TRANSPORTATION CONTINGENCY PLAN FOR SALT RIVER FLOODING IN THE PHOENIX METROPOLITAN AREA

ARIZONA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING DIVISION

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C O N T E N T S

LIST OF ILLUSTRATIONS

SECTION I

SUMMARY

In February 1980, flood waters closed all but 2 road crossings over the Salt River in the Phoenix metropolitan area, resulting in extreme transportation problems. Even though bridge conditions across the Salt River have been substantially improved since this flood, a potential still exists for severe floods to seriously disrupt traffic.

This plan presents a compilation of various actions that could be taken in the event of Salt River flooding to facilitate the movement of goods and people across the Salt River. The approach of this planning effort has been to identify, stimulate, and incorporate the plans and thinking of various valley agencies into one document. In no case should this plan be interpreted as in any way mandating or restricting the response of various agencies to Salt River flooding. In addition, it should be recognized that plans discussed in this report are largely based on past experience and thus could require substantial modifications to fit actual future conditions.

The plan has been divided into five phases. Actions in the first phase address low river flows and the closing of dip sections, while later phases address higher river flows and the closing of an increasing number of bridges.

Responsibilities for traffic controls on remaining bridges are considered to be the responsibility of the jurisdiction that owns the bridge. For high capacity bridges this means that the State is responsible for I-10, Tempe is responsible for the Mill Avenue Bridge, the County is responsible for Alma School Road Bridge, and the City of Phoenix is responsible for bridges at 24th Street and Central Avenue.

These jurisdictions were encouraged to develop high occupancy vehicle routes for high capacity bridges. High occupancy vehicle routes are recommended to be activated when only two or three bridges remain open across the Salt River. High occupancy vehicle routes are an integral element of this plan as they are a means of promoting carpooling and maximizing the use of available buses.

Carpooling is viewed as a critical element to minimize congestion and maintain mobility during flooding. Under emergency conditions, high level elected officials should encourage commuters to carpool and employers to allow

flexible working hours. Project Pool It will encourage promotion of carpooling and expedite its carpool matching program to permit 24 hour service.

This plan recommends that the State assume financial responsibility for emergency flood bus service, and that this service be provided by the City of Phoenix through Phoenix Transit. The level of this service, routes and schedules will vary with actual flood conditions. However, it is recommended that flood buses, to the extent possible, utilize existing Phoenix Transit routes, that fares be collected onboard flood buses, and that fares charged be the same as those of regular bus service.

A scenario for bus service was developed assuming only the Mill Avenue and Central Avenue Bridges remain open. Under this scenario, 32 emergency buses are recommended, and the cost of these buses is estimated to be about $12,000 per day (revenues would offset this gross cost somewhat).

The plan calls for initiation of emergency train service across the Salt River when only two bridges (8 lanes) remain open. The train service recommended is very similar to service provided during the 1980 flood. That is, the train would run between downtown Phoenix and downtown Mesa with

intermediate stops in Tempe and at 32nd Street. Itemized cost of train service in 1980 was about $17,000 per day.

The plan also calls for the ADOT Aeronautics Division to play a coordinating role in developing emergency commuter air service across the Salt River. Its principal function would be to provide public information on the availability of this air service.

SECTION II

INTRODUCTION

PURPOSE AND SCOPE

The purpose of this document is to present a plan of action that will minimize transportation problems in the Phoenix area in the event of severe flooding on the Salt River. Specifically this plan is aimed at providing for the continuous movement of as many people and goods across the Salt River as possible under various possible situations. This plan is one element of an effort being coordinated by the Arizona Division of Emergency Services, which addresses broader aspects of emergency preparedness for flooding in metropolitan Phoenix.

This transportation contingency plan is based on coordination with local public officials at all levels of government, and on experience gained during the last flood. Much of this experience has been documented in a series of reports which are listed in the Bibliography at the end of this document. In some cases elements of this plan are a summary of more detailed plans that agencies have for addressing Salt River bridge closings.

This plan suggests possible actions in the event of another flood. These suggestions are general by necessity and would, of course, need to be detailed and customized to fit unique actual conditions that develop under a given emergency situation. In particular, this plan would need to be adjusted to fit available resources, political decisions, and status of bridges.

Major aspects of the plan are traffic control, ridesharing, bus service, and train service. The plan also includes separate sections on public information and aviation, as well as walking and bicycling. Prior to developing specific elements of the plan, this introductory chapter will present background information on Salt River flooding, Phoenix area bridges, and division of responsibilities.

SALT RIVER FLOW

Rates of flow for the Salt River are highly variable (see Illustration 1). For 28 straight years (1938 through 1965) there was virtually no flow in the Salt River. Conversely, the highest rate of flow was 300,000 cubic feet per second in 1891. Under present conditions, a flood of this magnitude would inundate portions of downtown Phoenix

ILLUSTRATION 1

HISTORICAL FLOODS ON THE SALT RIVER

DATE	PEAK FLOW (In cubic feet per sec)
February, 1891	300,000
April, 1905	115,000
November 27, 1905	200,000
January 19-20, 1916	120,000
January 29-30, 1916	105,000
February, 1920	130,000
March, 1938	95,000
December, 1965 - January, 1966	67,000
February 21 - May 29, 1973	22,000
March, 1978	130,000
December, 1978	140,000
January, 1979	100,000
March, 1979	67,000
February, 1980	180,000

Source: U.S. Army Corps of Engineers

south of Washington Street, Sky Harbor International Airport, and the Southern Pacific railroad yards.

More recently, the Salt River did not flow between 1974 and 1977. However, twice in 1978 and once in 1979, rates exceeded 100,000 cubic feet per second. In February of 1980 the river flow peaked at 180,000 cubic feet per second. Recent figures by the U.S. Corps of Engineers identify a flow of 175,000 feet per second at Granite Reef Dam as a 50 year flood, that is, flows of this magnitude normally have only a two percent chance of occurring in any given year.

BRIDGES

There are currently 20 road crossings over the Salt River in the Phoenix area (these crossings are listed in Illustration 2). Currently, thirteen of these crossings are dip sections, which would be closed with even small rates of flow. In addition, three bridges (40th Street, Hohokam Expressway, and 7th Avenue) were designed for only modest rates of flow -- 8,000, 15,000, and 24,000 cubic feet per second respectively. Four bridges have a capacity of 180,000 to 200,000 cubic feet per second. These are Alma School Road, Mill Avenue, Central Avenue, and I-10. The Alma School Road Bridge is new, and channel improvements have recently been completed for the I-10 bridge which will

ILLUSTRATION 2

SALT AND GILA RIVER CROSSINGS

	ESTIMATED FLOW CAPACITY OF BRIDGES (In 1000's of cubic feet per second)	FLOW AT GRANITE REEF DAM THAT WILL LIKELY RESULT IN CLOSING OF CROSSINGS (In 1000's of cubic feet per second)
SALT RIVER		
Gilbert Road	dip	minimum
Country Club Drive (SR 87)	dip	minimum
McKellips Road	dip	minimum
Alma School Road	200	200 - 240
Hayden Road	dip	minimum
Scottsdale Road	dip	minimum
Mill Avenue (US 60)	200	210 - 250
Southern Pacific Railroad	200	210 - 250
48th Street	dip	minimum
Hohokam Expressway	15	15 - 20
40th Street	8	8 - 10
Maricopa Freeway (I-10)	180	190 - 240
24th Street (Jan. 1981)	180	190 - 240
16th Street	closed	closed
7th Street	dip	minimum
Central Avenue	200	220 - 270
7th Avenue	24	26 - 32
19th Avenue	dip	minimum
35th Avenue	dip	minimum
51st Avenue	dip	minimum
67th Avenue	dip	minimum
91st Avenue	dip	minimum
GILA RIVER		
115th Avenue	dip	minimum
El Mirage Road	closed	closed
Bullard Road	dip	minimum
Jack Rabbit Trail	closed	closed
Airport Road	12	11 - 13
State Route 85	33	30 - 36

hopefully eliminate past problems. A new bridge with a capacity of 180,000 cubic feet per second is scheduled to open at 24th Street in January 1981 (currently the 24th Street crossing is a dip section). Also, a new high capacity bridge is under construction at 51st Avenue; but it is not scheduled to open until April or May 1981.

Prospects for minor flows in the Salt River are considerable because reservoirs were filled last year. Minor flows will not create emergency conditions, but many people will be inconvenienced. These minor flows could be more disruptive than in the past because several bridges have been destroyed by previous flooding (namely Hayden Road, Scottsdale Road, 24th Street, 16th Street, 7th Street, 35th Avenue, and 51st Avenue).

It is not possible to fully predict which bridges will be open at various rates of flow. There are several reasons for this: First, river flow rates vary within the urban area. Generally flow rates decline down river, but this can be offset by heavy local rain falls. Second, duration of high flow rates influence the amount of scouring around bridge piers. (Scouring caused the closing of I-10 in 1980.) The most critical problem in forecasting bridge closures is that the volume of peak flow a bridge can accommodate is known only in very general terms. For

example, Hayden Road bridge was designed for 25,000 cubic feet per second, but accommodated flows up to 72,000 cubic feet per second during the last flood. Conversely, the I-10 bridge which was designed for 180,000 cubic feet per second, closed four out of seven times when exposed to floods of less than this magnitude. However, recent improvements to the I-10 bridge and channel work indicates a reoccurrence of this event is unlikely.

In order to gain some sense of which bridges might be in service at various flow rates, some calculations were made and the results are included in Illustration 2. The capacity of each bridge was obtained from standard sources: U.S. Army Corps of Engineers, Maricopa County Engineer's office, City of Phoenix Engineer's office, and Arizona Department of Transportation. Adjustments for the usual decline in flow below Granite Reef Dam were made using information from the Corps of Engineers. And finally, a range of 10 percent uncertainty was incorporated into the figures shown in Illustration 2.

In general, a flow rate of 200,000 cubic feet per second might not close any of the six major bridges over the Salt River, or it could destroy all of them. More likely, in very broad terms, one or two major bridges might close with a flow rate of 150,000 cubic feet per second at Granite Reef

Dam, while some might withstand 250,000 cubic feet per second.

RESPONSIBILITIES

It is proposed that the owner of each bridge be responsible for it. That is, in the event of a major flood the County would be responsible for Alma School Bridge -- in this case traffic management problems may need to be coordinated with Scottsdale, Mesa and the Salt River Indian Reservation. Although the State owns Mill Avenue Bridge, by cooperative arrangement the City of Tempe has undertaken responsibility for related traffic control. The Southern Pacific would be responsible for its railroad bridge, while I-10 is a State responsibility. The City of Phoenix would be responsible for bridges at Central Avenue and 24th Street.

The State of Arizona would be responsible for initiating emergency train service across the Salt River. The State would contract with Amtrak and coordinate with the Southern Pacific Railroad for train service. ADOT would be responsible for planning stops and schedules, managing stations, and selling tickets.

The initiation of emergency flood bus service would be the responsibility of the City of Phoenix. Phoenix Transit

would manage this service and the State would assume financial responsibility. General aspects of level of service, routes, schedules, and park and ride facilities would involve coordination between the State, Phoenix Transit, and the Cities of Phoenix, Tempe, and Mesa.

Individuals responsible for various ADOT flood related actions are detailed in Appendix D. Also, further details on ADOT procedures for responding to emergencies are discussed in the ADOT document A Guide for Emergency Highway Traffic Regulations.

SECTION III

LIST OF ACTIONS

This section lists principal actions recommended to alleviate transportation problems in the event of another flood. These actions, and suggestions as to when final preparations and implementation should take place, are presented in Illustration 3. It should be recognized, of course, that this plan cannot anticipate all events, and thus evaluation of actual circumstances will be critical in determining what actions should actually be implemented and when implementation should take place.

Final preparations for flood actions have been divided into five phases and tied to anticipated flow rates at Granite Reef Dam. These flow rates can be accurately projected 12 to 24 hours in advance by Salt River Project. The final preparation phases are:

Phase I -- Starts when the river is projected to start flowing and lasts to 10,000 cubic feet per second

ILLUSTRATION 3

LIST OF FLOOD EMERGENCY ACTIONS

ACTIONS	RESPONSIBLE AGENCY	NUMBER OF REMAINING TRAFFIC LANES FOR IMPLEMENTATION
PHASE I (less than 10,000 cfs)		
1. Establish system for public information.	See Illustration 4	Less than all
2. Install barricades and detour signs at closed crossings.	ADOT, Maricopa County, Cities of Phoenix and Tempe	Less than all
3. Reroute buses away from closed crossings.	Phoenix Transit	Less than all
4. Mark pavement on Mill Avenue Bridge for two-way traffic.	City of Tempe	Less than all
PHASE II (10,000 to 35,000 cfs)		
• Includes actions 1-4		
5. Establish emergency helicopter service	Department of Public Safety	Less than 24 (Major bridges only)
6. Increase promotion of ridesharing and reduce turn-around time for computer matching.	Project Pool-It ADOT	Less than 24 (Major bridges only)
7. Institute on-site carpool matching with major employers. All employees who cross the river should be encouraged to submit an application form.	Project Pool-It Major Employers	Less than 24 (Major bridges only)
8. Encourage employers to allow flex time for employees who must cross the river.	Governor Mayors	Less than 24 (Major bridges only)

ILLUSTRATION 3
(continued)

ACTION	RESPONSIBLE AGENCY	NUMBER OF REMAINING TRAFFIC LANES FOR IMPLEMENTATION
9. Discourage unnecessary travel across the Salt River	Governor and Mayors	less than 24 lanes (major bridges only)
PHASE III (35,000 to 180,000 cfs)		
• Includes actions 1-9		
10. Implement traffic control measures on bridge approaches such as restricting left turns	Maricopa County, Cities of Phoenix and Tempe	less than 20 lanes
11. Evaluate potential priority approaches to remaining bridges for use by high occupancy vehicles and establish where appropriate	ADOT, Maricopa County, Cities of Phoenix and Tempe	less than 16 lanes
12. Initiate flood bus service	ADOT, Phoenix Transit	less than 16
13. Establish park-and-ride lots for ridesharers and bus users	ADOT, Cities of Phoenix, Mesa, Tempe	less than 16
14. Activate van pool programs with major employers	Project Pool It Major employers	less than 16
15. Coordinate and enhance commuter air service between local airports	ADOT, Aeronautics Division	less than 16
16. Notify vehicles entering the State of bridge conditions and encourage rerouting.	ADOT, Motor Vehicles Division	less than 16
17. Activate flood train service	ADOT, Transportation Planning Division	less than 12

ILLUSTRATION 3
(continued)

ACTION	RESPONSIBLE AGENCY	NUMBER OF REMAINING TRAFFIC LANES FOR IMPLEMENTATION
PHASE IV (180,000 to 200,000 cfs)		
• Includes actions 1-17		
18. Restrict remaining bridge to emergency vehicles, vehicles carrying essential personnel and supplies, and high occupancy vehicles	To be determined	less than 8
PHASE V (more than 200,000 cfs)		
19. Secure air carrier and military aircraft to transport essential personnel and supplies	To be determined	no bridges

Phase II -- Starts with a projection of 10,000 cubic feet per second or more and lasts to 35,000

Phase III -- Starts with a projection of 35,000 cubic feet per second or more and lasts to 180,000

Phase IV -- Starts with a projection of 180,000 cubic feet per second or more and lasts to 200,000

Phase V -- Starts with a projection of 200,000 cubic feet per second or more

Actual implementation of actions has been tied to the number of total lanes remaining in operation across the Salt River. All major bridges are four lanes (two in each direction) except for I-10 which is eight lanes.

A flow of 2,000 to 10,000 cubic feet per second will close all dip sections across the Salt River, but will probably not close any of the current seven bridges. Under these conditions only minor actions are needed such as rerouting buses and barricading closed roads.

Flows of 35,000 cubic feet per second could leave only four open bridges across the Salt River and none across the Gila. Under these conditions emergency helicopter service would need to be provided and voluntary actions would be encouraged. That is, individuals would be encouraged to minimize trips across the river, commuters would be encouraged to carpool, and employers would be encouraged to allow flex time for employees who must cross the river.

As flows approach 180,000 cubic feet per second major bridges could close. With less than 16 lanes across the Salt River (for example, if only I-10 and Mill Avenue remained) it is recommended that high occupancy approach lanes be established for remaining bridges, that emergency bus service be initiated, and that ADOT become involved in coordinating and enhancing air service between local airports on opposite sides of the river. With less than 12 lanes it is recommended that ADOT establish emergency train service.

If flows exceed 200,000 cubic feet per second, the possibility of having only one bridge or no bridges is rapidly approached. Under the one bridge situation (less than 8 lanes) it is recommended that the bridge be restricted to only emergency vehicles, vehicles carrying essential personnel and supplies, and high occupancy vehicles. With no bridges prospects of using military aircraft to provide emergency service should be considered.

SECTION IV

PUBLIC INFORMATION

When Salt River flooding closes or threatens the closure of bridges, citizens need immediate information on travel alternatives. As information becomes available to public agencies, it should be released to the electronic and print news medias. Public agencies also need to establish telephone numbers for public information. Use of widely published and adequately staffed public information numbers also helps keep regular telephone numbers clear by minimizing disruptions from a high level of public inquiries.

A list of public information telephone sources is presented in Illustration 4. Sources of general emergency information are the Arizona Division of Emergency Services, the Maricopa County Department of Civil Defense and Emergency Services, and Community Information and Referral Services.

Information on bridge closings and traffic control measures on remaining bridges can be obtained from the agency responsible for each bridge (namely the Arizona

ILLUSTRATION 4

FLOOD EMERGENCY PUBLIC INFORMATION SOURCES

AGENCY	TYPE OF INFORMATION	TELEPHONE NO.
Arizona Division of Emergency Services	All aspects of emergency	231-0400
Maricopa County Dept. of Civil Defense and Emergency Services	All aspects of emergency	273-1411
Community Information and Referral Services	All aspects of emergency	263-8856
Arizona Department of Public Safety	Bridge closings and traffic control on State Highways	262-8261
Maricopa County Sheriff's Office	Bridge closings and traffic control measures related to the Alma School Road Bridge	256-1000
Phoenix Police Department	Bridge closings and traffic control on 24th Street and Central Avenue	262-6811
Tempe Police Department	Bridge closings and traffic control on Mill Avenue Bridge	968-8305
Maricopa Association of Governments Transportation and Planning Office	High occupancy vehicle routes	To be announced
Project Pool It	Auto and van pooling	248-7283
Phoenix Transit	Bus service	257-8426
ADOT Aeronautics Div.	Air Service	To be announced
ADOT Transportation Planning Division	Train Service	To be announced

Department of Public Safety, the Maricopa County Sheriff's office, and the Police Departments of Tempe and Phoenix). Information on all bridge closings can best be obtained from the Maricopa County Department of Civil Defense and Emergency Services, while information on high occupancy vehicle routes on remaining bridges could be obtained from the Maricopa Association of Governments Transportation and Planning Office.

Other sources of public information on emergency transportation matters include the following: Project Pool It can provide information on carpooling and Phoenix Transit can provide information on bus service. Within ADOT, the Aeronautics Division could provide public information on available emergency air service, and the Transportation Planning Division will provide public information on emergency train service.

SECTION V

TRAFFIC CONTROL MEASURES

This section considers traffic control measures for the five major bridges across the Salt River. Special attention is given to high occupancy vehicle (HOV) routes. These routes are an integral element of this plan as they are a means of promoting carpooling and maximizing the use of available buses. This section also considers procedures for minimizing interstate traffic and promoting staggered work hours.

The plan suggests that HOV routes should be operationalized on remaining bridges when less than 16 traffic lanes remain open across the Salt River. It is also suggested that HOV's include buses and all vehicles with three or more people. The details of operation and implementation as well as the final decision of whether to install HOV routes will rest with the agency responsible for each bridge or roadway.

CENTRAL AVENUE (PHOENIX)

Traffic control contingency plans for the Central Avenue Bridge are similar to those used during last year's flood. These measures have been documented in Traffic Control Measures During the 1980 Salt River Flood which was prepared by the Maricopa Association of Governments Transportation and Planning Office.

As detailed in this document, minor streets joining Central Avenue just prior to the bridge could be barricaded to prevent vehicles from side streets crowding into the main stream of traffic on Central Avenue. The exception to this is that Watkins Street could be open to southbound HOV's and Victory Street could be open to northbound HOV's (see Appendix A for map). A police officer could be stationed at each of these intersections to allow HOV's to enter the main stream of Central Avenue traffic with little delay. If this scheme were implemented high occupancy vehicles should experience little delay in crossing the river.

24TH STREET (PHOENIX)

Traffic control measures on the 24th Street Bridge are the responsibility of the City of Phoenix. If warranted, HOV express routes similar to those outlined for Central

Avenue could be implemented for the 24th Street Bridge. To accomplish this Wood Street between 32nd Street and 24th Street could be closed to all but local traffic and northbound HOV's. Similarly, Magnolia and a set of other streets between 24th Street and 16th Street (see Appendix A) could be used by southbound HOV's.

I-10 (ADOT AND PHOENIX)

Two ramps close to the I-10 Salt River Bridge could give priority access for HOV's. For eastbound traffic the 20th Street ramp could be closed to all vehicles but HOV's. Westbound HOV's could be given a priority to enter the 40th Street ramp. HOV lanes could be established on 40th Street between I-10 and University as well as between I-10 and Broadway (see Appendix A for map).

MILL AVENUE (TEMPE)

Contingency traffic control measures for Mill Avenue Bridge are similar to those used last year and are described in Traffic Control Measures During the 1980 Salt River Flood. As detailed in this document, HOV express routes for northbound traffic could be implemented between College Avenue and Mill Avenue using 5th Street. For southbound

traffic an HOV lane could be implemented on Curry Road between College Avenue and Mill Avenue (see Appendix A).

ALMA SCHOOL ROAD (COUNTY, MESA, AND SALT RIVER INDIAN COMMUNITY)

The Alma School Road Bridge is owned by Maricopa County. However, emergency traffic control measures for this bridge also need to be coordinated with the cities of Scottsdale and Mesa, as well as the Salt River Indian Community.

The priority access for southbound HOV's could consist of routing HOV's east on McDowell Road and then south on Alma School Road to McKellips. At McKellips the HOV's could be admitted to the traffic stream crossing the bridge at the discretion of a police officer controlling that traffic signal (see Appendix A for map).

Northbound HOV traffic could be accommodated with an HOV route that starts on McLellan at Country Club Drive, then goes west to Alma School Road where a free right turn is permitted onto Alma School Road. An HOV lane could then continue north in the right hand northbound lane to the bridge, HOV's will mix with the regular traffic near the south end of the bridge. In order to provide for three lanes of northbound traffic, the left turn lane on Alma

School Road would be needed as a northbound lane from McLellan to McKellips.

This plan results in the southbound lane of Alma School Road between McDowell and McKellips Roads being closed to all but HOV's and Salt River Indian Community members.

INTERSTATE TRAFFIC

With flood conditions in the Phoenix area, urban commuters are not the only travelers involved in traffic delays. Interstate traffic through the Phoenix area must also be considered. This section discusses those activities to be initiated in diverting traffic around a major flood situation in the Phoenix metropolitan area. Because of restricted through traffic and limited options on many routes, this consideration will be limited to I-10.

It is recommended that the ADOT Highway Division assume a leadership role in encouraging the rerouting of Interstate traffic. It should develop alternative routes and provide this information to the media. Also, a leaflet should be developed suggesting alternative routes that can be handed out at State Port of Entry stations. At these stations, ADOT Motor Vehicle Division personnel could provide rerouting information to commercial traffic and Agricultural

and Horticultural could provide information to passenger vehicles.

One alternative route for traffic traveling between Tucson and Los Angeles would be to use I-8 through San Diego. For traffic with shorter distances to travel, a possible alternative route (as shown in Illustration 5) might be a combination of I-8, State Route 85, and old U.S. Route 80 (now a county road). This route would need to be restricted to lightweight vehicles as old U.S. Route 80 crosses the Salt River on Gillespie Dam which has a 10,000 pound weight restriction. ADOT needs to further coordinate with the county on the feasibility of this route. Signing for alternative routes would be the responsibility of ADOT on State routes and of the County Highway Department on county roads.

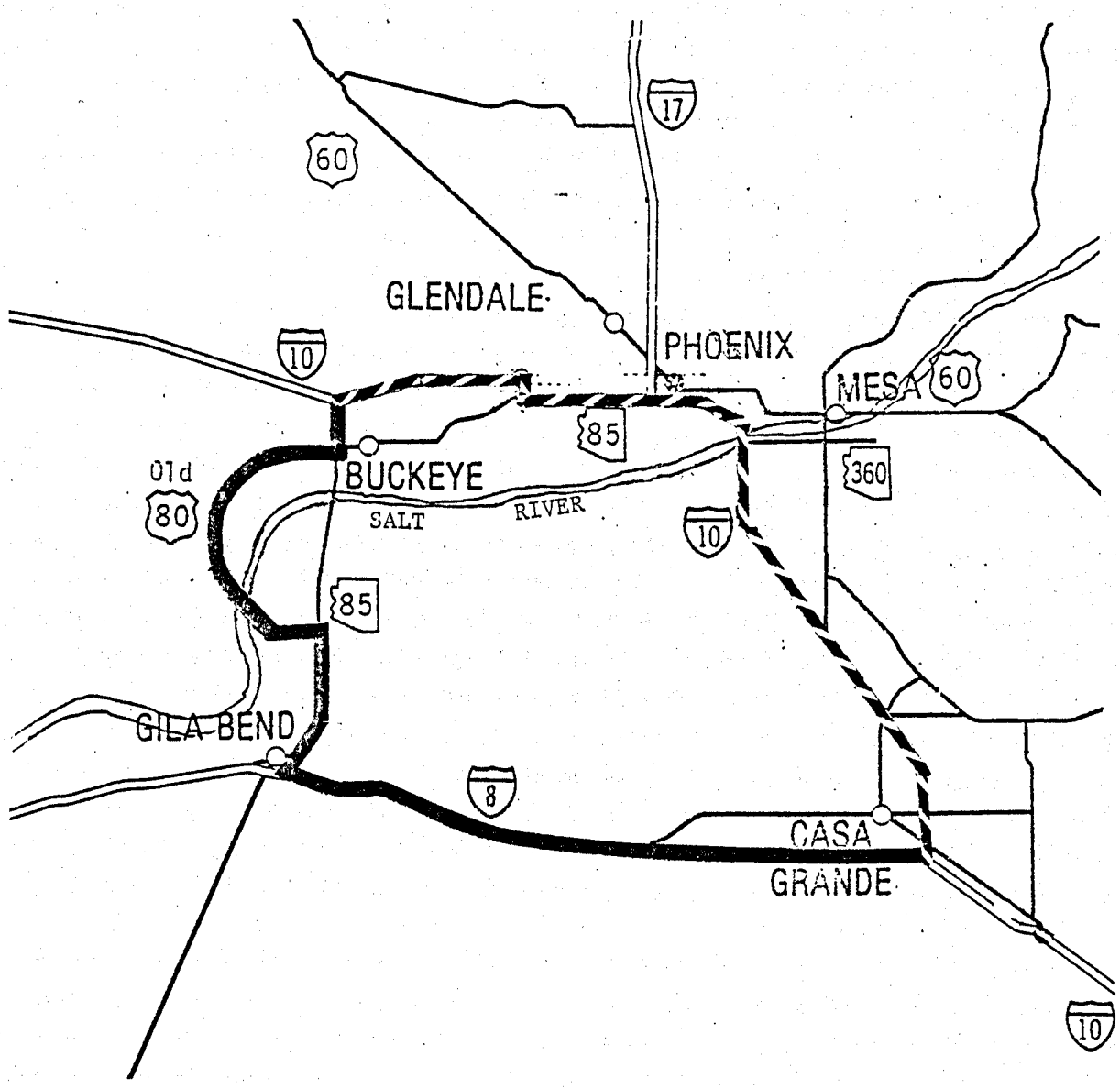
STAGGERED WORK HOURS

During the peak period and with only two or three bridges across the river, traffic delays will be very long and mass transit facilities will be packed. Traffic delay and mass transit usage will be less intense in the off peak.

To minimize traffic problems and employee absenteeism, the Governor, Mayors and others should encourage employers to stagger working hours. There are several approaches to staggered work hours including starting the work day earlier or later. Another approach is to allow flexible working hours for employees who must cross the Salt River.

ILLUSTRATION 5

I-10 BY-PASS ROUTE FOR MAJOR PHOENIX FLOODS



FLOOD BY-PASS ROUTE

NORMAL ROUTE

SECTION VI

RIDESHARING

Ridesharing through carpools and vanpools has the greatest potential for minimizing transportation problems during a major flood. Under normal conditions 74 percent of all the autos crossing the river carry only one person.

The previous section discusses procedures which would allow high occupancy vehicles to avoid the long traffic lines waiting to cross the river, thus providing an incentive for ridesharing. This section considers methods to facilitate getting people together to share the ride. Specifically, this section considers methods to intensify commuter matching, promote vanpooling, and maximize the use of ridesharing lots. The implementation of the intensified commuter matching and vanpooling programs will be the responsibility of Project Pool It. The establishment and management of ridesharing lots should be the responsibility of ADOT and the Cities of Phoenix, Tempe, Mesa and Scottsdale.

COMMUTER MATCHING

Actions to intensify commuter matching procedures by Project Pool It should be initiated under Phase II. Public service announcements which inform the public of services available would be delivered to all media outlets and Project Pool It's office hours would be extended. Various agencies would be contacted regarding the availability of temporary personnel to accommodate the increased work load. Specifically, help would be needed for coding applications, telephone answering, and clerical duties.

At this time arrangements would be made with the ADOT Information Systems Group for twenty-four hour "turnaround" time to process carpool matching lists. This procedure was instituted during last year's floods and resulted in greatly improved service to clients and a much higher degree of "matching".

Major employers, located on both sides of the river, could be contacted regarding the possibility of allowing Project Pool It to institute on-site carpool matching. All employees who must cross the river would be encouraged to submit an application form. These applications could then be processed and match lists provided to all applicants.

These actions could be initiated upon the first indication of a potential flooding problem.

VAN POOLS

At the heighth of last year's flood with only two bridges open, Valley Chevrolet dealers loaned passenger vans to major employers to shuttle employees across the Salt River. It is anticipated that this vanpool program would be activated again in the event of floods reducing the number of lanes crossing the river to less than 16. Preliminary steps necessary for implementing the vanpool program are detailed below.

1. Alert the Motor Vehicle Division of ADOT of the impending need for the issuance of temporary window plates for vans and for the driving records of van drivers.

2. Contact Executive Vice President of Arizona Automobile Dealer's Association and request that he send a letter to all dealers with an appeal that they loan vans for emergency transportation.

3. Print a supply of "hold harmless" agreements

for dealers and companies to be involved in the loan arrangements.

4. Contact officials at banks and GMAC to request that they consider waiving the "flooring costs" on loaned vehicles.

5. Contact major employers to be affected by bridge problems to prepare an attestation of the fact that the vehicle loaned will be maintained in a safe and reliable condition, and to supply proof of insurance.

Once these preliminary measures have been completed, the vanpooling program can be activated as conditions warranted. The first step would be to solicit the loan of vans from dealers. As vans become available, the Motor Vehicle Division will need to be contacted to issue temporary plates and to check the name of the designated driver. If the driver's record is satisfactory, the organization can be notified where to pick up the van and that plates will be available at the Pool It office.

RIDESHARING LOTS

Under Phase III conditions, priority approach lanes could be reserved for vehicles carrying three or more persons. The vehicles using these lanes will consist primarily of buses, vanpools and formalized carpools. There are many drivers who, due to the nature and/or location of their jobs or their place of residence, are unable to enter into a structured carpooling arrangement. Likewise, there are a number of persons who either do not drive or prefer not to drive and also may prefer not to use the bus.

The potential exists for utilizing bus park and ride lots to form "pick up" carpools. (Existing and potential lots are listed in Appendix B.) This would enable additional vehicles to use the priority approach lanes and potentially allow more people to cross the river. Under this arrangement, signs could designate waiting areas for those wishing a ride to major destination areas. Lots south of the river, for example, would have areas for Downtown, Uptown, Capitol, etc. Drivers looking for riders could simply pull into the lot and determine if riders were available. Combining ridesharing lots with bus park and ride lots provides a safety outlet for "pick-up" riders. In the event that they are not picked up, they have the option of using a bus.

SECTION VII

BUS SERVICE

During the last flood bus service was greatly expanded to reduce vehicle demand for the two remaining bridges. ADOT initiated express bus service between Mesa, Tempe and downtown Phoenix, and Phoenix Transit established emergency shuttle service between South Phoenix and downtown. Once fully established (and prior to the opening of the I-10 bridge) these special flood buses carried nearly 7,000 people a day across the Salt River while other buses carried another 17,000. In total, buses accounted for 7.9 percent of all person trips and 21.9 percent of the peak period trips across the Salt River.

This section outlines an approach for providing emergency bus service in the event of another major flood. Because of the large number of combinations as to which bridges will actually remain open during a major flood, this section is limited to developing one scenario of emergency bus service; this scenario is based on the assumption that the only two remaining bridges are on Mill and Central Avenue. By focusing on only one scenario sufficient detail can be developed to estimate costs, but yet most aspects of

this scenario can be adapted to other bridge situations. It should be recognized, of course, that many actual events, in addition to remaining bridges, will shape the actual bus service that might be instituted under emergency conditions.

The principal elements of this section are Responsibilities, Routes, Park and Ride Facilities, Fare Collection and Costs.

RESPONSIBILITIES

Several organizational schemes could be used to provide emergency bus service. However, this plan recommends that the State assume financial responsibility for special flood bus service, and that this service be provided by the City of Phoenix through Phoenix Transit. It should be clarified that Phoenix Transit is a company under contract to the City of Phoenix — Phoenix Transit operates the bus system, but the City of Phoenix provides overall policy direction.

The initiation of emergency flood bus service would be the responsibility of the City of Phoenix. The nature of the contract for financing this service remains to be negotiated. However, one approach would be for the State to contract with Phoenix Transit on a cost plus basis.

General agreement on level of service, routes, schedules, and park and ride facilities should be reached between ADOT, Phoenix Transit, and the Cities of Phoenix, Tempe, and Mesa. Phoenix Transit would be responsible for subcontracting for buses and drivers, operating these buses, and collecting fares. Additional park and ride facilities would be the responsibility of ADOT and local jurisdictions.

Because of the State's financial responsibilities, ADOT should closely coordinate contingency planning with the Federal Emergency Management Agency (FEMA). This agency administers federal funds which can pay for a substantial portion of certain aspects of disaster relief. It should be recognized that many aspects of flood operations will not be covered by federal funding.

ROUTES

A potential system of emergency bus routes has been developed assuming that Mill and Central are the only two remaining bridges. This system is largely an expansion of service on existing transit routes 60, 22, 93, 94 and 86. Flood bus routes are mapped in Illustration 6, and characteristics of each route are presented in Illustration 7. Principal aspects of each of these routes are highlighted in the following paragraphs.

ILLUSTRATION 6

FLOOD BUS ROUTES

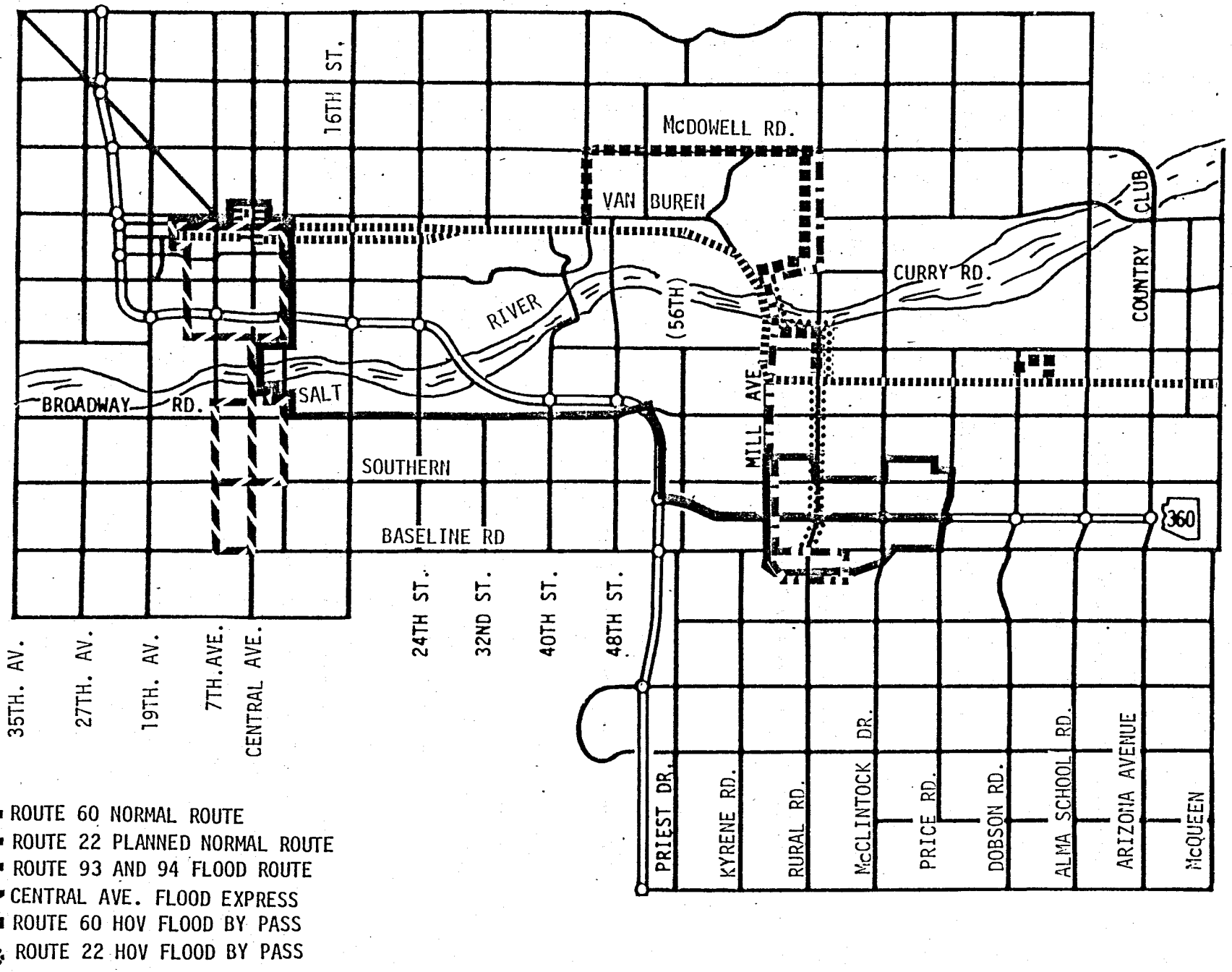


ILLUSTRATION 7
SCENARIO CHARACTERISTICS OF PHOENIX TRANSIT
BUS SERVICE UNDER MAJOR FLOOD CONDITIONS

ROUTE	60			22			93 & 94			CENTRAL AVENUE			TOTAL		
	REGULAR	FLOOD	BOTH	REGULAR	FLOOD	BOTH	REGULAR	FLOOD	BOTH	REGULAR	FLOOD	BOTH	REGULAR	FLOOD	BOTH
FREQUENCY (in minutes)															
Peak[a]	30	15	10	30	30	30	30	30	15	–	5	–	–	–	–
Off Peak	60	30	20	30	30	30	–	–	–	–	30	–	–	–	–
NO. OF ONE-WAY TRIPS															
Peak	22	64	86	27	32	59	19	32	51	208	192	400	276	320	596
Off Peak	12	24	36	25	24	49	–	–	–	140	24	164	177	72	249
LOAD FACTOR															
Peak	.6	.5	–	.6	.5	–	.8	.8	–	.5	.35	–	–	–	–
Off Peak	.3	.3	–	.3	.3	–	–	–	–	.3	.2	–	–	–	–
NO. OF PASSENGERS[b]															
Peak	673	1472	2145	826	736	1562	775	1178	1953	5304	3091	8395	7578	6477	14055
Off Peak	184	331	515	383	331	714	–	–	–	2142	220	2362	2709	882	3591
FARE															
Basic Adult	$0.500/$1.00			$0.500			$0.65			$0.65					
Average	$0.347/$0.97			$0.347			$0.63			$0.63					
REVENUES	$1000[d]			$185[e]			$742			$2086			$4013		
NO. BUSES REQUIRED	6			2			8			12			28[c]		
GROSS COSTS/DAY	$2247			$749			$2995			$4494			$10485[f]		
NET COSTS/PASSENGER	$0.69			$0.53			$1.91			$0.73			$0.88		

a For emergency conditions the peak period is defined as 5:00-9:00 a.m. and from 3:00-7:00 p.m.
b 46 seats per bus assumed for flood buses, and 51 seats used for regular buses.
c Totals do not include four buses to support the flood train. The estimated cost of flood train support is $1508.
d Two-thirds of the fares were estimated at 34.7 cents and one-third at 97 cents.
e One-half of the passengers were estimated to use transfers which are free.
f Costs were estimated at $306.21 per bus, plus a 15% management fee, plus $625 for extra personnel.

Route 60 runs from downtown Mesa to downtown Phoenix. For flood purposes, this route would likely need to be modified in the vicinity of Mill Avenue Bridge to minimize traffic conflicts and maximize the use of high occupancy vehicle lanes. Also, flood buses could terminate around Tri-City Mall rather than downtown Mesa. A potential schedule for this route would be to increase peak period service from every half hour to every 10 minutes, and increase off peak service from every hour to every 20 minutes.

Route 22 runs from 67th Avenue along Camelback Road to Scottsdale Road and then south to Arizona State University. In January Route 22 may be extended to Baseline Road. Additional flood buses could run on the lower end of this Route from McDowell Road to Baseline Road. A potential schedule would be to run at half hour intervals all day long.

Routes 93 and 94 are express routes which run from South Tempe to downtown Phoenix. Usually these buses cross the Salt River on I-10 -- under this scenario it is assumed they will cross on Central Avenue. Peak period bus service on these routes could be increased from every half hour to every 15 minutes. These additional buses might be considered a lower priority than other flood bus service

because they carry passengers only one way, that is, on the return trip these buses are empty. Alternatives for more fully utilizing these buses should be explored.

Under this scenario, it is suggested that express flood bus service be established on Central Avenue to run between downtown Phoenix and Baseline Road. In actuality, to minimize conflicts with delayed traffic, and to maximize use of high occupancy vehicle lanes, this route would likely run more on 7th Street and 7th Avenue than on Central Avenue. A potential schedule would be five minute service during the peak period and 30 minute service during the off peak.

It is estimated that approximately four buses will be needed to support the Flood Train. These buses would be timed with train arrivals and departures and circulate between the Phoenix Depot, downtown, and the Capitol. Possibilities for more fully utilizing these buses should be explored.

In the event of a major flood, Route 17 (which runs between Sky Harbor and downtown) should be monitored to be sure the persons flying from Mesa to Sky Harbor have adequate bus service.

Under this scenario, the number of bus runs serving Tempe and Mesa will increase from 105 to 281, while the number of bus runs serving South Phoenix will increase from 348 to 546. In actuality, the number of bus runs can vary considerably depending on traffic congestion and the extent to which runs are scheduled in the off peak.

PARK AND RIDE FACILITIES

In order to encourage bus usage, as well as carpooling, it would be desirable to increase park and ride facilities along emergency bus routes. There are various options for expanding park and ride facilities. Some existing and potential flood emergency park and ride lots are listed and described in Appendix B.

During the last flood, ADOT maintained two large lots (Arizona State University and Tri-City Mall) for express emergency bus service. However, the emergency bus service proposed by this plan is different than last year; it has little express service, fares will be collected on board, and for insurance and other reasons Phoenix Transit prefers that buses they operate stay on public streets at all times. Under this system a set of more numerous smaller lots seems desirable.

ADOT and the cities of Phoenix, Tempe, Mesa and Scottsdale would appear to be the most reasonable jurisdictions to play a lead role in expanding existing park and ride lots and establishing new ones for emergency purposes. ADOT should be prepared to provide signing which designates lots as park and ride lots. Phoenix Transit should be prepared to provide public information about these lots. Once established, ADOT or local jurisdictions should monitor these lots to be sure they are operating properly. Where problems arise lot changes may be necessary, or the assistance of local police may be needed. Certain large lots may require permanent personnel to manage them.

FARE COLLECTION

Fares charged for emergency service are recommended to be the same as regular Phoenix Transit fares. The basic adult fare would thus usually be 50 cents or 65 cents. However, as a result of various types of discounts the actual average fare collected per person is somewhat less than basic adult fares (see Illustration 7 for details).

It is recommended that fares be collected on board flood buses. However, unlike Phoenix Transit buses, most leased buses will not have fare boxes. Also, leased bus drivers do

not generally collect fares. Details of fare collection remain to be worked out.

BUS SUPPLIERS AND COSTS

The level of emergency service outlined by this scenario is estimated to require 32 buses. The distribution of these buses by routes is specified in Illustration 7.

It is unlikely that Phoenix Transit will be able to provide any additional buses should a flood occur in the next several months. Therefore, other potential suppliers were contacted. Sun Tran of Tucson may be able to supply 10 buses on the condition that they be returned in good condition and that Phoenix Transit supply fuel and drivers. In addition, four bus companies that provide charter service have been contacted and should be able to supply the following number of buses:

1. Arizona Bus Leasing -- 2 to 5 buses
2. Sun Valley -- 5 to 7 buses
3. Greyhound -- 20 to 35 buses
4. Trailways -- 5 to 7 buses

Charges for these local buses including drivers are:

1. Arizona Bus Leasing -- $136 with a five hour minimum plus $22 each additional hour.
2. Sun Valley -- $151 with a five hour minimum and $23 each additional hour.
3. Greyhound -- $150 with a three hour minimum or $270 for three to eight hours, each additional hour over eight costs $22 plus a 4.33 percent fuel surcharge.
4. Trailways -- $209 with a five hour minimum, each additional hour costs $32 plus a 4.52 percent fuel surcharge.

For cost estimation purposes, the cheapest combination of locally available buses was used. Total costs for leasing and operating 32 buses in the manner specified in this section was estimated by Phoenix Transit to be $11,993 per day (see Illustration 7 for details by route). Included in this daily amount are base costs for rental of buses and drivers, certain additional Phoenix Transit labor costs, and a 15 percent management fee.

When this system is fully operational and there are only eight lanes open across the Salt River, daily ridership on emergency flood buses is estimated to carry about 7,000 persons and daily revenues are estimated to be about $4,000.

Gross cost (including bus service for the flood train) is estimated to be about $12,000.

It must be reiterated that what has been put forth in this section is a scenario, and will need to be modified to fit actual conditions. For example, routes will need to be adjusted to connect with available bridges. Also, it is clear that the level of service will need to be adjusted based on severity of the problem and the availability of buses.

SECTION VIII

TRAIN SERVICE

In order to help alleviate severe transportation problems that occurred during the last flood, ADOT initiated train passenger service between Phoenix and Mesa. This train made use of Amtrak equipment and the Southern Pacific line across the Salt River. While the I-10 Bridge was closed, the train typically carried 5,000 passengers a day. This equates to 1.8 percent of all persons crossing the river and 3.9 percent of the peak period person trips.

This section outlines a procedure which may be applied should emergency train service be needed again. It draws heavily on last year's experience. Information is presented under the headings of Responsibilities, Stations, Equipment, Schedules, Fare Collection and Costs.

RESPONSIBILITIES

It should be ADOT's responsibility to monitor bridge conditions and flood potential, and to advise the Governor's Office if emergency train service is needed. Conditions which would call for the train would likely be the loss of

the I-10 Bridge or reduction of the number of traffic lanes across the Salt River to less than twelve lanes. Also, of course, the Southern Pacific Railroad Bridge could not be closed or seriously threatened by closure.

Principals in negotiating procurement of the train should include the Governor's Office, Amtrak, and the Southern Pacific Railroad. Last year's contacts included B. F. Biaggini, Southern Pacific Chief Executive Officer, San Francisco; and Louis J. Mayberry, Assistant Manager, Amtrak Western Division.

The ADOT project manager for flood train service should arrange for the development of required legal agreements and funding commitments. Last year's train involved a contract between ADOT and Amtrak, and a contract between Amtrak and Southern Pacific. Last year's train was contracted for on a weekly basis, and operation was scheduled to terminate after 30 days. Concurrently, funding arrangements should be made with the Federal Emergency Management Agency (FEMA).

Once a decision has been made to have emergency train service, it would be ADOT's responsibility (in coordination with Amtrak, Southern Pacific, and the Cities of Phoenix, Tempe and Mesa) to identify stops and develop a schedule.

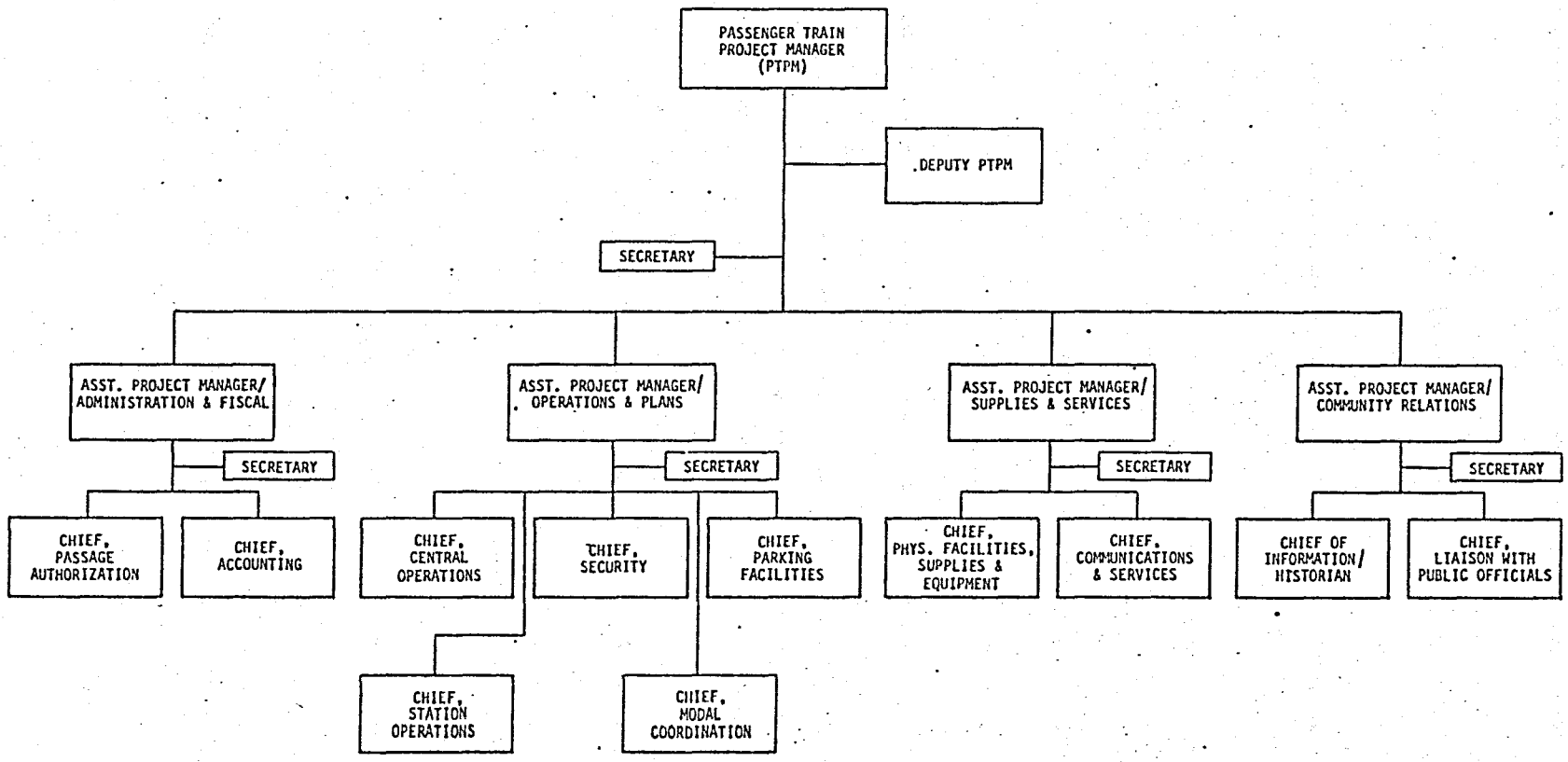
Under operating conditions, Amtrak and Southern Pacific would be responsible for running the train while ADOT would be responsible for managing stations. Amtrak personnel would be responsible for collecting tickets and loading and unloading passengers. ADOT, on the other hand, would be responsible for providing an adequate loading surface, lighting and parking facilities at each station. ADOT would also be responsible for selling tickets and providing public information.

A potential organizational chart for ADOT Flood Train functions is presented in Illustration 8. Responsibilities for positions shown by this chart are discussed in the ADOT document How Do You Spell Commuter Relief? Last year the project manager for the flood train was Deputy Assistant Director Louis Schmitt. The Transportation Planning Division provided the core personnel for this project. Other major sources of personnel were the Motor Vehicle Division and temporary help.

The total number of people required to operate the Flood Train last year was estimated to be 110 persons a day. This included, among others, personnel from ADOT, Amtrak, Southern Pacific, Department of Public Safety, and the Cities of Phoenix, Tempe and Mesa.

ILLUSTRATION 8

ADOT ORGANIZATION CHART FOR MANAGING EMERGENCY FLOOD TRAIN SERVICE



STATIONS

The route and stops for last year's Flood Train are mapped in Illustration 9. Stops included:

1. Phoenix Depot, 4th Avenue and Harrison Street

2. AiResearch, 36th Street and Air Lane

3. Fed Mart, McClintock and Broadway

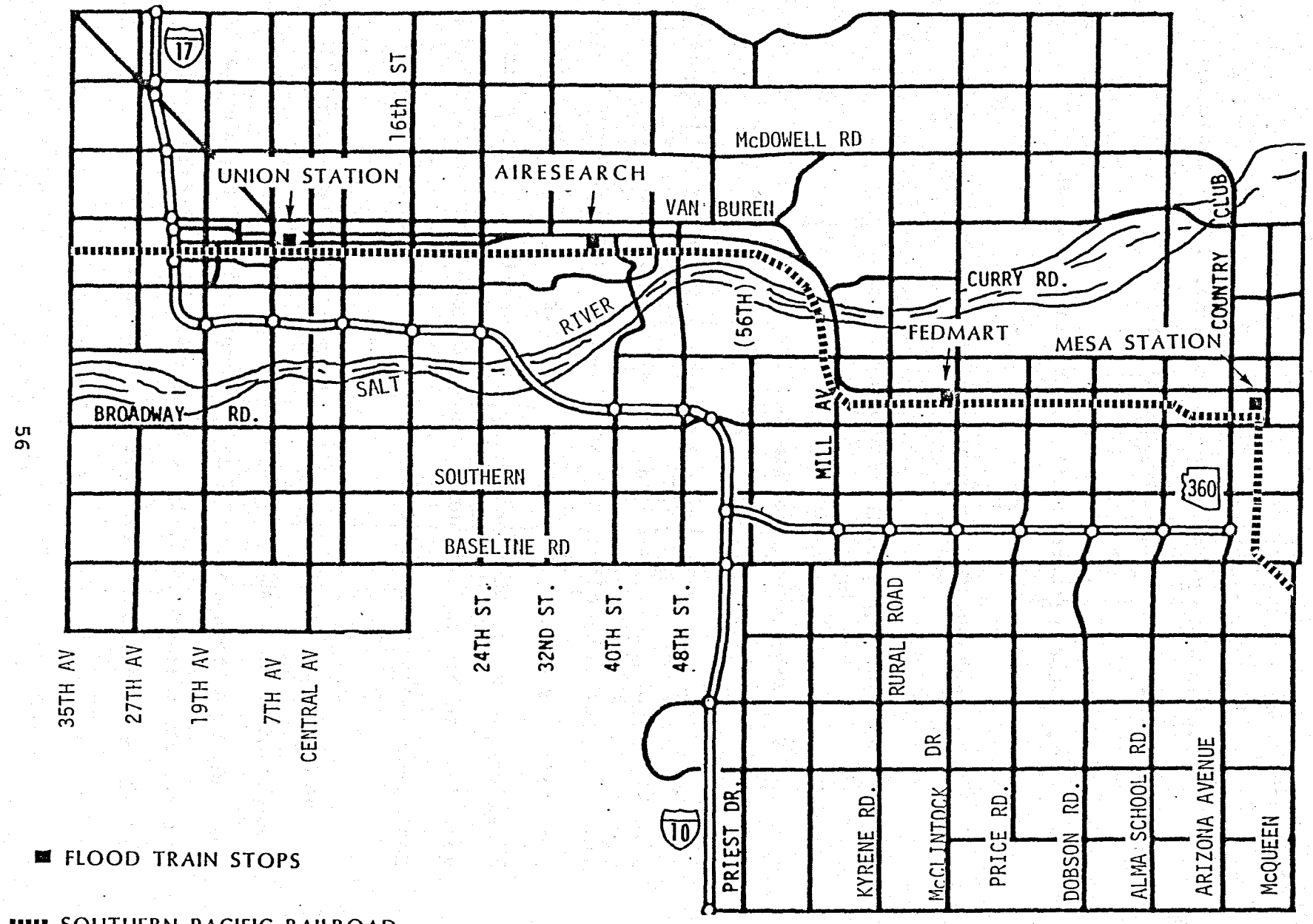
4. Mesa Depot, Robson and 3rd Avenue

It is recommended that these same stops be used again with the possible exception of Fed Mart. As the Fed Mart stop is privately owned, its availability for future use is uncertain. The Tempe Fed Mart store, at least initially, experienced some disruption to its normal operations last year because of traffic congestion. On the other hand, Fed Mart received a good deal of favorable public exposure.

Some other problems with the Fed Mart stop are: (1) parking area is limited (the overflow parking used last year has been developed into a shopping center), (2) parking lots and access are not directly adjacent to the boarding area, and (3) considerable personnel are needed to manage traffic.

ILLUSTRATION 9

FLOOD TRAIN ROUTE AND STOPS



■ FLOOD TRAIN STOPS

▪▪▪▪▪ SOUTHERN PACIFIC RAILROAD

Thus, options to the Fed Mart lot need to be considered. Two of these options are Southern Pacific land directly adjacent to Fed Mart and State owned land at Price Road and the railroad. Both of these areas are unpaved and could present problems -- especially if heavy local rains occurred. Also, Southern Pacific requires that the State assume liability if its land is to be used for parking. As a minimum, use of either of these unimproved lots would require grading, dust control, and some lighting.

Better parking facilities should be provided at AiResearch and the Phoenix Depot. Greyhound Park made some of its parking area available for public use last year, but this information was not sufficiently publicized. Also, land west of the Phoenix Depot could be improved for parking.

EQUIPMENT

The requested train should include at least six passenger coaches and two locomotives. Last year the number of coaches varied between four and six, however, even with six coaches peak period conditions were very crowded with as many as 2.2 persons for every seat. Two locomotives are needed to minimize turn around time at the end of each route.

In addition to the train, various support equipment will be required. Two ticket booths will be needed -- last year these were borrowed from the State Fairgrounds. Lighting equipment will be needed for at least two stops -- last year lighting was supplied and operated by the Travel and Facilities Section of ADOT. Public address horns will be needed to direct passengers waiting to board the train. Last year six hand held public address horns were obtained from the National Guard. Tickets will also need to be printed.

SCHEDULE

Last year's schedule was adequate, however, an improved schedule is suggested in Illustration 10. The principal change in this new schedule is that all stops have been shortened five minutes. End stops are now 10 minutes and intermediate stops 5 minutes. The resulting round trip time is exactly two hours; this makes for a very simple schedule for the uninitiated mass transit patron. For example, departures from Mesa are every two hours.

In general, this new schedule has earlier departure times and an extra round trip in the early afternoon. The old schedule needed an earlier departure from Phoenix and the last Phoenix departure was too late.

A problem with last year's schedule was that the Sunset Limited frequently delayed the Flood Train. The new schedule seeks to minimize this conflict by having the Flood Train depart the Phoenix Depot just as the Sunset Limited is scheduled to arrive. Nevertheless, unless the Sunset Limited is on time, or the Flood Train is given priority over the Sunset Limited, the Flood Train could become behind schedule two days a week in the later part of the morning.

ILLUSTRATION 10

FLOOD TRAIN SCHEDULE

ADOT
SALT RIVER RAIL SERVICE

MORNING SCHEDULE

AMTRAK TRAIN NO.	DEPART		ARRIVE		DEPART	ARRIVE		DEPART	ARRIVE	
901	MESA	430A	FEDMART	440A	445A	AIRESEARCH	505A	510A	PHOENIX	520A
902	PHOENIX	530A	AIRESEARCH	540A	545A	FED MART	605A	610A	MESA	620A
903	MESA	630A	FED MART	640A	645A	AIRESEARCH	705A	710A	PHOENIX	720A
904	PHOENIX	730A	AIRESEARCH	740A	745A	FED MART	805A	810A	MESA	820A
905	MESA	830A	FEDMART	840A	845A	AIRESEARCH	905A	910A	PHOENIX	920A
906	PHOENIX	930A	AIRESEARCH	940A	945A	FED MART	1005A	1010A	MESA	1020A
907	MESA	1030A	FEDMART	1040A	1045A	AIRESEARCH	1105A	1110A	PHOENIX	1120A

EVENING SCHEDULE

	DEPART		ARRIVE		DEPART	ARRIVE		DEPART	ARRIVE	
908	PHOENIX	130P	AIRESEARCH	140P	145P	FEDMART	205P	210P	MESA	220P
909	MESA	230P	FEDMART	240P	245P	AIRESEARCH	305P	310P	PHOENIX	320P
910	PHOENIX	330P	AIRESEARCH	340P	345P	FEDMART	405P	410P	MESA	420P
911	MESA	430P	FEDMART	440P	445P	AIRESEARCH	505P	510P	PHOENIX	520P
912	PHOENIX	530P	AIRESEARCH	540P	545P	FEDMART	605P	610P	MESA	620P
913	MESA	630P	FEDMART	640P	645P	AIRESEARCH	705P	710P	PHOENIX	720P
914	PHOENIX	730P	AIRESEARCH	740P	745P	FEDMART	805P	810P	MESA	820P

FARE COLLECTION

The fare for a one way ticket last year was $1.00. Actual costs were about $3.65 per person trip. It is recommended that the $1.00 fare charge be reviewed. Nevertheless, an even sum is simple to collect, and full charge for a trip could seriously discourage ridership. The purpose of the flood train is not to make a profit, but rather it is to get people to work and thus minimize flood impacts on the Arizona economy.

Procedures for selling tickets and collecting cash will need to be established. Last year the general rule for ticket purchase was exact fare and one ticket only. This greatly speeded ticket lines which was critical when lines were still long and the train was preparing to depart. Cash was collected twice a day last year by an ADOT employee accompanied by a Department of Public Safety officer. Money was deposited in a bank night deposit box and then transferred to the Motor Vehicle Division cashier. For purposes of cash security as well as crowd and traffic management, it is important that ADOT coordinate closely with local police, especially in the initial phases of establishing train service.

COSTS

Total costs and revenues that might be expected for future emergency train service can best be estimated from last year's ten days of flood train service. Final costs for this service as estimated for the Federal Emergency Management Agency were:

Amtrak charges	$ 48,549
Southern Pacific charges	84,477
Reimbursable State costs	37,704
Total	$ 170,730

It should be noted that these costs do not include numerous hours spent by State and local agency personnel as well as private industry. In particular, ADOT was not reimbursed for administrative, clerical, and secretarial costs, while cities were not reimbursed for police support and train related bus service.

Total revenues collected were $46,907. Thus, for itemized costs on a per trip basis, each passenger paid $1.00, the State of Arizona paid $0.53, and the Federal government paid $2.12.

SECTION IX

BICYCLING AND WALKING

During last year's flood a substantial number of commuters elected to walk and bicycle across the river. Pedestrian and bicycle activity occurred mainly upon the Mill Avenue Bridge as many Arizona State University students opted for these transportation modes.

More specifically, on a typical weekday during the flood, 9,100 people bicycled across the Salt River, and 4,100 walked. This represents 4.4 percent of total person-trips across the river and 5.7 percent of the peak period trips.

Two major problems were encountered last year with respect to bicyclists and pedestrians. The first occurred on the Mill Avenue Bridge. The walkway on the east side of the bridge was blocked by a traffic railing just short of the end of the bridge. This problem is being addressed by ADOT District I. A portable stairway should be available soon that will permit pedestrians to walk on a closed portion of the road during the flood.

The second problem is the "Old Tempe Bridge". Although long ago closed to traffic, during the last flood pedestrians and bicyclists were by-passing barricades and using the bridge. Decisions should be made regarding the utilization of this facility. Prior to the next flood answers should be obtained as to the safety of the bridge, legal ownership, and liability.

SECTION X

AVIATION

During the last flood some aircraft owners flew across the river to work, often carrying fellow workers. Commercial operators and commuter airlines also carried passengers across the river for a fee. In the event of severe flooding, it is felt that the ADOT Aeronautics Division and airport managers could play an important role to enhance the level and quality of emergency air service offered by the private sector. In particular, it is recommended that ADOT serve as a catalyst to quickly initiate emergency air service and to make the public aware of this service.

This section briefly considers sources of emergency air services, airport and terminal needs, and public information. This plan does not examine aviation needs under a no bridge situation which might require military and air carrier aircraft to transport emergency personnel and supplies. In addition, if flood waters are high enough to close all bridges, both runways at Sky Harbor would probably be closed and all aircraft would have to be diverted to other airports.

SOURCES OF AIR SERVICE

Sources of emergency air service can be divided into three categories: Commuter air carriers operating on fixed schedules, Commercial flight operators offering scheduled and unscheduled charter service, and aircraft owners who fly to meet their own needs.

During the last flood several commuter air carriers and numerous commercial flight operators provided air service across the Salt River. The standard fee was $20 round trip and $15 one way.

A list of regional commuter airlines and local commercial flight operators that could potentially provide air service in an emergency is presented in Appendix C. When less than 16 road lanes across the Salt River appears eminent, ADOT could contact these sources and encourage them to provide emergency air service.

Some aircraft owners will choose to avoid flood related highway congestion by flying to work. Often these owners would be willing to share the ride. However, a method is needed to match owners with potential ridesharers. Perhaps a centrally located bulletin board where aircraft owners and

potential ridesharers could post their interests would help facilitate this type of ridesharing.

The general plan is to quickly establish a core of scheduled air service across the river, and to vigorously inform the public of the availability of this service. This will attract passengers to airports and some of them could be absorbed by unscheduled service.

AIRPORTS AND TERMINALS

Principal airports south of the River are Mesa, Chandler, Stellar and Memorial; while principal airports north of the River are Sky Harbor, Scottsdale, Deer Valley, Litchfield and Glendale. During the last flood the main route of travel was between Mesa and Sky Harbor. However, as congestion did present some problems at Mesa last year, and because major floods can reduce runway facilities at Sky Harbor, additional airports should be considered. Chandler, Scottsdale, and Deer Valley would appear to be good alternative airports. Stellar Airport has a good location, but it is privately owned and part of a residential development -- difficulties arose during the last flood when some commercial flight operators attempted to use this airport to provide emergency air service.

Probably the greatest service airport managers can provide during a major flood is to provide adequate terminal facilities. Auto parking areas should be clearly designated, and signs need to direct passengers to loading areas. Within the terminal, ticket selling areas for various air services need to be clearly marked. Also, to minimize confusion, ticketing and passenger waiting areas need to be separated. Considerable additional phone service in the terminal areas would also be desirable.

Locations for passengers to wait for various air services should be clearly marked. Also, on the ramp temporary barriers (such as a rope fence) and possible security personnel will be needed to keep passengers out of areas where aircraft operate.

PUBLIC INFORMATION

Probably the single most important thing that the Aeronautics Division can do in the event of another major flood is to serve as a public information center. ADOT could provide news releases and a telephone answering service on emergency air services. This would require securing the necessary telephone lines, equipment for recorded messages, and personnel for answering more detailed

questions. Specific information that this center should be able to provide would include:

1. Departure and arrival times, fares, and gate locations for scheduled emergency air service

2. Parking areas for both aircraft and autos at each airport

3. Related bus schedules and fares

4. Approach and departure procedures for commuting aircraft

Of course, in order to provide this information, personnel would have to be assigned to gathering it and keeping it current.

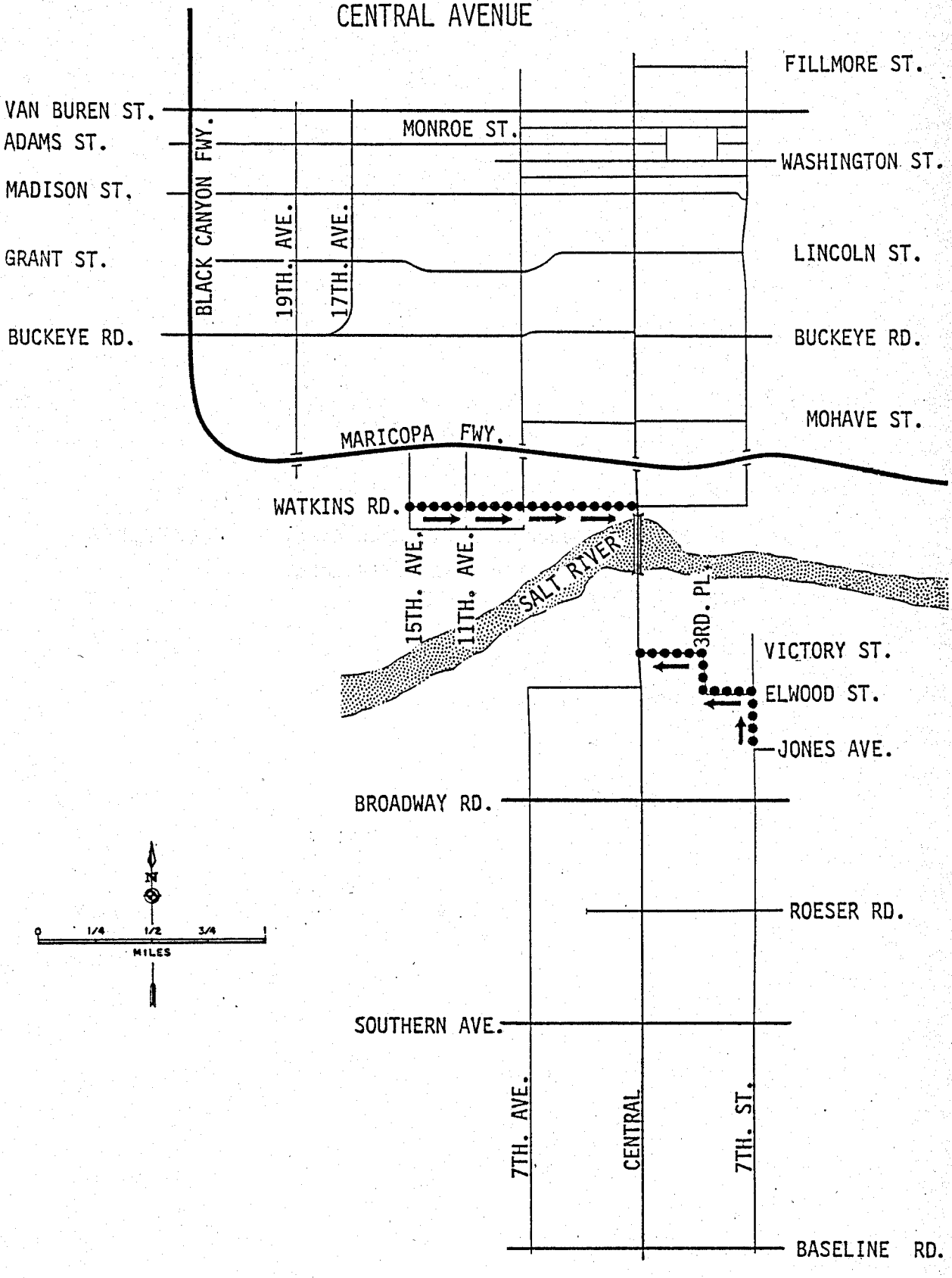
A P P E N D I C E S

A P P E N D I X A

PRIORITY TREATMENT OF HIGH OCCUPANCY VEHICLES FOR MAJOR BRIDGES

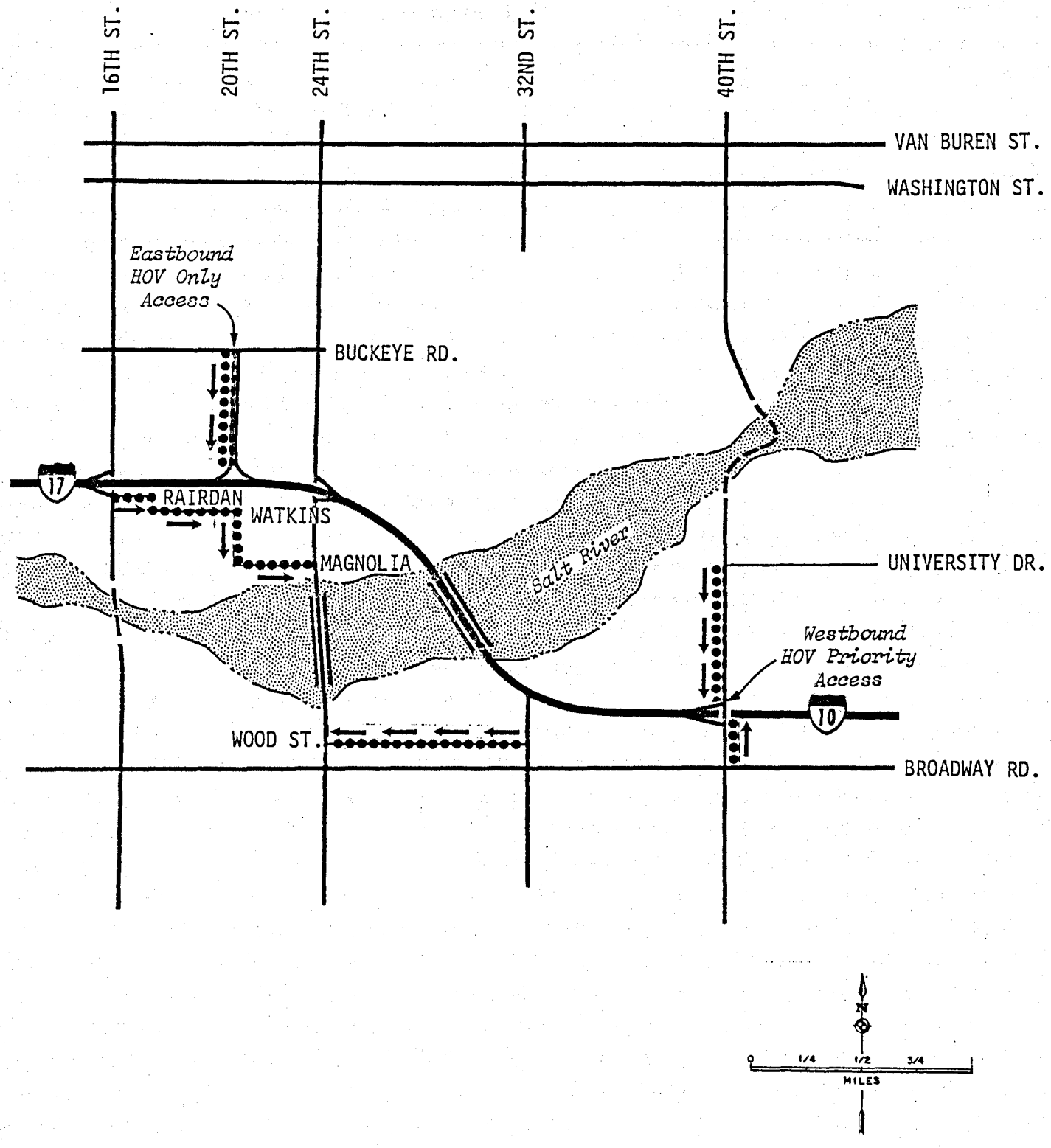
HIGH OCCUPANCY VEHICLE ROUTE

CENTRAL AVENUE



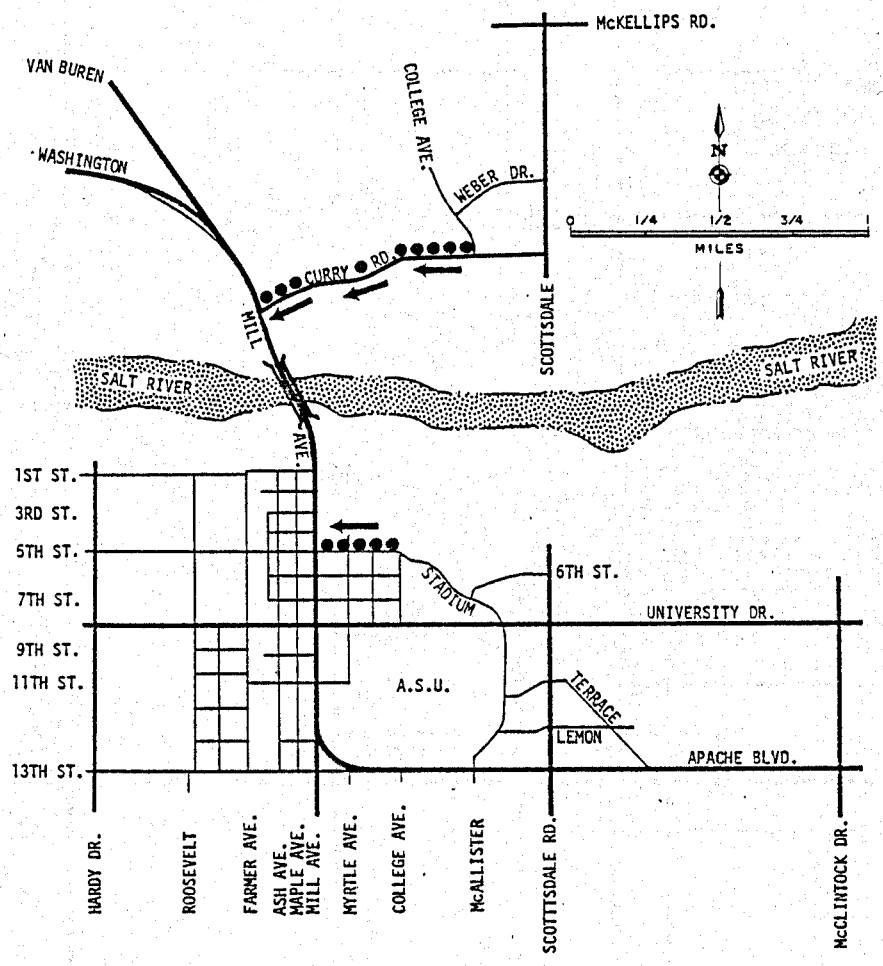
●●●●● High Occupancy Vehicle Route

HIGH OCCUPANCY VEHICLE ROUTES
I-10 AND 24TH ST.



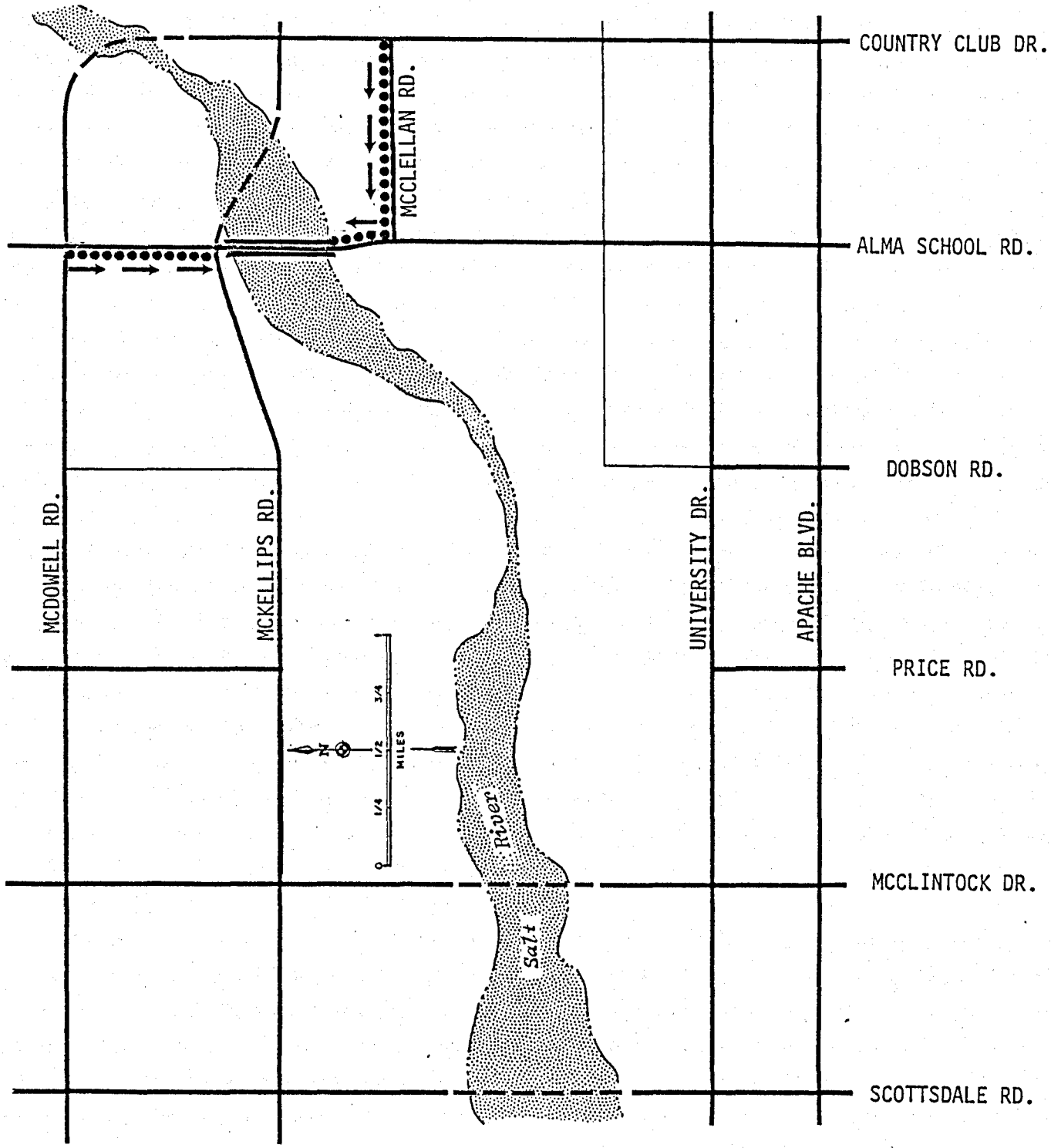
●●●●●● High Occupancy Vehicle Route

HIGH OCCUPANCY VEHICLE ROUTE
MILL AVENUE



●●●●●● High Occupancy Vehicle Route

HIGH OCCUPANCY VEHICLE ROUTE
ALMA SCHOOL ROAD



●●●●● High Occupancy Vehicle Route

APPENDIX B

PARK AND RIDE LOTS

BUS SERVICE
EXISTING PARK-AND-RIDE LOTS

LOCATION	CITY	CAPACITY	SURFACE	LIGHTING	CONTACT PERSON
Dooleys northeast corner Apache Blvd. and Dorsey Rd.	Tempe	15-20 vehicles	Paved	Lighted	Irwin Malamud Public Transit Admin. City of Phoenix
Tempe Municipal southeast corner 7th St. and Maple	Tempe	15-20 vehicles	Paved	Lighted	"
Robson and 1st Street southeast corner	Mesa	20 vehicles	UnPaved	Unlighted	"
Los Arcos Mall McDowell Rd. S.W. of Scottsdale Rd.	Scottsdale	15+ vehicles	Paved	Lighted	"
St. Catherine Church Central Ave. N.W. of Southern in South Phoenix	Phoenix	20 vehicles	Paved	Unlighted	"
Gemco Shopping Center north side of Baseline Rd. east of McClintock	Tempe	12 vehicles	Paved	Lighted	"
Tempe City Library south side of Southern Ave., west of Rural Rd.	Tempe	5 vehicles	Paved	Lighted	"
Freeway Interchange on Price Rd. S.E. of Manhattan	Tempe	30+ vehicles	Unpaved	Unlighted	"
Danelle Plaza on Mill Ave., S.E. corner of Southern	Tempe	6 vehicles	Paved	Lighted	"

BUS SERVICE

POTENTIAL PARK-AND-RIDE LOTS

LOCATION	CITY	CAPACITY	SURFACE	LIGHTING	CONTACT PERSON
Tri-City Mall Dobson North of Apache	Mesa	150 or more vehicles	Paved	Lighted	Grace Clicker 969-2261 Tri-City Mall Manager
Greyhound Park 36th St. on Washington	Phoenix	100 - 150 vehicles	Unpaved	Unlighted	Winston Burrows 273-7181 Facilities Manager
Sun Devil Stadium Northeast side Rural Rd. North of University	Tempe	150 or more vehicles	Unpaved (grass)	Lighted	Jack Penick 965-3201 ASU Vice-President
Mervyn's Southern west of Rural	Tempe	20 or more	Paved	Lighted	Richard Duris 894-9281 Manager
Grace Community Church Southern at Dorsey	Tempe	500 or more vehicles	Paved	Lighted	Ron Funderburg 894-2201 Building Administrator
ADOT property north and south of Southern at Price	Tempe	200 or more vehicles	Unpaved (dirt)	Unlighted	Harvey Friedson 968-8204 Tempe Traffic Engineer
Safeway Shopping Center Southern and Central N.E. corner	Phoenix	20 or more vehicles	Paved	Lighted	Grace Clicker 969-2261 Tri-City Mall Manager
Thunderbird Lodge Baseline and Central N.W. corner	Phoenix	400 or more vehicles	Unpaved	Unlighted	Ray Judd 276-3923 Executive Committee
Church of Jesus Christ Latter Day Saints 7th Ave. and Southern N.E. corner	Phoenix	50 or more vehicles	Paved	Lighted	Jimmy J. Cluff 268-5348 Dist.Bishop - 12th Ward

BUS SERVICE

POTENTIAL PARK-AND-RIDE LOTS

LOCATION	CITY	CAPACITY	SURFACE	LIGHTING	CONTACT PERSON
Fitch Park Center St. at 8th St.	Mesa	300+ vehicles	Paved	Lighted	Maurice Bateman 834-2351 Parks & Recreation Director
Hohokam Park Center St. North of Brown	Mesa	100 vehicles	Paved	Lighted	Same as above
Mesa Civic Center Center St. and University	Mesa	50 vehicles	Unpaved	Lighted	Jack Cummings 834-2178 Community Center Director
Fiesta Mall Southern - east of Alma School	Mesa	100 vehicles	Paved	Lighted	Mary Lindsey 833-4121 Asst. Mall Manager
Dobson Ranch H.S. Guadalupe between Alma School and Dobson	Mesa	1000 vehicles 200+ vehicles after Sept. 1981	Paved	Lighted	Howard Adams 964-6116

RAIL SERVICE
POTENTIAL PARK-AND-RIDE LOTS

LOCATION	CITY	CAPACITY	SURFACE	LIGHTING	CONTACT PERSON	
MESA DEPOT Robson & 3rd Avenue	Mesa	100 vehicles in lot; 200 or more on street.	Paved	Lighted	Southern Pacific	964-8658
FED MART McClintock & Broadway	Tempe	200 or more vehicles unpaved lot 100 + paved lot	Paved and Unpaved	Lighted and Unlighted	Jim Gunby (Store Manager)	966-6248
ASSOCIATED GROCERS East side McClintock, south of Apache Blvd.	Tempe	50 vehicles	Paved	Unlighted	Store Manager	894-9153
GREYHOUND PARK 36th St. & Washington	Phoenix	250+ vehicles	Unpaved	Unlighted	Winston Burrows (Facilities Mgr.)	273-7181
SOUTHERN PACIFIC LOT W. of Fed Mart, N. of Broadway	Tempe	250+ vehicles	Unpaved	Unlighted	District Manager Southern Pacific	258-5321
ADOT LOT Price & Southern Pacific RR	Tempe	200+ vehicles	Unpaved	Unlighted	ADOT	

APPENDIX C

POTENTIAL SOURCES OF EMERGENCY AIR SERVICES

POTENTIAL SOURCES OF EMERGENCY AIR SERVICES

ARIZONA BASED COMMUTER AIRLINES

1. Cochise Airlines, Tucson, Arizona: 602-889-6311
2. Desert Pacific Airlines, Sedona, Arizona: 602-282-7774
3. Grand Canyon Airlines, Grand Canyon: 602-638-2407
4. Havasu Air Lines, Lake Havasu City: 602-855-4945
5. Sun West Airlines, Scottsdale, Arizona: 602-991-0900

ADJACENT STATES BASED COMMUTER AIRLINES

1. Air New Mexico, Santa Fe, New Mexico: 505-471-5117
2. Aspen Airways, Inc., Denver, Colorado: 303-398-3744
3. Baja Cortez, Los Angeles, CA: 213-646-9333
4. Golden Gate Airlines, Monterey, CA: 408-646-0333
5. Inland Empire Airlines, La Verne, CA: 714-593-2550
6. Scenic Air Lines Inc., Las Vegas, Nevada: 702-739-5611
7. Sky West Air Lines, St. George, Utah: 801-628-2655
8. Swift-Aire Lines, San Louis Obispo, CA: 805-544-7700

LOCAL COMMERCIAL FLIGHT OPERATORS

1.	Advance Aviation	832-1864
2.	Air Centurion	869-7070
3.	Air Services International	948-2150
4.	Beckett Phoenix	275-5741
5.	Beckett Scottsdale	991-0900
6.	Chandler Air Services	963-6420
7.	Flight Tech	979-5986
8.	Glendale Aviation	979-3102
9.	G.T. Helicopters	991-5325
10.	Keeling Aviation	961-1198
11.	Litchfield Aviation	932-0006
12.	Madison Aviation	832-1420
13.	Porter Aviation	931-6931
14.	Professional Aviation	942-1566
15.	Sawyer Aviation	273-3770
16.	Scottsdale Charter	991-0900
17.	Southwest Air Center	948-2400
18.	Superstition Air Service	832-0704
19.	Taylor Aviation	830-9291
20.	Thunderbird Executive Air	832-4662
21.	Verticle Operations	244-1652
22.	Venture Aviation	963-0213

APPENDIX D

PERSONS IN ADOT RESPONSIBLE FOR FLOOD ACTIONS

PERSONS IN ADOT RESPONSIBLE FOR FLOOD ACTIONS

	FLOOD ACTION	RESPONSIBLE PERSON	POSITION	TELEPHONE NO.
1.	Barricade closed crossings and reroute traffic.	Robert Conklin	District One Traffic Engineer	261-7381
2.	Identify alternative route for interstate traffic (includes notifying media and preparing leaflet).	Tom Lammers	Assistant Director Highway Division	261-7391
3.	Advise commercial interstate traffic of alternative routes at port of entry stations.	Bill Cook	Deputy Group Manager Field Service Group Motor Vehicle Division	261-7723
4.	Post signs for alternative routes	Robert Conklin Orville Abney	Dist. One Traffic Engineer Dist. Two Traffic Engineer	261-7381 622-6701
5.	Develop High Occupancy Vehicle routes for I-10	Roger Hatton	Traffic Engineer	261-7616
6.	Decision to activate HOV routes for I-10 (coordination with the City of Phoenix would be required on use of 40th Street)	Tom Lammers	Assistant Director Highway Division	261-7391
7.	Provide signing and striping for I-10 HOV routes.	Robert Conklin	Dist. One Traffic Engineer	261-7381
8.	Expedite turn-around time for Project Pool It matching programs.	James Russell	Operations Manager	261-7281
9.	Coordinate Flood Bus Service.	Chuck Anders	Assistant Director Transportation Planning Div.	261-7431
10.	Operate Flood Train.	Chuck Anders	Assistant Director Transportation Planning Div.	261-7431
11.	Coordinate Flood Aviation Service.	Sonny Najera	Assistant Director Aeronautics Division	261-7778

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6. Maricopa Association of Governments Transportation and Planning Office, Travel Changes During the 1980 Salt River Flood, 1980.

7. Project Pool It, Valley Forward Association, Transportation Crisis Action, Rideshare Strategies, 1980 Flood, 1980.

8. U. S. Army Corps of Engineers, Los Angeles District Office, Flood Damage Report; Phoenix Metropolitan Area, February 1980 Flood, 1980.