

The Impact of I-37 Contra-Flow on Evacuation Planning in the Corpus Christi Study Area

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This paper examines the implications of lane reversal, or contra-flow, of Interstate 37 on current evacuation planning in the Corpus Christi Study Area. Contra-flow is to be implemented through the use of a two-lane crossover located north of the I-37 / US 77 interchange in San Patricio County (see attachment A). The crossover was designed to allow for the expansion of two northbound lanes into four, thus roughly doubling the evacuation capacity of the I-37 corridor north of the crossover.

Current evacuation times (see attachment B) do not include this additional evacuation capacity and were developed on the assumption that only two northbound lanes would be available to residents leaving a particular risk area (See Table 1) via I-37. In addition, it was assumed that the two-lane availability would remain constant beyond the risk area, until a final destination, or host area, was reached.

Table 1 – Risk Area Demographics for Nueces County

Risk Area	Population*	Households	Automobiles
N1a	16,435	5,628	7,598
N1b	2,841	973	1,313
N2	24,521	8,398	11,337
N3	243,432	83,366	112,545
N4	13,767	4,715	6,365
N5	10,553	3,614	4,879
Total	311,549	106,694	144,037

* Based on a year 2000 population projection of 316,472 for the entire county.

By adding evacuation capacity to the current road network, or road system, a number of advantages or improvements could potentially be realized. The key question is “at what cost”. In terms of evacuating a geographic area in response to an impending threat to the residents of that area, cost would most appropriately be measured in time. Specifically, how long does it take to evacuate a given population through a given road system, and can contra-flow reduce the time needed to safely complete this process? In order to answer these questions, several key issues need to be addressed:

- 1) Clearance time of threatened risk areas
- 2) Commute time to final destination
- 3) Making lane reversal operational

In the interest of a comprehensive and effective analysis, each of these issues needs to be thoroughly investigated. This assessment will focus primarily on item 1, the issue of clearance times. The Texas Department of Transportation (TXDOT) Committee on Hurricane Evacuation is currently examining commute times and operational concerns. A brief overview of the committee's objectives and current status will also be examined.

For the purpose of clarity, the usage of several terms needs to be defined. First, "*Clearance Time*" refers to the time needed to evacuate a threatened risk area before storm conditions make it dangerous to travel in an automobile. Secondly, "*Commute Time*" refers to the time needed to travel from the threatened risk area to a final destination. "*Evacuation Time*" is the time resulting from clearance and commute times combined. In other words, it is the time required for evacuees to travel from their home to a place of shelter.

Clearance Time of Threatened Risk Areas

For each risk area within a study area, an "evacuation route system" is identified. Evacuation route systems consist of major arterial roadways that are designated for different parts of a study area based on population distribution and the available road network. Each system is then assumed to provide egress for a specific set of risk areas within the study area.

The following roads constitute the evacuation route system available to residents of Nueces County:

- I-37
- SH 358
- SH 44
- FM 624
- FM 70
- FM 43
- FM 665

The "evacuation capacity" of each system is then estimated and measured in Vehicles Per Hour (VPH) per direction of travel. Evacuation capacities are estimated based on roadway information obtained from TXDOT. It is estimated that each lane will accommodate 80% of its maximum capacity during an evacuation due to vehicle spacing, start/stop traffic conditions and

additional vehicles entering the system. It is further estimated that vehicular movement speed will range from 23 MPH to 43 MPH with maximum capacity being achieved at approximately 30 MPH.

In general terms, evacuation capacity per lane is estimated at 800 VPH for most roadways with two exceptions: Low-type paved roads without an improved shoulder are estimated at 500 VPH and controlled access freeways are estimated at 1,600 VPH. From these benchmark capacities, exceptions can be made for specific or unique roadway configurations.

Such is the case with I-37, where limited access at interchanges and ramps provide for greater capacity than the standard 800 VPH but less than that of a controlled access freeway. Based on existing conditions, the evacuation capacity of I-37 is estimated at 1,400 VPH per lane with a total capacity of 2,800 VPH based on the minimum lane availability, or "choke point", within the system. The choke point for I-37 is the point at which outbound lane availability is reduced to two lanes at the I-37 / US 77 interchange located just north of the boundary between Nueces and San Patricio Counties (see Attachment A).

The crossover that can be utilized to divert northbound traffic onto the two southbound lanes is located in risk area 3, approximately .25 miles north of the I-37 / US 77 interchange (see Attachment A). Because the traditionally southbound lanes have no additional ramps equipped to facilitate access for northbound traffic, it can be assumed that the contra-flow lanes will have an evacuation capacity of about 1,600 VPH per lane. In theory, this would allow for a combined evacuation capacity of 6,000 VPH for the expanded route system north of the crossover.

Unfortunately, the limitation of two lanes prior to the crossover will not allow a flow rate of this magnitude for individuals accessing I-37 south of the I-37 / US 77 interchange. Therefore, it can be concluded that, while reversing the flow of south bound lanes north of the I-37 / US 77 interchange will enhance traffic flow from that point northward, it will not eliminate the two lane choke point that exists just south of the crossover. It is this road segment that dictates the evacuation capacity of this specific element of the evacuation route system. In other words, by increasing the capacity of one part of a system, it is not inherent that the capacity of the entire system will be increased.

For this reason, it has been determined that the addition of two lanes resulting from the reversal of I-37 will have very limited impact on the time needed to evacuate the area south of the crossover, including the City of Corpus Christi. This conclusion is supported by representatives of the TXDOT district offices in San Antonio and Corpus Christi and by the Texas Transportation Institute (TTI).

It should be noted, however, that there are some appreciable advantages to the contra-flow of I-37. The additional two lanes could significantly reduce the commute time from the point of reversal to the City of San Antonio. This would reduce the amount of time that evacuees might be exposed to hurricane conditions while in their automobiles.

Secondly, it would reduce the potential for traffic congestion beyond the risk areas. Such congestion could potentially cause traffic delays south of the I-37 crossover and thus increase the clearance time for all risk areas.

Third, the reduced overall commute time could have favorable effects on the present and future behavior of evacuees. By reducing the time individuals spend in their automobiles, the number of stops required for fuel, food and restrooms could be reduced. This would, in turn, reduce the traffic delays associated with vehicles exiting and then re-entering the traffic flow. In addition, expediting the evacuation process could reduce the reluctance of some individuals to evacuate due to the inconvenience of long commute times or fear of prolonged exposure to weather conditions.

Fourth, reversal of I-37 would reduce the number of vehicles needing access to the traditionally northbound lanes of I-37 north of the crossover, thus facilitating the evacuation of persons accessing the roadway from risk areas 4 and 5 in Nueces County. There may also be appreciable benefits to evacuees from San Patricio County who could access the traditionally northbound lanes of I-37 north of the crossover

Commute time to final destination

The TXDOT district offices in San Antonio and Corpus Christi, along with TTI, have formed a Hurricane Evacuation Committee to study the implications of lane reversal on commute time. The committee consists of representatives from TXDOT, TTI, the Department of Public Safety (DPS),

the Division of Emergency Management (DEM), local emergency management and Texas A&M University (see Attachment C).

There are presently six routing scenarios being examined by the committee (see Attachment D). These scenarios differ only in the points at which traffic would be diverted around municipalities and where lane reversal would cease and the conventional traffic flow restored.

TTI is using a computer model called CORSIM to evaluate the various scenarios and quantify the advantages and disadvantages of each. The basic premise of the model is to identify and designate all road segments and nodes (or intersections) in the entire system based on the individual characteristics of each. These characteristics include roadway capacity, changes on traffic load resulting from entrance and exit ramps, signalization and intersection limitations. Once this data has been collected and entered into the model, each scenario can be evaluated by activating only those segments and nodes constituting the evacuation route system for a specific scenario. Each scenario system is then loaded with traffic based on the estimated number of evacuating vehicles per risk area (see Table 1).

The result is a quantitative analysis of the strengths and weaknesses of each scenario. It is very unlikely that one scenario will be ideal under all circumstances. It is much more probable that some scenarios will be best suited for smaller scale evacuations while others will be more advantageous for mass scale evacuations.

One of the prime advantages of using a model of this type is that once it has been created, it can be used repeatedly to evaluate the effect of any change in system configuration. This would include any change from the addition of major evacuation lanes, the impact of closing an access ramp, or even changing the cycle of an individual traffic signal.

While the model presently being developed will address only the I-37 corridor from the crossover to San Antonio, the TXDOT committee has shown interest in the future inclusion of all evacuation routes in the Corpus Christi Study Area. By implementing a process that would allow for evacuation planning from point of origin to final destination and evaluation of all routes within the total system, a much more flexible and comprehensive traffic analysis would be possible. It would even be possible

to analyze multi-region or multiple study area evacuations to an extent that has never before been realized in the State of Texas.

In addition, TTI has indicated a willingness to place temporary traffic counters at key locations within the evacuation route system prior to the initiation of an evacuation. The resulting data would provide extremely useful in evaluating the effectiveness and utility of existing evacuation strategies.

TTI has also expressed interest in seeking funds for the placement of permanent, electronically linked real-time traffic counters at key points within the route system. These devices would not only provide useful information for post-evacuation analysis, but would allow the State to monitor the current status of an on-going evacuation and implement contingencies if warranted.

Making lane reversal operational

Three additional questions of great significance regarding the utility of lane reversal are: *what* will it take to make reversal operational, *who* will be responsible for its operation and *when* will the process begin? The TXDOT Hurricane Evacuation Committee is considering these issues as well.

Determining what it will take to make contra-flow operational will depend largely on the routing scenario being implemented. As the six scenarios are being evaluated, issues such as mechanical control devices, detours, intersections and southbound access for emergency vehicles will be assessed. Ultimately, each scenario will be assigned a benefit (the advantages the scenario offers) and a cost (the resources required for its use).

In terms of who will be responsible for operational concerns, several alternatives are being explored. The mechanical devices needed for reversal will be provided by TXDOT. Monitoring devices such as traffic counters, and the resulting data, will be supplied by TTI. Clearing the roadway prior to reversal will be done by DPS. The means by which this will be done is still being examined and will depend, to some extent, on the routing scenario being implemented. Again, various methods should be evaluated as to their benefit and cost.

A segmented approach, where several sections of the I-37 corridor are cleared simultaneously may offer a savings in time but will require a greater level of coordination. A subcommittee of the TXDOT Hurricane Evacuation Committee has been created to contact other states that have recently implemented contra-flow. The subcommittee will seek to identify strategies that have proven both successful and feasible under given conditions.

With respect to staffing and the manpower needed on the actual roadway in order to maintain reversal of I-37, several options have been identified. DPS personnel, local law enforcement, the National Guard, or a combination of the three, have all been considered. A worthy consideration is that use of the National Guard would allow law enforcement, especially at the local level, to provide services to their respective communities (a task with which they have greater familiarity than the National Guard).

The issue of when the reversal process should begin will be a function of the scenario and the time needed to safely clear the designated roadway, place barriers, and bring reversal into operation. If the process does not begin until the evacuation recommendation has been made to the public, reversal may or may not provide any benefit, depending on the scale of the evacuation.

Ideally, a phased process could be created in which emergency management would contact the agencies responsible for operations far enough in advance that the specific routing scenario would be operational at the time the evacuation recommendation is made. This is clearly an issue that will require a great deal of coordination between numerous state agencies and local jurisdictions. Great care should be taken to insure that a line of communication is established to all parties involved, from the initial planning phase through the period of operation.

In some scenarios, such as minor category one and two hurricanes, the conventional routing system should prove sufficient and the time required to make lane reversal operational might actually have an adverse effect on the overall evacuation process. In these cases, where far fewer people are vulnerable, the conventional routing systems should be adequate. Implementing contra-flow under these conditions may do little more than consume vital resources.

The point at which a major population center is to be evacuated, in this case the City of Corpus Christi, is likely to provide a better "trigger" for the

reversal process. It is at this point that clearance times increase dramatically and commute times are likely to increase as well. Because the majority of the population in Corpus Christi is located in risk area N3 (see Table 1), it may prove reasonable to initiate contra-flow only for evacuations involving risk areas 3, 4 or 5. Greater study is needed on this issue and more definitive answers will be possible once TTI has completed its analysis.

For these reasons, the question of “when” to reverse I-37 is of great significance. Based on the modeling and analysis being conducted by TTI and the capabilities of other agencies with support functions, the time required to make reversal operational must be estimated in order to determine the cost-effectiveness to the overall evacuation process.

Conclusion

While I-37 represents only one of a number of evacuation routes available to evacuees in the Corpus Christi Study Area, it has the greatest single traffic capacity of any route in the system and can accommodate approximately 55% of the total evacuation traffic volume. It is also the most direct link to the primary host area of San Antonio, the destination of approximately 38% of residents choosing to evacuate. Therefore, it could be regarded as the most vital corridor in the entire evacuation system. However, it should not be emphasized to the general public to the exclusion of other routes.

The reason being that I-37 alone cannot accommodate the evacuation of 144,000 vehicles from Nueces County, as would be the case for a category five hurricane, in a safe and timely fashion. To illustrate this point, Table 2 represents the preliminary analysis* of using all available routes within the system versus I-37 alone.

Table 2 - Clearance Time in Hours by Hurricane Category

Hurricane Category	All Evacuation Routes	I-37 Alone
Category 1	2 Hours	3 Hours
Category 2	4 Hours	7 Hours
Category 3	25 Hours	44 Hours
Category 4	28 Hours	50 Hours
Category 5	29 Hours	51 Hours

* Preliminary analysis is based on conventional traffic flow and direction only. Contra-flow is not addressed because entrance and exit ramps beyond the I-37 crossover have not been clearly defined.

While it is evident that the reversal of the southbound lanes if I-37 has certain advantages worthy of consideration, it will have very limited impact on reducing the clearance times of risk areas 1 through 3. This is due to the limited evacuation capacity of lanes south of the crossover. Therefore, it can be reasonably concluded that the evacuation route capacity of I-37 will remain constant at 2800 VPH for risk areas 1 through 3, regardless of conditions beyond the crossover.

There is, however, one notable exception. If traffic delays occur in the traditionally northbound lanes of I-37 beyond risk area 3, the evacuation capacity of I-37 within risk areas 1 through 3 could be reduced to less than 2800 VPH. Use of contra-flow should significantly reduce the potential for congestion and increase vehicle speed north of the crossover, thus reducing the possibility of additional traffic delays in risk areas 1 through 3.

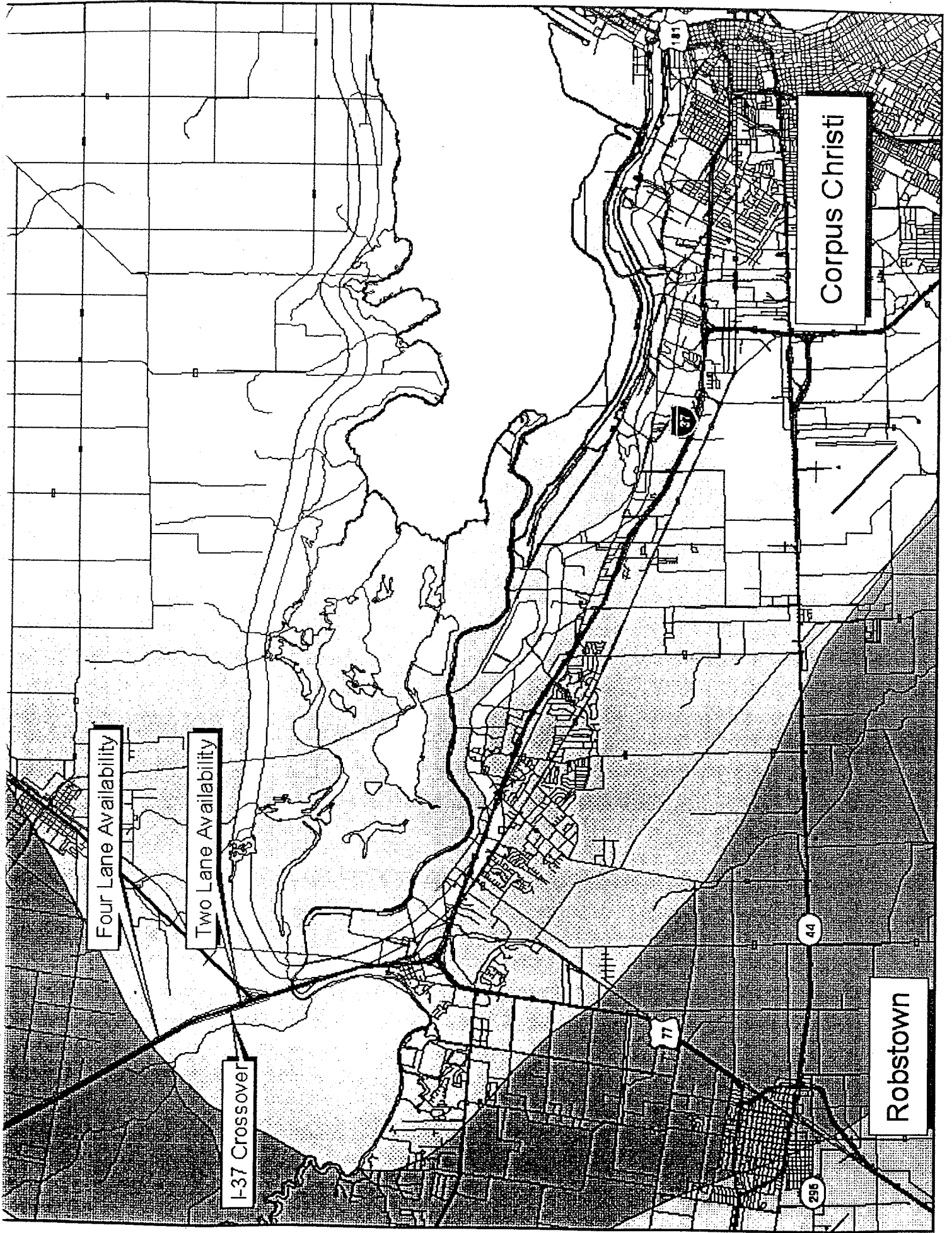
In short, contra-flow could represent an "insurance policy" that evacuation capacity would not be reduced to less than 2800 VPH. Unfortunately, it will not facilitate a capacity greater than that of the choke point, and therefore cannot be regarded as a measure to reduce clearance times.

Recommendations

- 1) Work with local officials to insure that reversal of I-37 is not regarded as a “time saving device”, but rather as an insurance policy.
- 2) Work with local officials and the media to insure that emphasis is not placed on I-37 to the exclusion of other evacuation routes.
- 3) Define very specific “triggers” or conditions in which reversal would be implemented.
- 4) Assign a DEM representative to the TXDOT Committee to insure that DEM concerns are being addressed.
- 5) Assign roadway staffing to the National Guard.
- 6) Consider clearing the southbound lanes of I-37 in multiple segments to reduce the time needed to make reversal operational.
- 7) Place real-time traffic counters at key locations within the evacuation route system.
- 8) Expand the road network under analysis to all major evacuation routes in the Corpus Christi Study Area. Using CORSIM or a similar model, reevaluate the existing evacuation route system to insure that all routes are being put to optimal use.
- 9) Expand the modeling process to all study areas, including all major routes from the points of origin to points of destination.
- 10) Structure the modeling process to allow for analysis of multiple study area evacuations.

Attachment A

Location and Routing Maps



I-37 / US 77 Interchange

Map Source: TxDOT
Hazard Analysis Laboratory
October, 1999

I-37 North and I-37 South Reversed (4 lanes - 6,000 vph capacity)

Crossover for Reverse-Flow of I-37

Ramp from US 77 South to I-37 North

US 77 South Merger with I-37 South

I-37 Northbound (2 Lanes - 2,800 vph capacity)

Ramp from I-37 North to US 77 North

I-37 Southbound

I-37 Southbound Access Road

I-37 Northbound (3 Lanes - 4,200 vph capacity)

Attachment B

**Current Evacuation Times for the Corpus Christi Study
Area**

**ESTIMATED EVACUATION TIME IN HOURS BY
COUNTY, RISK AREA, AND HURRICANE CATEGORY**

County	Risk Area	CAT1	CAT2	CAT3	CAT4	CAT5
Kenedy	K1	2	2	4	4	9
	K2		2	4	4	9
	K3			4	4	9
	K4			4	4	9
	K5			4	4	9
Kleberg	KL1	2	2	4	4	9
	KL2		2	4	4	9
	KL3			4	4	9
	KL4			4	4	9
	KL5			4	4	9
Nueces	N1a	2	4	25	28	29
	N1b	2	2	25	28	29
	N2		4	25	28	29
	N3			25	28	29
	N4			25	28	29
San Patricio	N5			25	28	29
	S1	2	5	13	16	17
	S2		5	13	16	17
	S3			13	16	17
	S4			13	16	17
Refugio	S5			13	16	17
	R1	2	3	4	4	5
	R2		3	4	4	5
	R3			4	4	5
	R4			4	4	5
Aransas	R5			4	4	5
	A1	4.2	7.3	9.4	10.4	10.5
	A2		7.3	9.4	10.4	10.5
	A3			9.4	10.4	10.5

} Corrected with
new times
period

Attachment C

TXDOT Hurricane Evacuation Committee

HURRICANE EVACUATION COMMITTEE

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Capt. John Galvan	D.P.S. - Highway Patrol	1922 S. Padre Island Dr. Corpus Christi, 78416	361 / 698-5613
Capt. Joe Hamilton	D.P.S. - Highway Patrol	6502 S. New Braunfels San Antonio, 78223	210 / 531-2200
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Juan Ortiz	Corpus Christi - Emergency Mgt.	P.O. Box 9277 Corpus Christi, 78469-9277	361 / 880-3700
Chris Caron	TXDOT	P.O. Box 889 Alice, 78332	361 / 664-4801 FAX 361 / 668-9788 ccaron @ dot.state.tx.us
Chris Lawrence	Nueces County - Emergency Mgt.	901 Leopard St., Rm. 302.01 Corpus Christi, 78411	361 / 888-0401 FAX 361 / 888-0403 chrislawrence @ msn.com
Russell Henk	Texas Transportation Institute	3500 NW Loop 410, Suite 315 San Antonio, 78229	210 / 731-9938 FAX 210 / 731-8904 r-henk @ tamu.edu
Jim Daily	TXDOT	125 E. 11th St. Austin, 78701	512 / 416-3187 FAX 512 / 416-2941 jdaily @ dot.state.tx.us

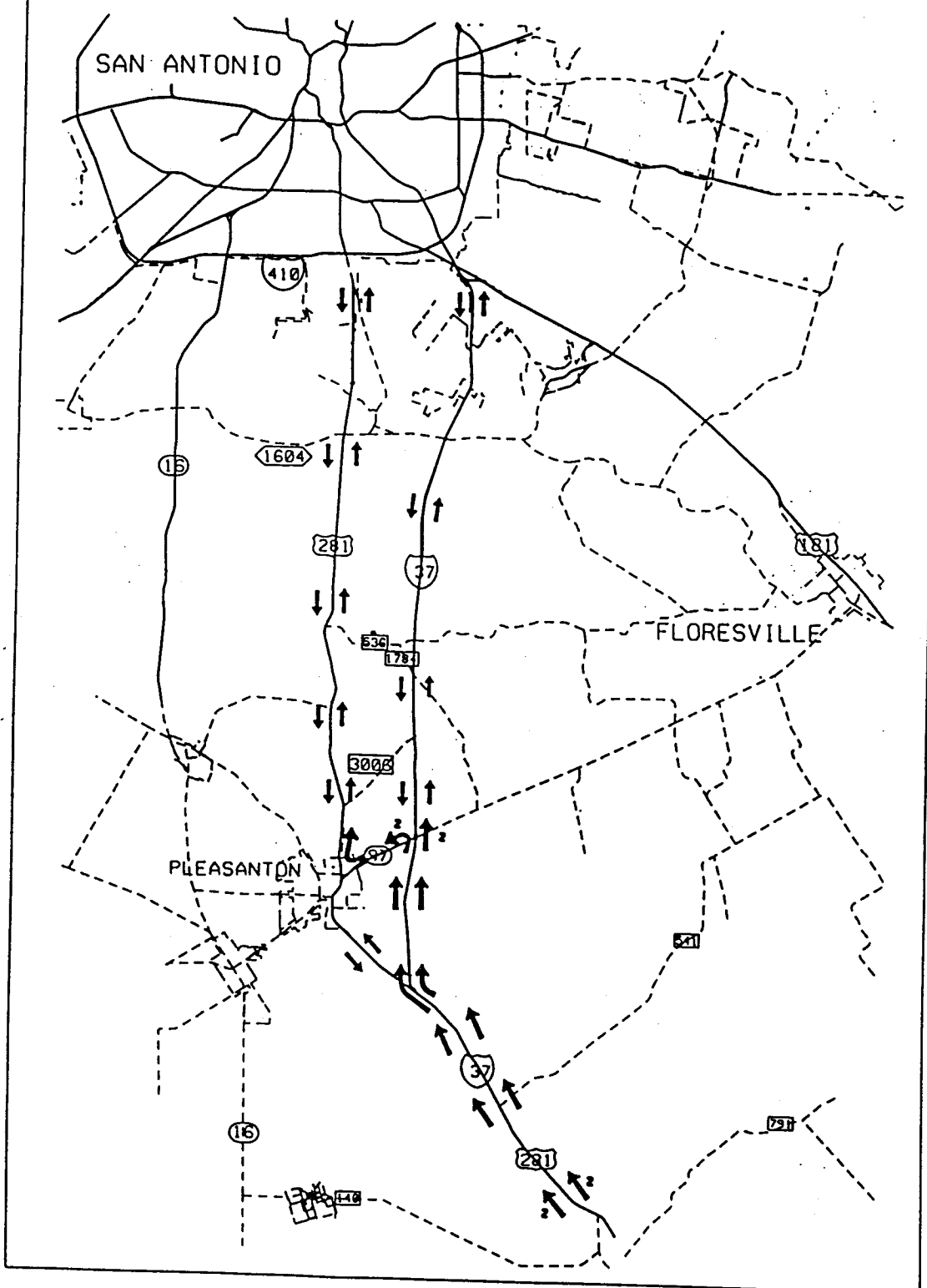
Handwritten notes and signatures:

- Chris Lawrence* (signature)
- Russell Henk* (signature)
- Jim Daily* (signature)
- Corpus Christi* (circled)
- TXDOT* (circled)
- 1-37 4600* (circled)
- 116 724* (circled)
- 4,000* (circled)
- 5000 2500* (circled)

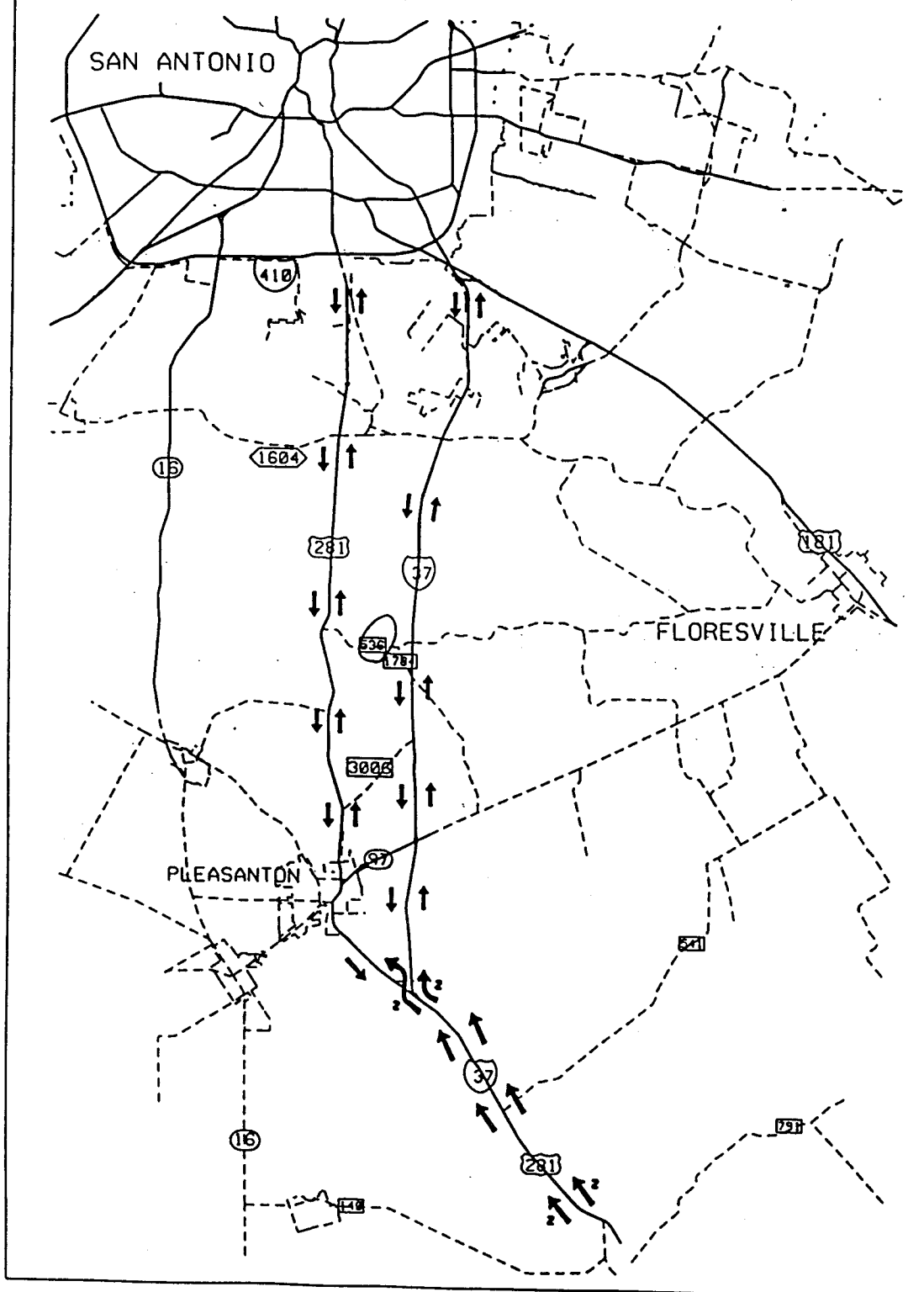
Attachment D

TXDOT Evacuation Routing Scenarios

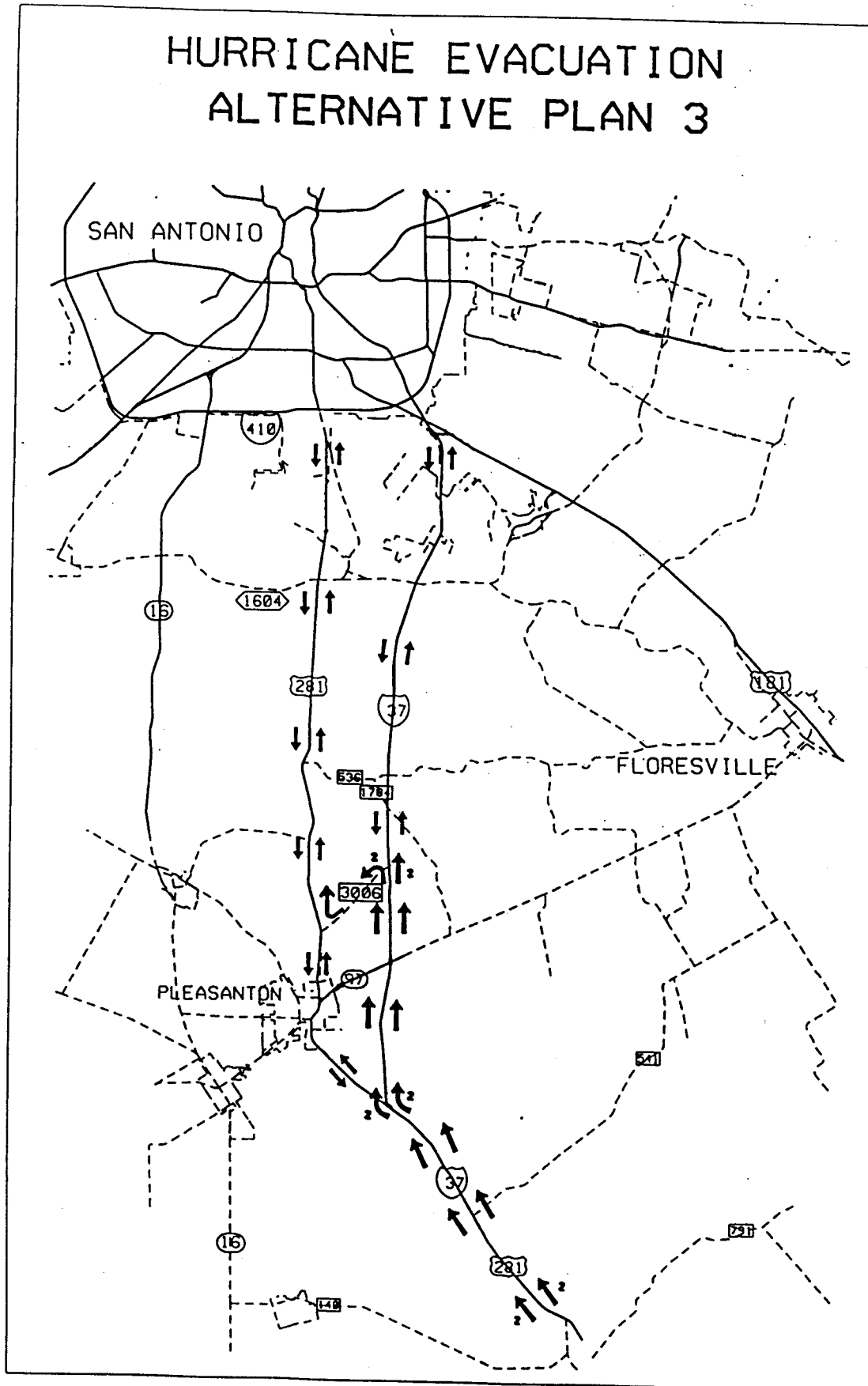
HURRICANE EVACUATION ALTERNATIVE PLAN 1



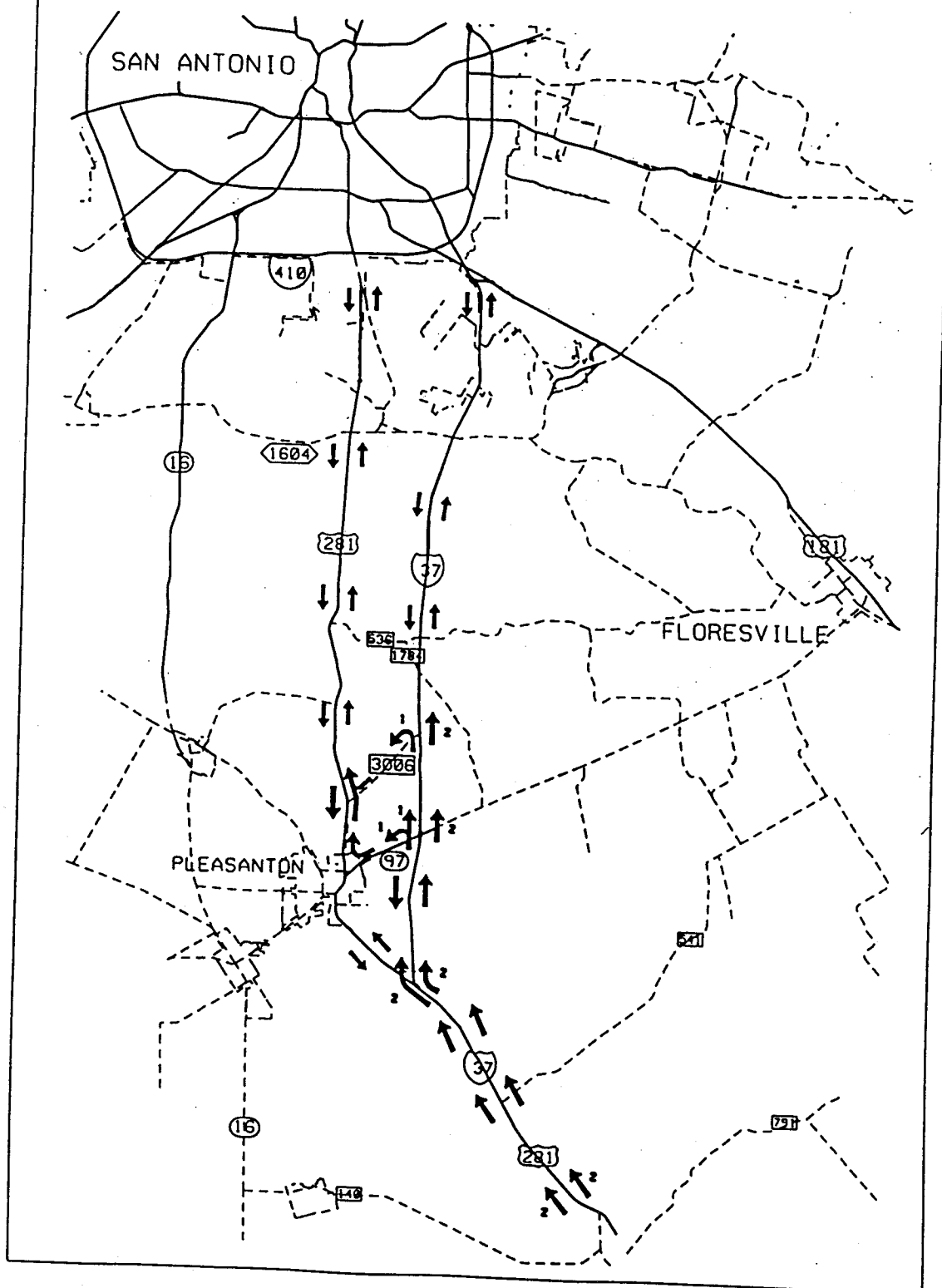
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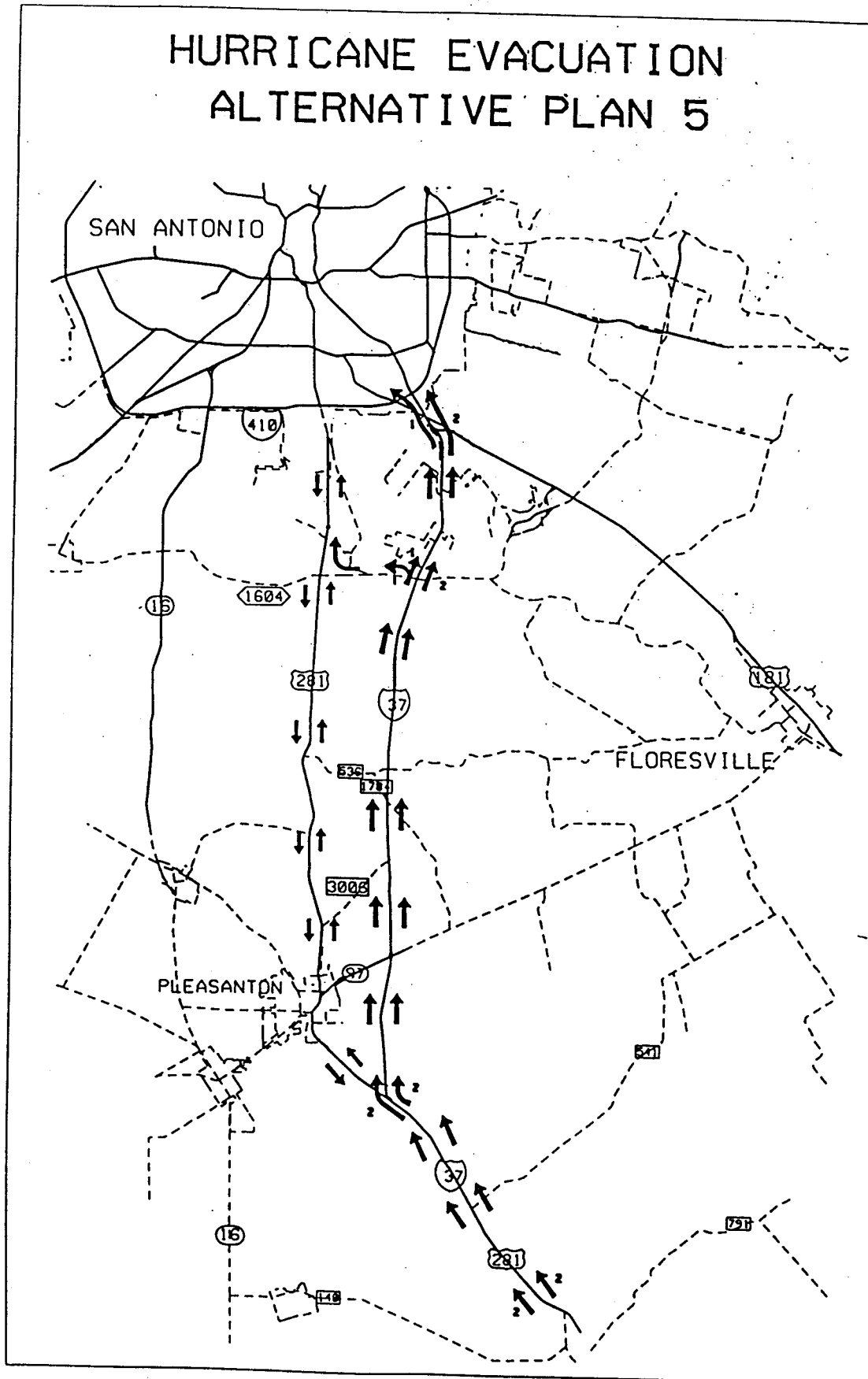
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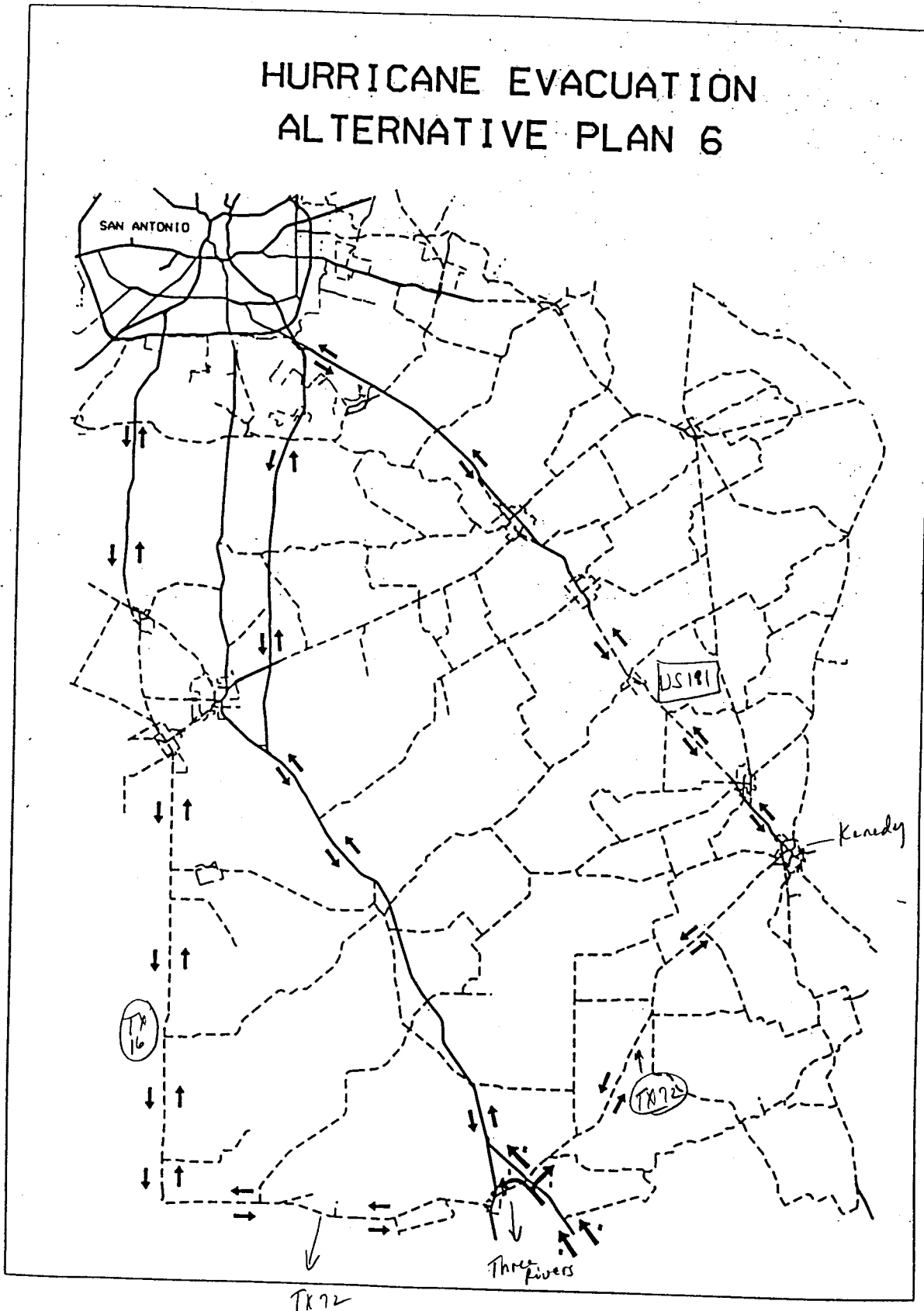
HURRICANE EVACUATION ALTERNATIVE PLAN 4



HURRICANE EVACUATION ALTERNATIVE PLAN 5



HURRICANE EVACUATION ALTERNATIVE PLAN 6



Attachment E

**Summary of TXDOT Hurricane Evacuation Committee
Meeting**

October 22, 1999

Evacuation Meeting Summary

Glen Sullivan, Corpus Christi TxDOT, convened the Hurricane Evacuation Meeting at 10 a.m., Friday, October 22, 1999.

I. Introductions

Everyone attending introduced himself or herself. (See Attachment 1)

II. Purpose and Goals

Large-scale evacuations overload our individual organizations. Hurricane Bret was a wake-up call for the necessity of having an evacuation plan. Hurricane Bret was only a partial evacuation. A full evacuation will have a big impact – TxDOT is only a facilitator at this meeting. How are we (Hurricane Evacuation Committee) going to put this plan together?

We have three issues to discuss:

- When to initiate the plan
- Where to terminate it
- When to re-open the southbound lanes

One of our goals is to identify the players, review our preliminary work, and identify everyone's needs.

III. Work Product of the Committee

The final work product will:

- Document everyone's needs
- Establish lines of communication between impacted organizations
- Establish timeline for reversal
- Establish annual review of plan

IV. Background Work

Greg Schumann, Texas A & M

He gave a short summary on the Evacuation Planning Process (See Attachment 2). The coastal area has been divided into 5 study areas. Each provides the basis for its own plan. The Corpus Christi area consists of six counties: Aransas, Kenedy, Kleberg, Nueces, San Patricio, and Refugio.

Each area is divided into five distinct Risk Areas. The first goal is finding the vulnerability of each area. For instance, storm surge is not a big factor in Corpus Christi because of its elevation.

The planning process is then completed for each Risk Area. The process consists of:

- Risk mapping

- Demographic Analysis
- Behavioral Analysis
- Traffic Analysis
- Evacuation Time Estimates
- Documentation and Public Awareness
- After this process is completed, an evacuation model called ESTED (Estimated Safe Time for Evacuation Decisions) is developed. The model calculates the time remaining before an evacuation recommendation must be made in order to allow for the safe evacuation of residents.

The folks are still learning from Hurricane Bret. They are still getting real-time data. One point being researched is how late can people still evacuate and remain safe from the hurricane.

Question: Will the study give indication of the destination of the persons evacuating the coast? Answer: One part of the behavioral study documents the destination of evacuating persons – an estimated 38% are going to San Antonio.

Question: How many shelters are available for those evacuating. Answer: Future studies will have an up-to-date shelter database.

Russell Henk, Texas Transportation Institute (TTI)

Russell introduced Garry Ford, Assistant Transportation Researcher and gave a short presentation on the methodology of modeling using CORSIM. It actually follows a vehicle through the complete route. It uses:

- FRESIM – freeway network component
- NETSIM – arterial street network component (includes signalized intersections)

The graphical user interface advantages include:

- Greater model accuracy due to improved calibration
- Visual tool to convey operation to all interested parties

They are looking at only two things – how to move folks out of Corpus Christi and where to terminate the contra flow near San Antonio. They are looking at six scenarios (See Attachment 3).

Perhaps modeling will not so much indicate which is the best route rather it might indicate what NOT to do.

The bulk of the work will be the calibration of the modeling and entering real time data.

Question: Where are we going to terminate the southbound traffic? While light, it will have an impact on drivers.

Note: David Neshyba gave a short overview of the pending project. TxDOT will have an on-going construction project on IH 37, from the Bexar/Atascosa County Line south to 1/5 mile north of S.H. 97. Two lanes of northbound lanes as well as one lane southbound will be maintained throughout the length of the project. It is scheduled for 540 working days (about 3 years). They will try to cut construction time down to 2 ½ years. The 1st phase is from just north of SH 97 to FM 3006.

Question: Should the modeling include the construction project in the modeling? (most definitely)

Other options that should be considered:

- Have smart call boxes (now available) along IH 37 for use on emergencies. The call boxes also collect real-time data while allowing travelers to get help
- Using radio frequency to inform travelers arriving in San Antonio where to go for help and/or shelter through WOAI AM Radio
- Control traffic signalization at critical junctions to facilitate traffic flow

The other alternative models suggested by the members of the audience:

- One lane of traffic through Pleasanton and one lane of traffic routed through Jourdanon (US 281 to SH 97, west to SH 16)
- After the evacuation plan is completed, analysis of other routes out of Corpus Christi is needed.
- Directional signs in south Texas to guide travelers away from IH 37
- US 281 route north of IH 37
- Route up to IH 410/IH 37
- IH 37 reversal at IH 410 – additional lane contra flow crossover near IH 410
- SH 97 direct to US 181 (in Floresville)
- Do nothing

Comments from attendees: The modeling is not the magic solution. It will simply show the consequences of the various plans. TxDOT is not pushing any one plan over another. There is a need to keep the plan simple -- peeling of single lanes of traffic at different points only introduces more variables into the plan. The number of variables will multiply the complications that might arise. Giving travelers options in an emergency situation will only confuse travelers

V. Work Session – Identify Issues/Concerns

Glen Sullivan facilitated this part of the meeting. The members of the audience identified these concerns.

1. Rest Areas

Lack of facilities as well as the lack of capacity in the established rest areas. This lack of facilities forced traffic to back up onto IH 37 mainlanes during Hurricane Bret.

2. Emergency vehicle access

One major concern is the ability of emergency vehicles to reach Corpus Christi from San Antonio or points north. Or the ability of local

emergency vehicles reaching stranded travelers on the road due to accidents or other medical emergencies where there are no frontage roads.

3. Public Information Office functions about contra traffic flows, how, etc.,
4. IH 37 – Southbound lanes closed in advance of the decision to evacuate
5. When and how to initiate the evacuation plan
6. Communication among the various entities involved in the evacuation
7. Ramp staffing – There is a real concern that law enforcement personnel not be used to secure the ramps. Perhaps the plan can call for public works personnel and/or volunteers.
8. Timelines – the ramp closures should be done by plan rather than by executive order
9. National Guard activation – the plan include a recommendation to notify the governor's office as he can then ask for federal assistance. It would allow, for instance, activation of the National Guard to help out with the evacuation. Federal monies would also be forthcoming faster (FEMA).
10. When & how to reopen the southbound lanes.
11. Alternate routes out of Corpus Christi impacting IH 37 capacity. (eliminated by consensus)
12. Improved communications by conference calls during the emergency. (eliminated by consensus)
13. Environmental concerns – Will the contra flow remain only in the daylight hours? Night?
14. Motorists' communication. Information is needed for those travelers needing access for southbound travel.
15. Contact Georgia DOT and Carolina DOT to find out what worked and what didn't.
16. Emergency response access (already covered in #2)
17. Texas Motor Speedway – the planned movement of large number of motorists from one point to another.

The next meeting is scheduled for sometime the latter part of January 2000. The committee will discuss the various results of their work on the above issues/concerns. The modeling should be complete by the end of February, early part of March 2000. The meeting scheduled after the modeling is complete will re-evaluate the models. The whole thing should be complete by the third week in April in time for Hurricane Polly (Hurricane simulation and drill). It will allow for two months to educate the public through the various Public Information Offices.