina DOT	4	2	4	4	N/A	4	4	4	3	4	4	4	2	4	4	4
	South Carolina Emergency Management Division	3	3	4	4	1	4	4	4	3	3	N/A	3	3	3	2	2
Jacksonville, FL	City of Jacksonville Department	4	3	0	N/A	N/A	0	3	4	3	3	N/A	0	N/A	2	1	1
	Florida DOT	4	1	3	4	N/A	4	4	4	N/A	3	N/A	N/A	3	3	N/A	N/A
	Jacksonville Port Authority	Did not participate in survey.															
Phoenix, AZ	Arizona DOT	Did not participate in survey.															
	Maricopa County DOT	3	0	2	N/A	N/A	2	N/A	4	N/A	2	N/A	2	0	2	1	1
	Valley Metro	Did not participate in survey.															
Portland, OR	City of Portland Office of Transportation	4	3	2	N/A	1	2	0	3	3	3	N/A	4	3	0	N/A	N/A
	Oregon DOT	4	3	4	4	N/A	4	4	3	N/A	N/A	N/A	0	0	0	0	0
	Oregon Emergency Management	N/A	1	0	N/A	N/A	N/A	N/A	3	1	1	N/A	N/A	N/A	N/A	0	0
	TriMet	0	2	0	3	N/A	4	N/A	4	1	N/A	N/A	1	0	0	0	0
San Francisco, CA	AC Transit	N/A	1	0	0	2	2	0	4	4	3	N/A	2	0	1	1	1
	Bay Area Rapid Transit	0	3	4	N/A	0	N/A	2	4	3	3	N/A	3	2	4	1	1
	Caltrans	3	3	0	2	N/A	3	3	4	2	2	N/A	0	0	3	2	2
	San Francisco MTA Department of Parking & Traffic	4	3	0	4	3	4	3	4	N/A	3	N/A	2	0	4	4	4
	Metropolitan Transportation Commission	3	3	0	N/A	0	N/A	2	4	4	4	N/A	N/A	4	3	4	4

N/A = Not Applicable

Table 2-3: List of Desirable Elements

Plans and Practices	Corresponding Question
1. Integration of transportation into general emergency plans	2
2. Tailoring of plans to address all types of evacuation and special event scenarios	3
3. Use of modeling tools to estimate capacity needs and availability	4
4. Pre-established evacuation routes and traffic control practices	5
5. Use of transit services and resources, including for special needs evacuees	5
6. Use of ITS components	6
7. Appropriate role of transportation agencies in resource and materials management and coordination, including resource staging	7
8. Use of an incident command system, and integration of transportation into the system	8
9. Coordination between traffic management centers, transit agencies, and emergency operations centers	8
10. Coordination among other agencies	8
11. Procedures for identifying and delegating management activities	8
12. Protocols for communications between agencies	9
13. Protocols for communications with evacuees	10
14. Appropriate testing/training practices	11
15. Incorporation of lessons learned in exercises and evacuations into plans and practices	15
16. Incorporation of lessons learned in exercises and evacuations into future training	15

2.2 Plans and Practices by Region

As mentioned above, the Harvey Ball rating system is somewhat subjective. The strategy during this analysis was to review each interviewee’s response on an item-by-item basis to determine which responses most completely addressed each of the desirable plans and practices items specified above. The final Harvey Ball ratings were a reflection of how the response to a particular desirable item compared to the response that was identified as the most complete for that same desirable item.

The following summaries are based on the information that was provided in the interview responses as well as any documentation received from the interviewees regarding their agency’s emergency evacuation plans. Please see the **Appendix** for the final interview documents, which contain all of the questions asked and each agency’s response to those questions.

Charleston, South Carolina

The South Carolina region plans are rather comprehensive in addressing the elements identified in the list of desirable elements. These plans were developed mainly to provide a plan for evacuating the public in case of a hurricane, but some aspects of the plans can be modified to apply to different types of evacuation scenarios. The element that both plans fail to address is the role of transit agencies within each plan.

South Carolina Department of Transportation (SCDOT)

SCDOT developed the Emergency Traffic Management Plan as part of the general South Carolina Emergency Operations Plan. This plan was developed following the events of Hurricane Floyd in 1999. This is a statewide plan developed mainly for hurricane evacuations; hence, the contraflow section deals particularly with evacuating the public away from the coast. The plan effectively addresses a majority of the desirable elements except for the subject of transit. ITS components including DMS, CCTV cameras, loop counter stations, HAR, and first responders are used in the evacuation plan. All the traffic management centers (TMCs) in South Carolina can be operated from the state traffic management center in Columbia.

South Carolina Department of Emergency Management (SCDEM)

SCDEM developed the Hurricane Response Plan. As indicated by its name, this plan pertains primarily to hurricane evacuations. However, the plan can be applied to other emergency scenarios. This plan includes an evacuation section that deals with contraflow operations. Similar to the Emergency Traffic Management Plan used by SCDOT, the Hurricane Response Plan effectively addresses many of the desirable elements except for transit. All state-of-the-practice ITS devices, including CCTV cameras, electronic message signs, and side-fire radar systems, are used. All this information is transmitted to the TMC and shared with all agencies involved in the evacuation.

Jacksonville, Florida

The emergency evacuation plans developed in the Jacksonville region pertain mainly to hurricane evacuations. Some aspects of the plans could potentially be used for other types of evacuation scenarios as well. None of the plans discussed in these interviews addressed the role of transit agencies in the emergency evacuation process.

City of Jacksonville

The City of Jacksonville operates under an emergency response plan that covers all of Duval County. The plan does not address traffic control, transit, or coordination issues among agencies in the event of an evacuation. Limited by resources, the city does not include ITS devices in its emergency response plan. Transit services in the city are provided by the Jacksonville Transportation Authority, and independent state agency.

Florida Department of Transportation (FDOT)

FDOT has developed two evacuation plans. The Evacuation Route Sign Plan identifies specific evacuation routes throughout the FDOT road network, and signs each route as an evacuation route. This plan is primarily tailored to assist in evacuating people away from the coast in the event of a hurricane. The other plan is the Contraflow Plan for the Florida Highway System. This plan deals specifically with the contraflow set-up procedure. The Contraflow Plan could possibly be used in applications other than hurricane evacuation, but the Evacuation Route Sign Plan is limited in its application. CCTV cameras, VMS, HAR, 511, and a network of count stations are all used in the evacuation plan. The public has access to count station information, which helps individuals determine traffic conditions along various evacuation routes. The count station information also helps departments of transportation (DOTs) identify when and where to dispatch or scale back the appropriate services.

Phoenix, Arizona

Maricopa County Department of Transportation (MCDOT)

MCDOT and the Maricopa County Department of Emergency Management jointly developed an Emergency Evacuation Strategy Plan as a template strategy for local agencies to use in developing their own plans. The second phase of the strategy plan to be completed by the end of 2006 will be more of an emergency evacuation plan tailored specifically for Maricopa County. This second phase addresses and expands upon areas identified in the first phase that are in need of more detailed planning, such as developing an inventory of existing resources, scenario analysis, an all-agency workshop, and a report on outstanding issues. The planning has also included analysis of evacuation routes, respite areas, and evacuation of special needs populations. Some of the ITS components used by the county include DMS, freeway and arterial CCTV cameras, and portable DMS. None of the region's TMCs can currently be operated from locations other than the TMC itself.

Portland, Oregon

The Portland region operates under three emergency response plans, two of them dealing specifically with emergency evacuation. All of the region's plans cover elements such as coordination among agencies in the event of an actual evacuation, use of the incident command system (ICS), and ability to apply the evacuation plans to various scenarios. However, the region does not address the specific roles of transit agencies in the event of an emergency evacuation. Based on the responses in the interviews, the Portland region does not spend very much time or energy executing the plans through testing or training because the likelihood of a massive natural disaster such as an earthquake, a tsunami, or a wildfire (which is what these plans are mainly designed for) is small.

City of Portland

Geographically, the City of Portland Evacuation Plan covers Portland as well as outlying areas including the tri-county area. The evacuation plan is an independent document and is not part of the general emergency plan. The city does not conduct any testing or training with regard to the evacuation plan. The plan does address coordination among agencies and establish protocols for communication with evacuees. The City of Portland owns and operates multiple ITS devices and communication systems, including CCTV cameras (sharing with ODOT), system detection, 511 system, and transit signal priority. These devices will be applied in the event of a mass evacuation.

Oregon Department of Transportation (ODOT)

ODOT's emergency response plan is called the Emergency Highway Regulation Plan. This plan addresses a number of key elements identified in the list of desirable elements. However, the plan does not address the role of transit agencies in the evacuation process nor coordination among the many agencies involved. There is also very little discussion about communication protocols and testing/training procedures, outcomes, or evaluations for the evacuation plan. There is discussion of the testing/training exercises conducted in the Chemical Stockpile Emergency Preparedness Programs (CSEPP) at the Chemical Weapons Facility in east Oregon. ODOT has all of the state-of-the-practice ITS devices and communication systems, such as

CCTV cameras, electronic message signs, HAR, statewide 511 system, ramp meters, and HOV lanes. ODOT also operates a real-time traffic condition Web site for people to obtain pre-trip traffic information. These systems will all be subject to use during evacuation as appropriate.

Oregon Emergency Management (OEM)

OEM created the State Emergency Management Plan, which is not a transportation plan. Based upon this plan, local and county jurisdictions are responsible for coordinating transportation evacuation efforts. OEM is there to provide support to local and county agencies upon request. Each county jurisdiction has its own ITS devices and control systems for evacuations.

Tri-County Metropolitan Transportation District of Oregon (TriMet)

TriMet falls under the City of Portland Evacuation Plan. TriMet's responsibilities during an evacuation are to coordinate with other agencies during the emergency in order to determine where or how its resources and equipment can be utilized in such a situation. Considering the City of Portland does not conduct any testing or training exercises pertaining to the evacuation plan, TriMet is not involved in any testing or training exercises. TriMet vehicles are equipped with ITS devices such as automatic vehicle location (AVL) and signal priority. These devices will function during emergency evacuation as allowed by their condition after a disaster.

San Francisco, California

Based on the interviews, the San Francisco region transportation agencies are well coordinated with regards to the various roles and responsibilities of each agency in the event of an emergency evacuation. As a result of the MTC's planning efforts, the major transportation agencies in the San Francisco region remain up to date with emergency operations training and well informed of any changes made to the regional emergency evacuation plans.

Alameda Contra-Costa Transportation District (AC Transit)

AC Transit does not operate under any specific emergency response or evacuation plan. The agency does have agreements with other local agencies to provide assistance in the event of an emergency. AC Transit is involved in tabletop discussions pertaining to evacuation planning, but does not participate in any testing or training exercises. AC Transit is equipped with transit vehicle traffic signal priority and GPS-based AVL systems. During an evacuation, AC Transit will use these tools as requested by the emergency responders, such as California Highway Patrol (CHP) and local police.

San Francisco Bay Area Rapid Transit (BART)

BART's emergency operations plan is independent of other regional and city emergency response plans. BART will provide resources and equipment on an as-needed basis in the event of a major emergency. Although the BART plan addresses internal coordination issues, it does not specifically address coordination issues with outside agencies in the event of an emergency. Testing/training exercises are conducted, but there is no indication as to the extent of the testing/training exercises or evaluations.

Caltrans

As an agency, Caltrans does not develop an emergency evacuation plan, but evacuation issues are addressed in the state emergency response plan under which Caltrans operates. Caltrans is also responsible for preparing evacuation capacity calculations, maintaining and managing evacuation routes, and maintaining and operating ITS devices in the event of an emergency evacuation. Caltrans does address the role of transit agencies in the state plan. Caltrans does not currently participate in any evacuation plan testing/training exercises. Caltrans currently owns and operates several state-of-the-practice ITS devices, including CCTV cameras, DMS, HAR, HOV lanes, and ramp metering. During evacuation, Caltrans will utilize these devices to increase highway capacity, improve evacuee information, and monitor the evacuation path.

San Francisco Municipal Transportation Agency (MTA) Department of Parking and Traffic

The San Francisco MTA Department of Parking and Traffic operates under the MTA's citywide emergency operations plan as well as the regional Trans Response Plan. Under both plans, the evacuation operations procedures effectively address nearly all of the key elements identified in the list of desirable elements. The Department of Parking and Traffic uses ITS in daily traffic operation. During an emergency, all of the available ITS devices, such as CCTV cameras and DMS, will be applied as needed to monitor and guide evacuation.

Metropolitan Transportation Commission (MTC)

The MTC developed the Trans Response Plan, which is used by 12 transportation agencies in nine counties throughout the Bay area. This plan was developed specifically to coordinate the region's transportation agencies with state and county emergency services in the event of an emergency. The plan focuses on coordination, as well as testing and training exercises and evaluations. As the region's transportation planning agency, MTC does not own or operate any ITS devices. However, during an emergency, MTC will send staff to Caltrans, who has traffic surveillance and control devices, to collect region-wide real-time traffic information. MTC will also call for information from all the transit agencies and ferry services in the region regarding their current situation, needed resources and urgent needs, and resources that they can share. 511 staff are not part of the Caltrans emergency operations center (EOC), but Caltrans and 511 may send staff to assist each other during an emergency.

3. EXPERIENCES AND RECOMMENDATIONS

During the interview and survey, interviewees were asked to discuss their experiences and/or recommendations with respect to evacuation. In addition to direct responses from interviewees, lessons learned and recommendations for best practices for evacuation management were gleaned indirectly from answers to the other questions in the survey.

This chapter presents lessons learned and recommendations for best practices for evacuation management.

3.1 Lessons Learned

- Risk management is a key component of emergency evacuation planning and execution. Individuals need to realize that, in the event of an actual emergency evacuation, they will be required to make very critical decisions on the spot without the advice of supervisors or peers.
- It is difficult for transportation agencies to develop evacuation plans if there is only enough budget to conduct essential traffic operations work.
- Evacuation is not always the best choice; at times, it is not even feasible. Evacuation routing becomes very difficult if the transportation network is damaged during an event. Hence, sufficient planning for shelter-in-place is needed to complement evacuation planning.
- Implementing contraflow in the hopes of increasing roadway capacity is a tough decision to make because it will typically take at least a half day to set up contraflow operations.
- Agencies need to be aware that “letting their guard down” because an event has not occurred for some time can be costly.
- Regularly scheduled meetings among key transportation agencies throughout the region are very helpful for keeping up-to-date changes to various evacuation plans, among other things.
- Frequent emergency evacuation operations drills are very helpful for preparing for “the real thing.”
- Typically, the actual event is worse than anything that can be planned for.
- Some of the transit agencies involved in this project indicated that they are consistently left out of the loop when it comes to changes to the evacuation plan as well as major training. Essentially, these agencies are told that in the event of a disaster, they should wait for further instruction from an unknown source.

3.2 Recommendations for Best Practices

- Be sure to pre-plan.
- Have intelligent, motivated, and dedicated staff that are very familiar with the plan and its goals.
- Emphasize the need to educate the general public on evacuation procedures, especially if

located in an area where evacuations do not occur often.

- Provide back-up power to essential traffic operations devices such as traffic signals and ITS devices in case of power loss following an event.
- When conducting exercises and training for emergency evacuations, no matter what the size, be sure to include every agency identified in the plan so that everyone is aware of what they need to do and where they need to be during an emergency event.
- Regional emergency agency response should not rely solely on transit agencies to evacuate the public. The responsibilities of transit agencies should be to maintain normal transit operation and assist in evacuating those with special needs. The emergency coordination agency should consider available “surge” transportation resources such as school bus fleets and operating companies that would be idle during the emergency period.
- It is very important to develop a nationwide real-time emergency traffic management system that applies surveillance technologies to provide real-time evacuation information to all participating agencies. FHWA should adopt this strategy nationally for all types of disaster response and large-scale event management.

4. APPENDIX

This appendix provides the final interview documents, which contain all of the questions asked and each agency's response to those questions.

DICK JENKINS – STATE TRAFFIC AND SAFETY SYSTEMS ENGINEER

South Carolina Department of Transportation
State Traffic and Safety Systems Engineer

Monday, April 17, 2006

- 1) ***Evacuation Plan Status: What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?***

The South Carolina Department of Transportation (SCDOT) has an Emergency Traffic Management Plan (Emergency Support Function 16), which is part of the general South Carolina Emergency Operations Plan. ESF 16 is led by the Department of Public Safety, which includes the South Carolina Highway Patrol (SCHP), in conjunction with the Department of Transportation. This plan was originally developed following Hurricane Floyd in 1999.

ESF 16 includes a plan for implementing contraflow on five South Carolina highways leading away from the coast. The plan was used during the Hurricane Charley evacuation in 2004, when contraflow was implemented on US 501 out of Myrtle Beach.

The Governor's Office has the authority to issue mandatory/voluntary evacuation orders in coordination with, and input from, the affected counties.

- 2) ***Scope of the Plan: What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?***

The plan is a statewide plan. The contraflow portion was developed with hurricane evacuations in mind, so it deals mainly with evacuating motorists away from the coast into Columbia where they can access other major freeways leading to destinations outside of South Carolina. A whole host of agencies are involved in the evacuation process including; SCDOT, DPS (highway patrol), State Law Enforcement Division, Department of Natural Resources, and the National Guard. The state utilizes a variety of ITS elements during the evacuation process including portable/variable message signs (P/VMS), highway advisory radio (HAR), CCTV cameras, motored assisted patrol, and a number of loop counter stations.

The evacuation transportation management plan is part of the general emergency plan.

- 3) ***Plan Scenarios: What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?***

The plan divides the state's coastal area into three distinct evacuation areas. The plan addresses the evacuation of one, two, or all three of the designated areas. The plan can be modified as necessary.

- 4) ***Capacity Needs and Availability: Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?***

Yes, computer programs have been used to analyze capacity-related issues in the event of an evacuation. Most of the analysis consisted of determining the benefit of contraflow lanes and their effect on clearance times. SCDOT is in the process of upgrading key traffic signals to provide more efficient traffic signal timing and timing patterns.

- 5) ***Traffic Control Practices: What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.***

SCDOT is responsible for signage, ITS, and first-responder duties. When the decision to implement contraflow is made, SCHP is responsible for handling all the traffic control practices designated by the plan. Other traffic control practices designated by the plan for use in an evacuation include pre-established evacuation routes, contraflow, mitigation of work zone impacts, suspension of tolls and fares depending on the type of evacuation.

The plan specifies the messages that are to be placed on the DMS and when to show them. It also specifies locations for PDMS.

- 6) ***Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.***

ITS components used in the evacuation plan include DMS, CCTV cameras, loop counter stations, HAR, and first responders. There aren't any redundant systems, but the network of SCDOT devices is extensive enough to provide sufficient coverage in the event that a portion of the system fails.

All the TMCs in South Carolina can be operated from the state traffic management center in Columbia.

7) *Resources and Materials:* What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?

SCDOT is responsible for providing traffic control equipment such as barrels, cones, barricades, and other related equipment. Coordination of transportation services is done through the state emergency management center.

8) *Evacuation Control, Coordination, and Management:* Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?

ICS is used. Each agency is represented somewhere within the ICS. SCDOT and SCHP officials work side by side out of the TMC or EOC directing their field personnel. The SCDOT remains in direct contact with each TMC or EOC throughout the course of the evacuation.

Each evacuation area has a plan for re-entry, but whether or not the plan is executed all depends on the condition of the area following the event. Re-entry is typically orchestrated by the Emergency Management Division.

The accommodation of special needs evacuees is handled through an emergency support function other than ESF 16. In the case of an advance-notice evacuation, these individuals are evacuated in advance of the general population.

9) *Communications Between Agencies:* What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?

The state EMC uses the HURREVAC software to determine what information to deliver to various jurisdictions. The SCDOT and SCHP both follow an emergency operations check-off list dealing with established procedures for emergency evacuation situations.

10) *Communications with Evacuees:* Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

The public is educated in advance through the media, the South Carolina Web site, and some published material. Evacuation route maps and procedures are provided in newspaper inserts and on the back of state highway maps. The media is encouraged to get involved early, especially during an advance-notice evacuation. There are media personnel in the TMC during evacuations providing up-to-the-minute data regarding evacuation conditions related

to weather and traffic. Any and all information is cleared through the state emergency operation center before being reported to the public.

11) *Testing and Training Procedures: How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?*

There are approximately 20 testing/training exercises conducted each year. There is full contraflow exercise scheduled in June, which will involve a large number of agencies. The drill scenarios that have been used range from hurricane evacuations, to evacuations as a result of weapons of mass destruction.

12) *Evaluation of Exercises: What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?*

It has been identified that the state needs more routes leading away from the coast; this is a problem with an expensive solution. The public needs to recognize the fact that during evacuations, trips will more than likely take longer than they normally would. Efficient coordination between SCDOT and SCHP is particularly useful for a successful evacuation. Lessons learned include the need for clear and concise communication through the ICS and cooperation among all involved.

13) *Evaluation of Evacuations: If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?*

The contraflow implementation along US 501 during the Hurricane Charley evacuation worked very well with no collisions. The contraflow evacuation was conducted at night and was completed in a shorter amount of time than expected.

The evacuation was both managed and monitored effectively. CCTV camera feeds and loop counter station data provided enough information for individuals in the TMC to respond in a timely manner to changes in traffic conditions.

Many aspects of the plan were implemented well during the Hurricane Charley evacuation, but one thing that could have been improved (and has since been remedied) is the system for providing essentials, such as food and water, to first responders.

14) *After-Action Report: What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?*

A meeting is held following an actual evacuation or evacuation drill in which all agencies involved attend.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

Yes.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

The most important thing during the development of an emergency evacuation plan is to make sure that all agencies identified in the evacuation plan be present to provide their input. In South Carolina's case, having the SCDOT and SCHP working essentially in tandem, from the start, has been a real benefit to the entire evacuation process along with a strong desire to get the job done without any regard to "turf."

Having the Governor's Office at the top of the command chain and coordinating everything through the ICS has been very beneficial to South Carolina's emergency evacuation plan.

JOHN BOETTCHER – MANAGER OF NATURAL HAZARD PLANS

South Carolina Emergency Management Division
1100 Fish Hatchery Road West
Columbia SC 29172

Monday, April 17, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

The State of South Carolina's current Hurricane Response Plan, which includes an evacuation plan, was developed in 2000. The Plan has been revised through various exercises and discussions at least twice every year. There were two hurricanes in 2004 and one in 2005 during which the plan was activated. During these three actual events, evacuations were conducted. In South Carolina, the governor has the authority to issue an evacuation order while the Emergency Traffic Management Planning Cell (ESF 16) is the primary planner and coordinator of evacuations.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

In addition to the coastal counties directly subject to hurricanes, the counties along evacuation routes are also covered in the evacuation plan. In all, 26 counties are covered in the Hurricane Response evacuation plan. Three agencies—SCDOT, SCEMD, and SC Highway Patrol—cooperatively developed the plan. During evacuation, many law enforcement agencies, such as SC Highway Patrol, Department of Natural Resource, National Guard, Department of Forestry, and other county and municipal agencies are also involved. SCDOT, SCEMD, and SC Highway Patrol play important roles during evacuation by providing traffic management equipment, sending staff on site to manage traffic, operating ITS devices, and integrating all hurricane response operations. The evacuation plan was designed for hurricane response, but can be easily tailored to address evacuation triggered by other emergencies such as HazMat or earthquake.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

As stated in question 2, the plan was primarily prepared for hurricane events, but can be adapted to no-notice or advance-notice emergencies such as HazMat, WMD, or earthquake. The ESF 16 team is in charge of tailoring the plan to suit other types of disasters.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system

during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

SCEMD uses a traffic demand forecasting spreadsheet model. The model collects the demographic information from all evacuation covered counties, calculates the people to be evacuated, and converts the people to vehicle volume. The volume is then assigned to each evacuation route and evacuation zone to calculate the time needed for the evacuation. Road reversal and contraflow situations can also be calculated by model. In addition to the traffic demand forecasting model used by the SCEMD, SCDOT also has a traffic flow model which specifically analyzes the loading and unloading time of road reversal and contraflow situation, and identifies potential bottlenecks. Route reversal refers setting both highway directions to one direction while contraflow means changing three of the four lanes to the primary evacuation direction while leaving one lane in the original direction. SCDOT also has a plan in place for signal changes, such as setting signals ever-green or flashing yellow during evacuation.

- 5) ***Traffic Control Practices: What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.***

ESF 16 is the primary traffic management function during evacuation. ITS technologies, such as electronic message signs and HAR, are applied extensively during evacuation traffic management. ESF 16 identified 600 key intersections as traffic control points. During evacuation, traffic management staff will be deployed to these points during the entire evacuation. Traffic signal timing plans can be modified during an evacuation. Roadways are marked by cones and barriers to indicate it as an evacuation route. Evacuation routes are preplanned and re-evaluated every year. The public is well informed regarding these evacuation routes.

The evacuation is phased for barrier islands. There is no regulation regarding type of vehicles in evacuation. Though not strictly regulated, suspending tolls is the common practice.

- 6) ***Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.***

All state-of-practice ITS devices are used. CCTV cameras provide real-time monitoring of evacuation condition. Evacuation information is promptly provided to the public through

electronic message signs. Vehicle speed is detected by a side-fire radar system. Road reversal and contraflow are both assisted by ITS operations. All this information is transmitted to the TMC and goes through ESF 16 to share with all agencies involved in the evacuation.

Currently, SC does not have a 511 system.

7) *Resources and Materials: What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?*

Resource coordination is conducted with all agencies and is specified in the plan. SCDOT has the largest inventory of traffic equipment. Each year, SCDOT examines the plan and reevaluates the level of resources that will be required during evacuation.

8) *Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?*

An ICS is used. It is primarily controlled by SC Highway Patrol. The TMC follows the ICS. Operations are coordinated through pre-hurricane season meetings, telephone, radio, staff physical presence and any other available means. Re-entry plans are made by each county. People with special needs are evacuated by the agency in charge of their normal management, but SCEMD will possibly provide assistance as requested.

9) *Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?*

All of the agencies involved in evacuation are organized into function categories. The SCEMD has procedures in place to notify the public.

10) *Communications with Evacuees: Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?*

Information for evacuees is disseminated through public Web sites, public radio, news releases, and other traditional media. SCDOT issues evacuation guidance through the field ITS devices. Information is coordinated through Public Affairs in the SCEMD before sending to the public.

11) *Testing and Training Procedures: How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?*

All agencies involved in the evacuation attend tabletop discussions every year to identify things that need to be improved. Annually, SC Highway Patrol simulates the evacuation situation and road reversal.

- 12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?**

SCEMD indicated that the response time for SC SCDOT and Highway Patrol personnel deployment needs improvement.

- 13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?**

The evacuation plan has been implemented for an actual event and has been very successful. The plan is proactively managed so that all types of incidents during evacuation can be addressed. Potential challenges result when a storm arrives earlier than forecasted and the evacuation needs to be conducted immediately.

ITS, the evacuation path design, and ESF 16 coordination are the most critical factors to the success of evacuation

- 14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?**

Each agency is required to perform an internal review of the evacuation. Shortly after the evacuation, a formal review compiles lessons learned from all of the agencies.

- 15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?**

Yes.

- 16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?**

SCEMD indicated that it is very important to develop a Nationwide Real Time Emergency Traffic Management System, which utilizes surveillance technologies to provide real-time evacuation information to all the participating agencies. SCEMD suggests FHWA adopt this strategy nationally for all kinds of disaster response and other large-scale event management.

RICHARD BALL – INTERIM CHIEF

City of Jacksonville, Traffic Engineering Division
1007 Superior St.
Jacksonville, FL 32254

Wednesday, April 12, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

The City of Jacksonville Emergency Operation Center currently has an emergency response plan addressing various natural and manmade emergencies with specific focus on hurricane response. The emergency response plan has been in place for 10 years and has been used in an actual hurricane evacuation. That hurricane did not cause major damage. The Mayor's Office of Jacksonville has the authority to issue evacuation orders.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

The emergency response plan covers all of Duval-County including four major communities. The evacuation plan is addressed generally in the emergency response plan.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

The emergency response plan is meant to address hurricanes primarily. Meanwhile, the plan also prepares for other types of emergencies, such as chemical leaks, fire, and terrorism attacks.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

The City does consider capacity enhancement methods such as freeway contraflow lanes and traffic control. The evacuation capacity is estimated through traditional traffic engineering rules and manuals.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit),

optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

The role played by the Traffic Engineering Division is primarily assisting the Emergency Operations Center in developing the emergency response plan. During an emergency, the Traffic Engineering Division will send staff to control major intersections.

- 6) ***Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.***

Limited by resources, the City does not include ITS devices in its emergency response plan.

- 7) ***Resources and Materials: What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?***

The Emergency Operations Center will contact all of the affected agencies regarding needed, as well as available, resources.

- 8) ***Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?***

The Traffic Engineering Division does not utilize the ICS system. The Emergency Operations Center controls the emergency response. Agencies resort to traditional communication media, such as phone and fax, to coordinate with each other during emergencies. High-speed Internet is also available. Evacuation of people with special needs is taken care of by other agencies in the city, such as the Red Cross.

- 9) ***Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?***

As stated above, traditional communication media are used to connect agencies. There is no established procedure for information dissemination.

- 10) ***Communications with Evacuees: Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler***

information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

Communication with evacuees is conducted through public radio or TV from the Mayor's Office. The Traffic Engineering Division will contribute traffic information to the city, but does not disseminate any information directly to the public.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

The Emergency Operations Center conducts training regularly. There is no consistent plan as to which agencies will be involved in the training exercises.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

The emergency response plan has only been used once.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

As stated before, the plan was used only once during a forecasted hurricane, which did not cause much damage.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Still in development.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

Lessons and inefficiencies will be improved or corrected as soon as they are identified.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

The City of Jacksonville is not as vulnerable to storm disasters as many other coastal cities south of Jacksonville. More lessons and experiences can be obtained from cities that have dealt with more such actual emergencies.

JIM SCOTT – DISTRICT TRAFFIC OPERATIONS ENGINEER

Florida Department of Transportation
District II/ FDOT

Wednesday, April 12, 2006

1) *Evacuation Plan Status:* What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

The Florida Department of Transportation (FDOT) has two evacuation plans.

1. *The Contraflow Plan for the Florida Highway System* – This is the first version of a statewide strategic plan that was developed in June 2005.
2. *Evacuation Route Signs* – Emergency management officials requested the Department to erect and maintain evacuation route signs on those portions of the State Highway System that comprise official evacuation routes to educate motorists as to the available routes and to ensure the signs are in place well in advance of the actual need to guide motorists away from high risk areas.¹ This plan was developed about 15 years ago and last revised in August 2001.

There may also be a formal emergency evacuation communication plan at the state level. It is possible that the governor's office, along with local authorities, has the authority to issue evacuation orders. Personnel at the state EOC would likely advise the governor's office before they make the final decision. The decision to implement the contraflow plan rests solely with the governor's office due to the statewide impact of such a decision.

2) *Scope of the Plan:* What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

Both plans are implemented throughout the state of Florida. The contraflow plan was developed by FDOT in conjunction with the Florida Highway Patrol (FHP). The understanding is that the FHP would be in charge of implementing the plan while FDOT would provide traffic control and ITS elements. It isn't clear whether or not the contraflow plan is separate from or a part of the general emergency plan.

The evacuation route signing plan is considered part of the Traffic Management Element portion of the statewide regional evacuation plan.

3) *Plan Scenarios:* What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

¹ Florida Traffic Engineering Manual, Section 2.14 – Signing for Evacuation Routes

The contraflow plan and the evacuation route signing plan were both developed to aid hurricane evacuations. The contraflow plan inherently would require some set-up time, so the plan may not immediately be fully operational in a no-notice emergency evacuation situation. The evacuation signing plan utilizes permanent signs located along different roads and highways throughout the state. The plan could potentially be applied to no-notice emergency evacuations depending on the nature and geographic location of the trigger event.

The state EOC likely has a plan that addresses accidental and/or terrorist events.

- 4) Capacity Needs and Availability: Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contra flow lanes, signal pattern changes)?**

Appendix B of *Contraflow Plan for the Florida Interstate Highway System* documents the analysis that has been performed to estimate commute times and feasibility in the event of contraflow implementation.

The scope of work [for *Contraflow Plan for the Florida Interstate Highway System*] did not include modeling to evaluate changes in District population growth patterns and evacuation needs. During the course of the meetings held, it became clear that a fundamental change in evacuation philosophy has occurred. This new philosophy, known as “shelter in place,” would likely cause a significant reduction in the number of mandatory evacuees.²

- 5) Traffic Control Practices: What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contra flow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.**

FDOT is responsible for traffic control in the contraflow plan and erecting evacuation signs in the evacuation signing plan. FHP is responsible for traffic management and control in the contraflow plan. Preexisting hurricane evacuation routes are signed throughout the state transportation network. The contraflow plan designates the closure of exit/entrance ramps, use of temporary barricades, and whatever else may be required to implement the use of contraflow lanes. The state also utilizes their service patrol. Service patrol is a fleet of drivers and heavy-duty vehicles essentially responsible for keeping traffic moving during an evacuation. They carry fuel, change tires, make minor repairs, and have the ability to remove disabled vehicles from the roadway.

- 6) Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS**

² Contraflow Plan for the Florida Interstate Highway System, Section 1 – Introduction

components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.

CCTV cameras, VMS, HAR, and 511 are all used in the evacuation plan. The plan also utilizes the network of count stations located all over the state. The public has access to count station information, helping individuals determine traffic conditions along various evacuation routes. The count station information also helps DOTs identify when and where to dispatch or scale back the appropriate services.

The state Emergency Operations Center informs each TMC of what messages to put on their VMS so that there is no conflicting information among TMCs. The Jacksonville regional TMC can be operated from the Florida Highway Patrol facility. There are plans for regional-to-regional communication among the various TMCs.

7) *Resources and Materials:* What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?

The FDOT is responsible for identifying and providing needed resources and materials. The traffic operations department of FDOT does not handle coordination of transportation services.

8) *Evacuation Control, Coordination, and Management:* Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?

An ICS is used starting with the state Emergency Operations Center at the top, followed by FDOT, then followed by the various district EOCs. Considering the fact that any hurricane that hits the state of Florida affects the entire state, all coordination starts at the state level. Any reentry plan would likely be coordinated starting at the state EOC level as well.

9) *Communications Between Agencies:* What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?

In the event of a statewide emergency, each local emergency operations organization would be represented at the state EOC level. The state EOC would communicate with local EOCs as to how to proceed with the evacuation. FDOT would also take direction from state EOC officials, and guide local DOTs through the evacuation process.

10) *Communications with Evacuees:* Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler

information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

The public is educated in advance about evacuation procedures through the media, state Web site, and evacuation route signage. There are static signs along evacuation routes advising motorists to tune into specific radio stations for evacuation information. The state EOC provides the information that is broadcast through National Public Radio stations all over the state. There is an agreement among local TV stations and newspapers allowing them to view CCTV camera feeds in order to report road conditions to the public. Information is coordinated through the state EOC before being delivered to the media.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

Not sure exactly how often the contraflow plan is tested, but it is at least once per year.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

Deferred to Jim Hannigan, FDOT District Maintenance Engineer

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

The contraflow plan has never been used in an actual evacuation in the state of Florida. The contraflow conference hosted by the Florida Department of Transportation in February 2006 may provide answers from individuals who have implemented their contraflow plans in an actual emergency evacuation.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Deferred to Jim Hannigan

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

Deferred to Jim Hannigan

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

Try to be as prepared as possible because you can never be too prepared. These situations typically turn out to be worse than what you've planned for, so be ready.

BILL HAHN – PROJECT MANAGER

Maricopa County Department of Transportation

Monday, April 03, 2006

- 1) ***Evacuation Plan Status: What is the status of your agency’s existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?***

The Maricopa County Department of Transportation works closely with the Maricopa County Department of Emergency Management. Phase I of the Maricopa County Emergency Evacuation Strategy Plan was completed in July 2004 (Phase II is currently being developed). Phase I was developed as a template strategy for local agencies to use in developing their own plans.

The Regional Emergency Action Coordinating Team (REACT) is an incident management group created by MCDOT in 2001. REACT is dispatched frequently to take care of traffic control related issues wherever an incident occurs along any of the county’s major roadways.

At the county level, Dave Smith (County Manager) has the authority to issue evacuation orders. It is presumed that Warren Leek (Director of Maricopa County Department of Emergency Management) would send the order up the chain to Dave Smith. If the evacuation involves multiple counties, the order will come from someone at the State level, most likely the governor.

- 2) ***Scope of the Plan: What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?***

Phase I is a general evacuation strategy plan that deals specifically with evacuation scenarios within Maricopa County. Phase II (currently in development) will consider the evacuation of all of Maricopa County, as well as the ingress scenario involving evacuations from other cities into Maricopa County, Phoenix, in particular.

Plans for evacuation transportation management are part of the overall general emergency plan, but they make up a very large portion of the plan.

- 3) ***Plan Scenarios: What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?***

See Question 2 for Phase I scenarios. Phase II can be applied to all of the above and more (e.g. ingress scenario). There will be provisions for naturally occurring, accidental, and/or terrorist events in the Phase II document.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

Phase I only dealt with two scenarios in two selected areas of the Phoenix Valley, so the results are not necessarily reflective of a full evacuation scenario. Maricopa County depends on the ADOT White Paper as a basis for its capacity demand numbers in the event of a mass evacuation. Bill did indicate, however, that the high-level calculations used in the White Paper still need work. These calculations do not take into consideration certain key issues such as road closures as a result of some catastrophic event.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

Many of these issues are still being worked out in the Phase II document. Currently, a majority of the Phoenix Valley's TMCs are linked back to the ADOT TMC. In the event of a multi-jurisdictional or statewide emergency evacuation, there is an agreement in place among all valley cities to relinquish control to ADOT.

- 6) ***Role of ITS:*** What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.

Some of the ITS components used by the county include DMS, freeway and arterial CCTV cameras, portable DMS, etc. Bill believes that the trucking industry could play a critical role in the event of an emergency mass evacuation. Trucks could be used as traffic barriers, transport vehicles, and communications posts.

None of the valley's TMCs can currently be operated from locations other than the TMC itself. Bill does anticipate that, in the future, TMCs will be operated from Emergency Operation Centers as well.

- 7) ***Resources and Materials:*** What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?

These issues are being addressed in the Phase II document. The county has identified many resource needs such as emergency centers, temporary hospitals, and shelters along the evacuation routes. The special needs populations (nursing homes, incarcerated individuals, etc.) will need to be taken into consideration as well. This type of coordination will need to take place among various tiers of government.

- 8) ***Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?***

An ICS is used.

Various cities throughout the valley are currently in the process of workshopping re-entry plans for the “regular” and special needs evacuees.

- 9) ***Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?***

Some of the current communications protocols are outdated and in the process of being updated. As far as disseminating information quickly and accurately to personnel, there are currently no established procedures, but this is something that should be addressed in the Phase II document.

- 10) ***Communications with Evacuees: Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?***

The public is not educated in advance. The general public may not be concerned because they have never experienced a mass evacuation in the valley before.

Transportation agencies do have a specific role in media coordination before and during an evacuation because a lot of information will be coming from the TMCs.

Bill currently has no answer to the question regarding coordination and/or centralization of information being delivered to the media.

- 11) ***Testing and Training Procedures: How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?***

Emergency personnel (e.g., EMT, fire service, police service) are frequently involved in testing/training exercises. The problem is trying to figure out who should be included in the

training pool. Should TMC officials and personnel, as well as EOC officials and personnel, be included in the same training exercises as other emergency personnel?

The evacuation-related drills that are currently conducted on a frequent basis involve the Palo Verde nuclear plant, various dam breaks, and forest fire drills.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

As mentioned in Question 11, no mass evacuation drills have been conducted. The REACT team has received great feedback for their work on the valley freeways as well as the Phoenix International Raceway (PIR). The REACT team has helped reduce the time it takes to exit PIR from 12 hours to 2.5 hours. However, the few number of REACT vehicles would be overwhelmed in event of a mass evacuation.

Good pre-planning, and having intelligent, motivated, and dedicated staff who are very familiar with the plan and its goals are a few key elements of a successful plan. If the staff is prepared to react to issues before they become major problems, things are likely to go much smoother.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

The Maricopa County Emergency Evacuation Strategy Plan has never actually been put to use in the valley, but a smaller evacuation plan in Palo Verde was a few years ago.

The Palo Verde evacuation (as a result of having to shut down one of the reactors) was handled poorly. There was a lack of communication among plant staff/management, emergency responders, and evacuees.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Still in development.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

Mainly, the lessons learned from real evacuations in other cities have resulted in revisions to the emergency evacuation strategy plan.

Bill believes that lessons learned have likely resulted in changes in personnel training, but he's not certain.

16) Conclusions: What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

Bill believes that funding is a major issue. The money is there to be spent, but the people in charge of spending it are reluctant. These individuals are afraid of being ridiculed for making bad spending decisions. Bill feels that key individuals in the planning, as well as execution, phases of the emergency evacuation plan need to be trained in risk management. These people need to be able to make critical decisions in a short period of time with little to no guidance from superiors. These individuals need to be assured that they will not be held personally responsible for any decisions made (within the realm of common sense) that result in injury or death to the general public.

Public planning individuals need to think more outside the box.

WILLIE ROTICH – ITS ENGINEER

City of Portland Office of Transportation

Friday, April 21, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

The City of Portland does have a draft Evacuation Plan, which was established in 2003 and is currently being updated. The Plan has not been used in any actual emergency situations. In the City of Portland, the Emergency Advisory Group, which is composed of chief staff from Police, Fire, and other emergency response agencies, has the authority to issue an evacuation order.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

The draft Evacuation Plan covers the entire City of Portland. Its neighboring counties, including the tri-county area in Oregon and one county in the State of Washington, are also covered by the Plan with respect to inter-agency coordination issues. The draft Evacuation Plan is an independent document.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

The Plan was prepared primarily for earthquakes. Other emergencies, such as HazMat, flood and other no-notice or advance-notice disasters, are also addressed in the Plan.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contra flow lanes, signal pattern changes)?

The City does not have special capacity estimation tools for arterial streets. The Oregon DOT can estimate freeway capacity during an evacuation, and they also have a contra flow plan. The City has a plan to optimize traffic signals during evacuation.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contra flow, evacuation phasing, regulation of type or number of vehicles (including transit),

optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

In addition to managing traffic signals, the City of Portland will also send staff to critical intersections to manage traffic. All the operations are controlled from the TMC located at 1120 SW 5th. Ave, Portland, OR, 93204. The TMC also has data communication with other transportation agencies in the neighboring counties.

- 6) ***Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.***

The City of Portland owns and operates multiple ITS devices and communication systems, including CCTV cameras (sharing with ODOT), system detection, 511 system, and transit signal priority. These devices will be applied in evacuation. The specific plan for their application will be determined from the TMC.

- 7) ***Resources and Materials: What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?***

ODOT is the primary agency that will coordinate resources and materials in accordance with ICS guidelines.

- 8) ***Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?***

ICS is used. The Police and 911 center will control the Incident Command System (ICS) and coordinate with traffic management agencies. The draft Evacuation Plan does cover re-entry issues and evacuation of people with special needs.

- 9) ***Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?***

Telephone will be used to communicate with other agencies during evacuation. There are established procedures/checklists as to the specific information dissemination.

- 10) *Communications with Evacuees:* Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?**

The City will communicate with the evacuees through public radio. All information will be coordinated with related agencies, particularly those in the tri-county area, before dissemination.

- 11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?**

No testing or training has been conducted for the evacuation plan.

- 12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?**

No evacuation training has been conducted.

- 13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?**

Actual evacuation has never happened.

- 14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?**

Still in development.

- 15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?**

Not applicable.

- 16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?**

The City of Portland is not as advanced with respect to emergency or evacuation planning as other cities that are more vulnerable to natural disasters; therefore, the city does not have much experience or lessons to share.

ROSE GENTRY – CHAIR OFFICE OF MAINTENANCE

Oregon Department of Transportation (ODOT)

Friday, April 28, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

ODOT established Emergency Highway Regulation Plan in 1998. The Plan was last updated in 2004. It has not been used in an actual large-scale evacuation. In Oregon, the governor and local jurisdictions, including counties and cities have the authority to issue an evacuation order.

There is another much more detailed and extensive emergency response plan, Chemical Stockpile Emergency Preparedness Programs (CSEPP), prepared for 10-mile radius area in the Chemical Weapon facility in east Oregon.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

The Plan covers the entire State of Oregon. Evacuation issues are covered in the Plan.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

In the metropolitan Portland area, the Plan is primarily prepared for earthquake, wild fire, and flood. Other no-notice and advance-notice disasters such as terrorism are also covered in the Plan.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

The evacuation capacity is estimated by an ODOT computer model, which considers many factors such as emergency type, regional population, time needed for evacuation. The actual additional evacuation capacity is also a variable depending on these factors.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit),

optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

The primary responsibility of ODOT during any emergency including those needing evacuation is to keep the highways clear for priority use and to assist local governments by providing requested transportation resources. The Plan basically covers all of the traffic control practices including pre-established evacuation routes, contraflow (under development), evacuation phasing, regulation of type or number of vehicles, optimization of signal patterns and lane use, and mitigation of work zone impacts.

- 6) ***Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.***

ODOT has all the state-of-practice ITS devices and communication systems, such as CCTV cameras, electronic message signs, HAR, statewide 511 system, ramp meter, and HOV. ODOT also operate a real-time traffic condition Web site “Trip Check” for people to obtain pre-trip traffic information. These systems will all be subject to use during evacuation as appropriate. The Plan specifically covers how the surveillance and the highway gate/ramps will be controlled during evacuation. ODOT has agreement with local police that, when necessary, the police may operate the traffic signals from the TMC.

- 7) ***Resources and Materials: What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?***

Oregon Emergency Management is the primary coordinator of resources and material during emergency situation. ODOT will provide transportation-related resources, including staff in-field support when requested by OEM or any other agencies.

- 8) ***Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?***

An ICS is used. Various agencies are involved with the operation of ICS. The detailed ICS operation procedure was developed to be consistent with the national standard ESF plan. The re-entry issue is not covered yet. ODOT is not in charge of evacuating people with special needs but may assist by providing transportation-related resource when requested by other agencies.

9) *Communications Between Agencies:* What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?

ODOT use multiple media to communicate with other agencies during emergency situations. These media include phone, fax, radio, satellite phone, and dedicated range (800MHz) wireless communication for first responders. There is no current procedure established as to communications.

10) *Communications with Evacuees:* Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

ODOT does not communicate or distribute information to evacuees directly but will provide en-route traffic information through DMS. ODOT staff on site at the Emergency Operations Center will coordinate the information before it is released.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

Extensive testing and training are conducted annually for the CSEPP Chemical Weapon facility in east Oregon. Evacuation training has not been conducted for the Portland area.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

Similarly, careful review and report of the evacuation with established performance measures will be conducted for CSEPP.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

Not applicable.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Not applicable.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

The Plan indicates that any inefficiency identified during actual evacuation or exercise will be quickly addressed.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

ODOT indicates that effective coordination among agencies during evacuation is the key to a successful emergency response plan.

DAVID CASSEL – PLAN AND TRAINING SECTION DIRECTOR

Oregon Emergency Management (OEM)

Monday, April 24, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

The State of Oregon has a State Emergency Management Plan promulgated in 2000, which has been updated annually. In Oregon, local jurisdictions and counties make decisions about evacuations during any natural or manmade disasters. All evacuation plans are local. The State provides support on request.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

Each jurisdiction's evacuation plan is specific to its own jurisdictional area. Plans also address some coordination issues with neighboring counties.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

The State of Oregon's most frequent hazards are wildland fire, flood, and severe weather. Oregon Emergency Management is also prepared for other events in the all-hazard environment.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

There are no models or computer simulations used at the state at Oregon Emergency Management. Local jurisdictions estimate their evacuation capacity. Oregon DOT may have some freeway capacity estimation tools, and they may have developed contraflow studies, etc.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

ODOT is working in this area. Again, each county jurisdiction has its own traffic strategies for evacuations. OEM is not involved directly in traffic control except to support requests by local government. In that case, OEM would coordinate providing resources needed.

- 6) ***Role of ITS:*** What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.

Again, local jurisdictions and ODOT may have these devices and control systems.

- 7) ***Resources and Materials:*** What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?

This must be asked of ODOT.

- 8) ***Evacuation Control, Coordination, and Management:*** Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?

ICS is used in the State ECC. These activities are conducted in accordance with the State Emergency Operations Plan. There is not enough space here to detail answers on how the emergency management system operates. Again, counties conduct the details of these operations.

- 9) ***Communications Between Agencies:*** What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?

In addition to face-to-face operations during ECC activations, OEM communicates with other agencies by phone, email, computer software, and various radio systems. Many agencies have their own operations centers.

- 10) ***Communications with Evacuees:*** Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

It is the local jurisdictions that are responsible for evacuations. Information content is disseminated by them via the Emergency Alert System, message boards, the media, and other systems which vary with jurisdictions resources, such as sirens, reverse 911, or verbally.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

Each county conducts its own exercise or training. There are also quarterly meetings among key emergency response agencies to discuss improvements or updates of the emergency response plans and procedures after events. Frequency varies with jurisdictions based on training schedules.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

OEM found that the coordination between neighboring jurisdictions receiving evacuees needs to be improved.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

Large-scale evacuations are rare. Several small-scale evacuations annually, usually due to wild land fires, are all successful.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

After-action reports are prepared for every event and the results used to improve plans and procedures.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

The lessons identified during evacuation and after-action evaluation will be incorporated in future plans and procedures as appropriate.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

One lesson is that receiving jurisdictions need to be included early in evacuation planning.

DAN CAUFIELD – DIRECTOR, OPERATIONS PLANNING AND DEVELOPMENT

Tri-County Metropolitan Transportation District of Oregon (TriMet)
4012 SE 17th Avenue MS-HOP 1
Portland, Oregon 97202

Friday, April 14, 2006

- 1) ***Evacuation Plan Status: What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?***

The City of Portland's Office of Emergency Management (POEM) is the agency responsible for completing the City's Comprehensive Emergency Management Plan, which includes the evacuation plan. The latest version of the plan is under development. Existing plans are outdated and do not reflect a regionally integrated plan.

- 2) ***Scope of the Plan: What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?***

TriMet provides transit service in three counties: Clackamas, Washington, and Multnomah. TriMet's primary role during an evacuation emergency in the Portland region is to keep the fixed-route public transit system running during the emergency, for the numerous family, economic, and access to services needs of the people in the region.

- 3) ***Plan Scenarios: What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?***

The primary disaster the City of Portland is potentially exposed to is earthquake. The evacuation plan will prepare for other emergencies such as floods and wildfires in addition to earthquakes.

- 4) ***Capacity Needs and Availability: Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?***

The capacity of TriMet normal operations cannot be applied or easily converted to that in emergency evacuation. Under conditions of being critically short of employees due to difficulties getting to work, and with potentially damaged TriMet facilities and public roadways, TriMet will likely be severely challenged in continuing its own operations.

- 5) *Traffic Control Practices:* What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.**

TriMet will coordinate with other agencies, including traffic management agencies, during evacuation. The specific measures the traffic agencies will take during emergency is still under development.

An Emergency Transportation Routes (ETR) intergovernmental agreement was executed in 2005 among Oregon Department of Transportation; Washington Department of Transportation; Clark County Washington; Columbia, Multnomah, Clackamas, and Washington counties; the City of Portland; the Port of Portland; and Metro (the Portland region's metropolitan service district). The agreement includes an adopted operations plan by the road-owning agencies for rapid damage assessments of ETRs and reporting their status to respective county/city emergency operations centers (EOCs), which will share this information with each other. TriMet has specific responsibilities under the plan to report the status of its light rail crossings over/under ETRs to respective county/city EOCs and road authorities. TriMet is a major beneficiary of the plan, by being able to access road/bridge status information from county/city EOCs, informing TriMet of when to resume bus transit route service.

- 6) *Role of ITS:* What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.**

TriMet vehicles are equipped with ITS devices such as automatic vehicle location (AVL) and signal priority. These devices are used on a daily basis in normal transit operations. These devices will provide similar functions during emergency evacuation as allowed by their condition after disaster.

- 7) *Resources and Materials:* What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?**

See response to question 5, re: ETRs.

Among the considerations for the Portland region's updated evacuation plans will be special needs transportation (for persons with disabilities, unable to use regular fixed-route transit service). TriMet and associated partners who provide dedicated special needs transportation

(e.g., TriMet LIFT service) may be able to cancel some or all such discretionary service during the period of emergency, and re-direct special needs service to evacuees who are persons with disabilities. (The Oregon State Fire Code requires, pursuant to federal regulations, that each licensed care facility have an emergency preparedness plan, including plans for evacuation, if the facility becomes uninhabitable due to quake, fire, etc. However, following a catastrophe such as earthquake, there may be a “surge” of needs to evacuate care facilities whose structures are damaged. The region’s evacuation plan must consider how this need will be resourced.)

- 8) *Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?***

An ICS is used. The detailed operations procedure is consistent with the national incident management system (NIMS) developed by the Department of Homeland Security in 2004.

- 9) *Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?***

TriMet primarily communicates with other agencies through telephone. TriMet has set all the emergency contact numbers as speed-dial to accelerate disaster response.

- 10) *Communications with Evacuees: Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?***

POEM will communicate with evacuees through general public media such as radio. TriMet will not provide communication to evacuees by itself.

- 11) *Testing and Training Procedures: How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?***

TriMet attends the regional monthly meeting regarding emergency response. Actual evacuation training has not been conducted.

- 12) *Evaluation of Exercises: What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?***

TriMet indicated that being a transit agency, having full-partnership spirit with the primary emergency coordinator, is very important to a successful evacuation plan development and

implementation. Meanwhile, for cities that do not have significant natural disaster risks, the awareness and preparedness for emergency tend to be lower than those more vulnerable to these risks.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

Actual evacuation has never happened.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Still in development.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

Inefficiencies identified during monthly meetings will be adjusted as resources allow.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

The regional emergency response agency should not rely solely on transit agencies to evacuate the public. The responsibilities of transit agencies should be to maintain normal transit operation and assist in evacuating those with special needs. The emergency coordination agency should consider available “surge” transportation resources such as school bus fleets and operating companies that otherwise would be idle during the emergency period.

JOHN CAVE – MANAGER, PROTECTIVE SERVICES

Alameda-Contra Costa Transit District (AC Transit)

Thursday, April 27, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

AC Transit does not have an existing evacuation plan in response to regional disasters. The agency's primary role is to assist other emergency response agencies by providing transit vehicles when requested. So far, AC Transit has not participated in an actual evacuation.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

AC Transit serves the Counties of Alameda and Contra Costa. In addition to providing evacuation assistance to these two counties, AC Transit will also help the City of San Francisco when needed.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

The most likely event in the Bay Area that would result in a mass evacuation would be a major earthquake. AC Transit is prepared to assist in the event of a major earthquake or other likely events such as fire or severe weather.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contra-flow lanes, signal pattern changes)?

The capacity that AC Transit is able to provide depends on the type of disaster, the time of day, and other factors. AC Transit does not currently utilize any models to estimate capacity needs.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contra-flow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

AC Transit will not control traffic in the event of an evacuation.

- 6) ***Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.***

AC Transit is equipped with transit vehicle traffic signal priority and GPS-based automated vehicle location systems. During an evacuation, AC Transit will utilize these tools as requested by the emergency responders, such as CHP and local police.

- 7) ***Resources and Materials: What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?***

MTC is the primary agency for coordinating transit resources.

- 8) ***Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?***

An ICS is used. AC Transit does not participate in the operation of the EOC but will send staff to the EOC during an emergency. AC Transit will assist evacuating people with special needs when requested by the EOC to do so.

- 9) ***Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?***

AC Transit communicates with other emergency agencies through telephone, fax, and other common communication media.

- 10) ***Communications with Evacuees: Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?***

AC Transit does not communicate with or disseminate information to evacuees. The evacuees on AC Transit buses resort to other common media, such as radio, for information update.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

AC Transit regularly participates in tabletop discussions regarding evacuation planning. To date, no testing or training has been conducted.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

Not applicable.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

Not applicable.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

AC Transit will prepare an after-action evaluation report after any actual evacuation activities.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

In any future evacuations, AC Transit plans to incorporate the lessons learned.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

Since AC Transit does not play a critical role in the Bay Area's evacuation planning process and has never participated in any evacuation exercise, it does not have much experience to share with other cities.

LEN HARDY – SAN FRANCISCO BAY AREA RAPID TRANSIT

Chief Safety Officer
San Francisco Bay Area Rapid Transit District (BART)
P.O. Box 12688 (LKS-18)
Oakland, CA 94604-2688

Wednesday, April 5, 2006

- 1) ***Evacuation Plan Status: What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?***

The existing evacuation plan was developed over 10 years ago. The plan is being updated and is currently in the review process. The final document is expected to be released in the near future.

The plan has been used in actual emergency situations. It is most frequently used in situations involving fires.

For minor incidents, the Operations Control Center (OCC) becomes the command post responsible for issuing evacuation orders, if necessary. In the event of a major incident (e.g., massive earthquake), the Emergency Operations Center (EOC) will be in charge.

- 2) ***Scope of the Plan: What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?***

Geographic coverage is not one of the plan's main focuses. The plan focuses on keeping passengers safe and securing BART facilities anywhere that the rail cars travel.

- 3) ***Plan Scenarios: What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?***

The plans are meant to address scenarios including bomb threats, fire, derailments, dangerously high winds, earthquakes, anything that could adversely effect rail operations.

- 4) ***Capacity Needs and Availability: Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?***

No additional capacity is expected to result from emergency measures because the rail system is designed according to NFPA (National Fire Protection Association) 130 standards.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

This question may not pertain to rail transit. The evacuation plan has a procedure in place to send out a rescue train whenever needed.

- 6) ***Role of ITS:*** What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.

Not applicable.

- 7) ***Resources and Materials:*** What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?

In the event of a major disaster, BART will activate its EOC. There are currently existing agreements with other agencies that BART has agreed to assist in the event of a major disaster.

- 8) ***Evacuation Control, Coordination, and Management:*** Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?

An incident command system is used in the BART plan. BART follows the standardized emergency management system. In the event of a disaster, the EOC becomes BART's command center. Once BART has assessed the situation and the condition of their facilities, they become available to assist others if needed.

- 9) ***Communications Between Agencies:*** What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?

In the event of an emergency, BART activates its EOC. Once the EOC is activated, BART notifies other transit agencies and the Metropolitan Transportation Commission (MTC).

10) *Communications with Evacuees:* Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

The public is educated in advance about evacuation procedures. There are evacuation placards in each rail car, and safety brochures are available to all users. Information is centralized at either the EOC or Metropolitan Transportation Commission before being delivered to the media.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

On average, there are at least three significant testing/training exercises conducted each year. These exercises involve the fire department, police department, emergency response personnel, BART personnel, and BART passengers.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

A debriefing and evaluation is conducted after each drill. Often times, communication issues (who was informed, who wasn't informed) are identified as needing improvement.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

Recently, the evacuation plan was put to use in a "real life" situation. There was a fire in one of BART's underground tunnels. The operator of the rail car in the tunnel urged passengers to remain in the car so that he could reverse out of the tunnel and off load at the next station. Many of the passengers disregarded the operator's request and walked out of the car onto the safety walkway within the tunnel. Passengers managed to exit the tunnel safely and no one was injured.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

After-action reports are done after each drill.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

Changes are made to the emergency evacuation plan when it is next updated.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

CYRUS MASHHOODI – OFFICE CHIEF

Caltrans District 4

Wednesday, April 12, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

Caltrans does not develop or maintain any evacuation plans by itself. Instead, Caltrans will assist other agencies with evacuating people during disasters.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

During an evacuation, Caltrans will control all the highways within its authority as well as all the devices and facilities on these highways. Evacuation issues are included in the general emergency plans.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

Caltrans is prepared for both advance-notice and no-notice disasters, specifically with focuses on earthquake, tsunami, and terrorism attacks.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

Caltrans is in the process of reviewing evacuation capacity calculations.

- 5) ***Traffic Control Practices:*** What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

As stated above, Caltrans will control all the highways within its authority during evacuation. Caltrans specified a list of lifeline highways, which will be considered high priority from a maintenance standpoint in case they are used as evacuation routes. Caltrans is also considering the application of contraflow during an evacuation.

- 6) ***Role of ITS:*** What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras; variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.

Caltrans currently owns and operates all sorts of state-of-the-practice ITS devices, including CCTV cameras, DMS, HAR, HOV, and ramp metering. During evacuation, Caltrans will utilize these devices to increase highway capacity, improve evacuee information, and monitor the evacuation path. These ITS devices are controlled from Caltrans TMC located at 111 Grant Ave, Oakland. A redundant system has also been deployed to operate all the ITS devices in case the TMC is not functional during disasters.

- 7) ***Resources and Materials:*** What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?

MTC is the lead agency for coordination of resources and materials distribution during an emergency. Caltrans will assist MTC by providing resources or identifying needs.

- 8) ***Evacuation Control, Coordination, and Management:*** Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?

ICS is used by Caltrans. The Bay Area generally follows the California Standardized Emergency Management System (SEMS) when dealing with emergencies. Caltrans will not manage re-entry but will assist other agencies by providing information related to highway conditions.

- 9) ***Communications Between Agencies:*** What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?

All communications media can be used to communicate with other agencies. The procedure for Caltrans to communicate with other agencies is developed based on SEMS.

- 10) ***Communications with Evacuees:*** Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

The general public in the Bay Area has never experienced a large-scale evacuation. Depending on the scale of the disaster, the evacuation order will be issued for cities, county, multiple counties or the entire region. Information regarding evacuation is distributed to the public through general public media such as TV and radio. Caltrans is only responsible for distributing highway-related information through its field ITS devices, such as DMS. Caltrans will also provide this information to other agencies.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

Caltrans participates in yearly emergency response plan exercises.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

Due to stringent budget and staffing, Caltrans as a primary traffic operating agency cannot devote significant resources to evacuation training. Lessons learned from exercises will be adopted as quickly as budget allows. Caltrans indicates that communication among agencies is very important in evacuation planning. There should be a clear procedure listing how and who each agency should start to contact during an emergency.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

As stated above, large-scale evacuation has never happened in the Bay Area.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Still in development.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

As stated above, this depends on budget and staffing resource availability.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

The normal duties for traffic operating agencies like Caltrans is to maintain daily transportation network performance. Without extra budget specifically for emergency and evacuation planning, these agencies will not be able to devote much time to training and other preparations for emergency or evacuation planning.

NAPOLEON KHALILNAJI – SAFETY ANALYST

Municipal Transportation Agency
Department of Parking and Traffic (DPT) City and County of San Francisco
1 South Van Ness, # 7232
San Francisco, CA 94103

Tuesday, April 11, 2006

1) *Evacuation Plan Status: What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?*

DPT's Citywide Emergency Operations Plan has not been significantly modified from the last draft, dated March 2004. However, there have been minor additions, which include the following:

- A new list of emergency phone contacts
- A list of emergency battery-operated traffic signals
- City-owned garages emergency alert levels
- A listing of city-owned garages and their respective emergency response districts
- City's emergency route map
- MTA/Muni Operation Return Route Map.

Elements of this program have been used in many actual disasters or emergencies including a major power outage several years ago. Emergency routes, emergency traffic signals, priority intersections for fixed-route transit, and post-incident traffic control are all included in the Emergency Operations Plan, but an actual city-wide evacuation has not occurred. The Mayor of San Francisco has the authority to issue evacuation orders.

2) *Scope of the Plan: What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?*

DPT's Emergency Operation Plan is for the City of San Francisco and San Francisco County. The City and County of San Francisco is participating in a regional plan to provide assistance and coordination when needed. Evacuation issues are addressed in the general plan. The city's plan is in coordination with the state level emergency plan.

State legislation requires all jurisdictions to comply with the National Incident Management System (NIMS). San Francisco has fully adopted the provisions of the NIMS and requires its implementation at the Emergency Operations Centers (EOC).

The emergency operations plan is an extension of the *State Emergency Plan*. It is reviewed and exercised periodically and revised as necessary to meet changing conditions.

3) *Plan Scenarios:* What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

The Plan addresses a range of emergencies, including advance-notice, no-notice, natural, and manmade disasters. The National Incident Management System (NIMS) has been adopted as a functional approach that is not incident specific. NIMS facilitates coordination among all responding agencies and expedites the flow of resources and communication within all organizational levels. NIMS is a uniform method for managing emergencies based on the Incident Command System (ICS). NIMS standardizes the organizational structure and terminology used by every response agency. NIMS is intended to be flexible and adaptable to the needs of all emergency responders.

4) *Capacity Needs and Availability:* Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

DPT's traffic engineers (pre-designated staff) will cooperate with other agencies to find out the optimum evacuation path and will control traffic signals to facilitate evacuation. The Department of Traffic and Parking will utilize all potential traffic control methods, such as traffic signal control and other ITS devices, to increase roadway capacity for the evacuating public.

5) *Traffic Control Practices:* What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.

DPT's role is to manage the traffic and parking of the entire SF [San Francisco] City and County. Their specific mission is to perform traffic control/traffic management, during an emergency. The citywide plan is designed to incorporate and coordinate all DPT's facilities and personnel into an efficient organization capable of responding effectively to any emergency. DPT will direct emergency traffic, arriving emergency personnel and the public to various local emergency centers or to pre-designated staging areas, through pre-designated emergency routes.

DPT's Emergency Operations Plan includes a pre-designated Emergency Command Center, pre-designated emergency response personnel, alternate emergency staff and operational sites, emergency routes, emergency traffic signals, priority intersections for fixed post traffic control, intelligent transportation management systems (ITMS) to program, monitor, control and respond to transportation problems, from a laptop or computer connection. The plan includes equipment inventory and departmental vehicle and personnel as well as an 800 MHz Radio Call Back Directory.

6) *Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras; variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.*

DPT's SFgo Transportation Management Center (TMC) is located at 25 Van Ness Ave Suite 210, San Francisco, CA 94102.

DPT is presently installing, utilizing, and incorporating SFgo San Francisco Intelligent Transportation Systems (ITS). This computerized technology enables DPT's SFgo Program to monitor, control, and respond to transportation problems in a safe and efficient manner, from any laptop and/or computer connection. A Satellite Transportation Management Center that will serve as a back-up of the main TMC is to be installed in the dispatch center and in the Mayor's Office of Emergency Services.

The SFgo Program led by DPT in conjunction with Muni (Municipal/Public Bus Transportation), California Department of Transportation, California Highway Patrol (CHP) is a citywide transportation management system that will gather real-time information on current traffic flow and congestion, process and analyze this information, respond to changes in roadway conditions, and disseminate information to the public. The program will significantly improve the city's obsolete traffic signal facilities and implement various intelligent transportation systems (ITS) technologies to improve the overall effectiveness of the transportation system. This program will also effectively serve as an emergency response tool.

The Initial Phase of implementation that is currently taking place includes the following components in the Market and Civic Center areas, as well as 3rd Street and Fell/Oak corridor:

- Main Transportation Management Center (TMC) at 25 Van Ness Avenue
- Satellite TMC at Pacific Bell Park (home of the San Francisco Giants)
- Communications network links
- Closed Circuit Television (CCTV) cameras
- Advanced traffic signal controllers
- Variable Message Sign (VMS) system
- Vehicle detection system (VDS)
- Fiber connection to Caltrans Transportation Management Center in Oakland.

Implementation of future phases of the SFgo Program will include the following:

- Satellite TMC at the Dispatch Center of DPT Enforcement Division
- Satellite TMC at the Office of Emergency Services
- Additional advanced traffic signal controllers

- Additional field elements of CCTV, VMS, VDS
- Expanded communications network linking all TMCs, traffic signals, and field elements.

ITS is used by DPT in daily traffic operation. During an emergency, all the available ITS devices, such as CCTV cameras and dynamic message signs, will be applied as needed to monitor and guide evacuation.

7) *Resources and Materials:* What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?

SF Mayor's Office of Emergency Services and Homeland Security is the primary coordinator of resources for an emergency. It will identify problems and shortages and contact agencies, such as the Department of Public Works, Transit Operators, and DPT, to request and deliver resources as appropriate.

8) *Evacuation Control, Coordination, and Management:* Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?

The Plan does use ICS. As stated in the last question, it is the Mayor's Office that coordinates among different agencies. Re-entry issues are covered in the Plan. For example, *Operation Return* is a program coordinated by the Transportation Unit of the Logistics Section (the other division of SF MTA) at the Emergency Command Center (ECC), in the event a disaster is declared. Operation Return provides transportation to critical personnel from access points throughout the Bay Area to the city.

In the event that a Response Level 2 (Local Disaster) or Level 3 (Major Disaster) emergency closes bridges, BART systems, or freeways, certain city employees will be required to immediately return to duty. Instructions will be broadcast via the Emergency Alert System (public radio announcements) directing these employees to assemble at one of the pre-designated sites (including neighboring counties).

The Office of Emergency Service Coastal Region (the State of California) will coordinate the dispatch of a radio operator to each site to assist with communications. Other methods of communication will be by handheld radio and cellular phone. Priorities for transport will be established at each Operation Return site.

The Operations Section at the ECC will determine reception sites based on emergency conditions. Reception sites are locations where Operation Return vehicles, ferry boats, helicopters or aircraft will bring employees who will then be transported to emergency assignments.

As part of this plan, pre-designated and prioritized building evaluations are conducted by the city's structural engineers immediately after earthquakes to determine whether it is safe for people to go back. Evacuation of people with special needs would also be discussed and resources will be made available on an as needed basis.

9) *Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?*

Aside from the face-to-face meetings and hand-written communication among different representatives of all the city agencies at the ECC, the ECC has built in many different means of communication using different technology in order to provide range of options, in case of a system failure during an emergency. A brief description of each system is as follows:

- **Mayor's Emergency Telephone System (METS)**

This is a stand-alone, hard-wired and virtually unblockable telephone switching system, designed to provide back-up communications for CCSF in emergencies. The METS connects all police stations, fire stations, health centers, police call-boxes, the emergency dispatch center and all other key departments.

- **The City's Siren System**

The City's siren system consists of 49 sirens covering the entire city. The sirens can be activated by quadrant, by bank or individually. This system is maintained by the Department of Electricity and Telecommunications, and is tested weekly by personnel of that department.

- **Auxiliary Communications Service (ACS)**

The ACS is a volunteer service comprised of licensed operators of the Amateur ("Ham") radio service, General Mobile Radio Service (GMRS), commercial radio licensees, telephone operators and other individuals with communications experience who train under the guidance of the City and commit to its aid as Disaster Service Workers in emergencies.

Each member of the ACS has an assignment to provide a specific element of communications support to the city. These assignments may include operating a station on a radio net, acting as a communications assistant for a designated official, supporting the operation of a radio net or message center, managing foot and mobile messenger systems, or providing other support as needed during an emergency.

- **The Emergency Alert System (EAS)**

The City participates in the federal, state and local government Emergency Alert System. EAS provides alert information to all radio and television stations, thus disseminating official government information of a critical nature.

- **911 Dispatch**

911 Emergency Communications is designed to provide command and control communication between the public and departments with response duties (Police, Fire and Emergency Medical). The system is designed for Response Levels 0, 1, 2. A Response Level 3 emergency may disrupt communication and auxiliary radio systems may support normal service. The Response Level is defined as:

- *Response Level 0 – Readiness & Routine Phase*

Ongoing routine response to daily emergencies or incidents. Stand-by and alert procedures issued in advance of an anticipated or planned event.

- *Response Level 1 – Local Emergency*

A minor to moderate incident in which local resources are adequate and available. This level of emergency response occurs when an emergency incident, e.g., gas leak, sewer back-up, assaults, bomb threat, toxic spill, medical emergency, shooting, etc., occurs.

- *Response Level 2 – Local Disaster*

A moderate to severe emergency in which resources are not adequate and mutual aid may be required on a regional, even statewide, basis with coordination with local police and fire departments of the affected area working in concert.

- *Response Level 3 – Major Disaster*

Resources in or near the impacted areas are overwhelmed and extensive state and federal resources are required. The cities and the counties will proclaim a local emergency. Then, the State of California will declare a State of Emergency. A Presidential Declaration of an Emergency or Major Disaster is requested by the state. Examples of major disasters are the Loma Prieta Earthquake of 1989 or the Oakland Hills Firestorm of 1991. When local jurisdictions declare a State of Emergency, the district board can declare the same.

- **CityWatch Cable TV Channel 54**

CityWatch Cable television Channel 54 is the city's government access channel, used routinely to convey essential elements of information directly to the public over the cable network following an emergency. It is viewed as particularly valuable during the recovery phase of a major emergency. The cable head end located in the ECC complex allows the Incident Commander and other officials to cablecast directly from the ECC. In addition, a satellite dish located on the roof of the ECC gives the ability to downlink satellite signals from FEMA etc., and cablecast that information to the general public. The text of Emergency Alert System (EAS) messages can be transmitted via CityWatch Cable Channel 54.

- **Emergency Digital Information System (EDIS)**

A statewide system linking news media with emergency services locations everywhere in the state. It provides a vital link to the public in an emergency.

- **E-Team Internet**

The City and County of San Francisco has installed a citywide data sharing program that is accessible via internet. The purpose of this software is to track incidents and resource requests in the Emergency Operations Center. Each department has an assigned username and password to access the system. The system could be accessed from any where, any time, with the right username and password. The E-Team to E-Team data sharing capabilities are now part of the city's core emergency means of communication. This gives an E-Team user the ability to share reports with other E-Team user organization(s). E-Team to E-Team allows each user to send reports, transfer editing responsibility, and allow forwarding of individual reports. Features include user-created map overlays, personnel management, real-time messaging and report interface.

- **Radio Emergency Communication Systems**

KCBS 740 AM, KNBR 680 AM, KGO 810 AM or City Watch Cable TV Channel 54 have been pre-designated as Emergency Alert System (EAS) station for disaster information.

Interdepartmental Communication Systems

Department of Parking and Traffic will utilize all functional office equipment such as computers, telephones, cell phones and laptops, in case of an emergency. If all else fails, our citywide 800 MHz Radios will be the most effective and reliable means of communication. This will be done through our own Enforcement Dispatch Center. Our Dispatch Center is equipped with a back-up power generator to feed our equipment in case of power failure. Our Dispatch Center is in communication with all field personnel, Police Department, Fire Department and 911 Dispatch.

Remote Voice Mail: In addition, DPT has an Emergency Remote Voice mail system. In the event of a major disaster (including after hours), DPT employees could and should call the following toll free number:

888-DPT-EMER

To obtain directives employees are expected to leave messages on the voice mail system regarding their personal status.

The voice mail system is physically located in Fresno, California. It can answer multiple calls at the same time, and holds up to 30 messages of up to 3 minutes each.

DPT's Safety Analyst and pre-designated responders can access the system, retrieve messages, issue new directives and /or change the greeting.

10) *Communications with Evacuees:* Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?

Elements of this program have been used in many actual disasters or emergencies such as a major power outage several years ago, but an actual citywide evacuation has never occurred.

There are Text and Voice Communication network links within our TMC that could be utilized for information dissemination, but DPT does not have a specific and primary role in media coordination. The information is coordinated between agencies and /or centralized before being delivered to the media.

DPT shall direct emergency traffic, arriving emergency personnel and the public to various local emergency centers or to pre-designated staging areas, through pre-designated emergency routes.

Announcement of evacuation could be disseminated to the public through the reverse 911 system. The reverse 911 system will dial from the Office of Emergency Services to notify the public of the evacuation order. TV, radio, and Web page are also used to disseminate emergency information. In addition, to identify optimized evaluation path as stated before, the DPT will also identify dangerous traffic areas in the city during an emergency and send staff over to mitigate impacts. For example, DPT may identify a series of intersections where heavy congestion or accident rate can be expected during evacuation and send traffic management staff on site to control the traffic flow.

11) *Testing and Training Procedures:* How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?

Monthly meetings are conducted among all emergency-related agencies in the City and County of San Francisco. During these meetings, table topics will include inefficiency identification, coordination improvement, and other action items. Exercise of the Plan is also conducted every month. All potential emergency scenarios are considered in the exercise.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

Monthly scheduled and structured meetings among all different city agencies have been very useful. Lack of funds and thus volunteer allocation of resources and participation of all agencies requires improvement. Experience indicates that awareness and alertness to disasters needs to be enhanced if no emergency occurs after a long time.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

The evacuation plan has never been applied in an actual event.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Yes, there is a post-event evaluation. This would be a collaborative effort among all agencies. Evaluation of the exercise could be conducted during the regular meetings as well.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

Yes, inefficiencies identified during the regular meetings of all agencies will be corrected as soon as resources allow.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

Successful communication and constant exercises are necessary to emergency plans. Installing, utilizing and incorporating Intelligent Transportation Systems and back-up battery operating traffic signal lights would improve emergency evacuation plans.

Pre-designation of an emergency command center, pre-designated emergency response personnel, alternate emergency staff and operational sites, emergency routes, emergency traffic signals, priority intersections for fixed post traffic control, Intelligent Transportation Management Systems (ITMS) to program, monitor, complete inventory of departmental equipment such as generators, vehicles, radios and Call Back Directory should be considered very basic requirements!!

JEFF GEORGEVICH – SENIOR PROGRAM COORDINATOR

Metropolitan Transportation Commission (MTC)
101 8th St.
Oakland, CA 94607

Monday, April 10, 2006

- 1) ***Evacuation Plan Status:*** What is the status of your agency's existing evacuation plan? For example, when was it first developed and when was it last revised? Has it ever been used in an actual emergency situation? Who has the authority to issue evacuation orders?

Trans Response Plan is the transportation plan that Bay Area transportation agencies are currently using for all emergencies including evacuations. It was first developed in 1997, and has been tested every year since then. There has not been an actual emergency situation that has activated the Trans Response. MTC as a transportation agency does not have the authority to issue evacuation orders. The Governor's Office of Emergency Services (OES) is the agency to make that decision for the Bay Area.

- 2) ***Scope of the Plan:*** What is the scope of the plan with regard to geographic coverage, agency involvement, and presence of transportation elements? Are plans for evacuation transportation management separate from or a part of the general emergency plan?

The Plan covers the nine counties including the 12 largest transportation agencies in the entire Bay Area. Planning for evacuation transportation is part of the Trans Response Plan. The purpose of the Trans Response Plan is to coordinate the response to any regional emergency by the region's transportation agencies, and ensure that the transportation agencies coordinate with the state and county offices of emergency services.

- 3) ***Plan Scenarios:*** What types of scenarios are the plans meant to address? Can they be applied to no-notice, advance-notice, and/or special event emergency evacuations? Do they have provisions for naturally occurring, accidental, and/or terrorist events?

The plan focuses on no-notice emergencies, particularly severe earthquakes. Terrorism emergencies are also addressed in the plan.

- 4) ***Capacity Needs and Availability:*** Have any models, computer simulations, or other calculations been performed to estimate capacity needs of the transportation system during an evacuation? How much additional capacity is expected to result from emergency measures that are to be put in place (e.g., contraflow lanes, signal pattern changes)?

No mathematical models, computer simulations, or other calculations have been used for the plan. Caltrans may have computer models to assist in emergency response capacity analysis. The capacity of evacuation routes primarily depends on the type and magnitude of the disaster as well as the disaster location. For example, the collapse of any of the bay bridges

caused by a disastrous earthquake will severely impact the evacuation capacity from San Francisco.

- 5) ***Traffic Control Practices: What is the role of transportation agencies in traffic management and control? What traffic control practices are designated by the plan for use in an evacuation? Examples include pre-established evacuation routes, contraflow, evacuation phasing, regulation of type or number of vehicles (including transit), optimization of signal patterns and lane use, mitigation of work zone impacts, and suspension of tolls and fares.***

MTC does not have the authority to control traffic, which is controlled by law enforcement agencies, or to issue commands to transportation agencies. Instead, MTC relies on cooperation and mutual assistance between agencies. For example, during an emergency evacuation, MTC may suggest that transit agencies waive fares, and that transit agencies send buses to help CHP to enforce certain temporary traffic closures by using the buses as a physical barrier to close roads.

- 6) ***Role of ITS: What intelligent transportation system (ITS) components and other related traffic management tools are used in the evacuation plan? How, when, and why are they each used as part of the evacuation plan? Do you have redundant systems? Can you operate the ITS elements from any location other than the TMC? Examples of ITS components include surveillance cameras, variable message signs (VMS), highway advisory radio (HAR), 511 or other traveler information systems (phone and/or Web), interconnected traffic signal systems, high-occupancy vehicle (HOV) lanes, ramp metering, traffic signal priority for buses, and vehicle detection systems.***

As the region's transportation planning agency, MTC does not own or operate any ITS devices. However, during an emergency, MTC will send staff to Caltrans, who has traffic surveillance and control devices, to collect region-wide real-time traffic information. MTC will also call for information from all the transit agencies and ferry services in the region regarding their current situation, needed resources and urgent needs, and resources that they can share. This information is filed into standard forms and sent to MTC through phone or fax. MTC's Emergency Operation Center will follow a checklist of tasks to compile a Regional Situation Summary for transportation, share that summary with transportation and emergency agencies, and coordinate the emergency response according to the information in the summary.

The 511 system is located in the Caltrans Headquarters Building, very close to the Caltrans Emergency Operations Center, and currently operated by contractors. At this point, 511 staff are not part of the Caltrans EOC, but Caltrans and 511 may send staff to assist each other during an emergency; this topic is under preliminary discussion.

- 7) ***Resources and Materials: What is the role of transportation agencies in identifying resource needs and in providing resources or materials? How do they assist in transportation service coordination?***

MTC will collect information regarding resources and manpower from all the transit agencies in the Bay Area. MTC will also disseminate this information to all the agencies (transportation and emergency management) so that they will know who to contact and what to request.

- 8) ***Evacuation Control, Coordination, and Management: Is an incident command system (ICS) used? How are transportation needs and resources, and the role of transportation agencies, integrated into the ICS? How are operations coordinated between TMCs, transit agencies, EOCs, and other agencies? Do you have plans for the re-entry of evacuees after the evacuation? How do you accommodate special needs evacuees (seniors, nursing home residents, hospital patients, inmates, people with pets, etc.)?***

The plan complies with ICS. The plan also complies with the California Standardized Emergency Management System (SEMS) and the Federal NIMS. No re-entry issues are addressed in the plan currently. Evacuation of those with special needs is critical and currently the responsibility of the Office of Emergency Service (OES), in each county and in the Governor's Office.

- 9) ***Communications Between Agencies: What are the communications protocols between agencies? Are there established procedures for disseminating information quickly and accurately to personnel?***

The consistent communication system is ensured by physical communication such as phone and fax between MTC and the 12 agencies. Communications through phone and fax may experience overload problems during an emergency. The transportation agencies have an emergency radio system, but the mountaintop receivers are vulnerable. Therefore, MTC will procure satellite phones for the 12 agencies plus the 9 Offices of Emergency Services in the next few months to enhance the emergency communication reliability and quality.

- 10) ***Communications with Evacuees: Is the public educated in advance about the evacuation procedures? What information is provided and how is the information disseminated? Do transportation agencies have a specific role in media coordination and traveler information dissemination, either before or during an evacuation? Is information coordinated between agencies and/or centralized before being delivered to the media?***

The Bay Area general public is well aware of earthquakes, due to countless media reports on experiences during the 1906 earthquake. General media such as radio is usually used to inform the public in emergency situations. MTC will provide transportation information and media-advisory suggestions to the Governor's Office/Office of Emergency Services, which will release them. MTC will also send staff to the OES for face-to-face communication. MTC and the transportation agencies will also deal directly with the media.

- 11) ***Testing and Training Procedures: How often are testing/training exercises conducted? Who do these exercises involve? What drill scenarios have been used?***

Testing and training exercises are conducted every year. They involve all the 12 major transportation agencies in the Bay Area activating their EOCs. Right after the training, agencies will debrief and make action plans for the next year.

12) *Evaluation of Exercises:* What aspects of the evacuation plan were implemented well in drill situations, and what aspects of the plan were found to require improvement? What elements of the plan were most useful for a successful evacuation drill? What lessons have been learned as a result of these drills?

The region-wide data collection and coordination procedure has proven to be successful in the Plan. Communication system needs more investment for enhanced reliability and simultaneous multi-agency communication.

13) *Evaluation of Evacuations:* If the evacuation plan has ever been used in an actual evacuation, how successful was its implementation? To what extent was the evacuation simply monitored, rather than managed, by responding agencies? What aspects of the plan were implemented well in the actual emergency situation, and what aspects were found to require improvement? What elements of the plan were most useful for a successful evacuation?

The Plan has not been used for an actual emergency yet.

14) *After-Action Report:* What is the process for post-evacuation evaluation? Is the post-incident review a collaborative effort among all agencies that were involved?

Immediately following training and testing each year, the participating agencies are required to fill reporting forms and identify issues that came up during testing. The 12 agencies will each send a report, and MTC will compile them into a complete region-level document with action items identified.

15) *Incorporation of Lessons Learned:* Have the lessons learned in testing/training exercises and in real evacuations resulted in revisions to the emergency evacuation plan? Have the lessons learned resulted in changes in personnel training?

The group testing the plan has not been changed. Lessons learned in testing are quickly solved and corrected in the plan. For example, faxes from MTC to local agencies were verified by sending and receiving an extra copy to MTC itself. This practice could not reveal those fax failures at other agencies caused by out-of-paper problem. MTC identified the failure so that MTC staff could try other ways to reach the local agencies.

16) *Conclusions:* What specific recommendations do you have regarding management of traffic during evacuations for another agency developing or improving upon their own emergency evacuation plans?

Depending on the disaster type, evacuation is not always the best choice, or even feasible. The evacuation routing is also difficult if the transportation network is damaged during the disaster. Therefore, sufficient planning for shelter-in-place is needed to complement the evacuation planning.

Increasing roadway capacity through emergency contraflow is hard for no-notice emergencies because the time needed to set up the contraflow, including controls at each ramp along the highway, will take at least half day.

Contact Information

For additional information on this report, contact Kimberly Vasconez, via e-mail at Kimberly.Vasconez@dot.gov.

Federal Highway Administration
1200 New Jersey Avenue, SE
Washington, DC 20590
www.ops.fhwa.dot.gov

June 26, 2006

Publication #FHWA-HOP-08-016