

***Grand Avenue
Northwest Corridor Study***

WORKING PAPER NO. 3

***TRANSPORTATION FACILITIES AND
CONDITIONS***

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Prepared for



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EXECUTIVE SUMMARY

This working paper documents the current transportation facilities and conditions within the Grand Avenue Northwest Corridor, which extends from Loop 303 to Loop 101.

Grand Avenue has historically served as the major highway linking Phoenix to Los Angeles and Las Vegas. The completion of I-10 removed the California function from the roadway. On the other hand, the upgrading of US 93 and its designation as the CANAMEX corridor will add additional Nevada-oriented traffic pressures onto US 60 in the study area.

These pressures are, in part, being relieved by SR 74 connecting Grand Avenue to I-17 and by Loop 303 connecting Grand Avenue to I-10. As a result, within the study area, Grand Avenue is serving an increasing function as an urban arterial for Surprise, El Mirage, Youngtown and unincorporated Sun City and Sun City West. The absence of a more complete urban arterial network in the study area places a heavier traffic burden on Grand Avenue. It must serve local shopping trips as well as longer intercity trips. It is important to understand this shift in function of Grand Avenue when formulating needs and plans for future improvements.

Roadway Inventory

Generally, Grand Avenue is a four-lane divided highway/urban arterial street through the study area. Six lanes exist between approximately 103rd Avenue and 99th Avenue. A two-way frontage road parallels Grand Avenue between Dysart Road and the Agua Fria River. Right-of-way varies between 105 and 215 feet. Grand Avenue crosses the Agua Fria River, the New River and Loop 101 on bridges. A Burlington Northern Santa Fe (BNSF) Railroad spur, Ennis Spur, crosses Grand Avenue at grade just west of Primrose Street.

A total of 17 signalized intersections (including two at Loop 101) are located along Grand Avenue within the study area. An additional 9 unsignalized intersections or median breaks are located within the study area. Due to the railroad, access along the northeast side of Grand Avenue is restricted to intersecting streets only. Property access on the southwest side of Grand Avenue is generally restricted, except for some commercial driveways.

The metropolitan grid system of one-mile spaced arterial streets is disrupted in the Northwest Valley area because of the BNSF Railroad, Luke Air Force Base (LAFB), Agua Fria River and the New River, leaving only a few east-west routes continuous between Loop 101 and Loop 303. Only 99th Avenue and 107th Avenue cross Grand Avenue and provide continuous extended travel (several miles) both north and south of Grand Avenue. Major capacity improvements are planned by ADOT on US 60 both north and south of the study area. Improvements to Loop 303 are also planned.

Traffic Data

Daily traffic volumes along Grand Avenue range from 9,400 west of Loop 303 to 37,400 at 107th Avenue. Approximately 15% of the vehicles in the traffic stream are trucks. The only two intersections that operate at an unacceptable level of service are Bell Road and 107th Avenue.

A total of 556 accidents occurred within the project area over the latest three-year period. Slightly over half of the accidents (53%) resulted in property damage only. There were 11 fatal accidents. The remaining 45% involved injuries. The top four types of accidents were rear-ends (264 accidents), angle accidents (74 accidents), left turn accidents (68 accidents), and sideswipes (67 accidents).

Accident rates were also calculated. The accident rate on Grand Avenue between Loop 101 and Loop 303 is 1.7 accidents per million vehicle miles of travel (VMT). This rate is significantly lower than the City of Phoenix citywide average of 5.0 accidents per million VMT.

The fatal crash rate for the corridor is 3.4 fatal accidents per 100 million VMT. This is much higher than the State of Arizona rate of 1.9 fatal accidents per 100 million VMT.

Intelligent Transportation Systems (ITS)

Grand Avenue from Van Buren Street to Bell Road was previously identified in the AZTech Model Deployment Initiative as one of 24 regional SMART corridors. ITS technologies to be implemented in SMART corridors include traffic detection, closed circuit television cameras and variable message signs. The goal is to coordinate traffic signals across jurisdictional boundaries and to coordinate freeway interchange signals with arterial street signal systems. Grand Avenue from Bell Road southeastward is in Phase I of deployment; however, the signals along Grand Avenue are not coordinated at this time.

Public Transit/Interstate Bus Service

The Regional Public Transportation Authority (RPTA) provides limited public bus service within the project area. The only route provided is Route 106, which begins at 105th Avenue and Santa Fe Drive (adjacent to Boswell Memorial Hospital) travels west to 111th Avenue, south to Peoria Avenue and then east to Metrocenter Transit Center. Demand responsive (also known as paratransit) service also operates in the study corridor.

Several Greyhound buses per day on the Phoenix-Las Vegas and Phoenix-Los Angeles routes serve Youngtown. K-T Services operates several daily Phoenix-Las Vegas trips that stop at the same location, where passengers can connect with local bus route 106.

The only existing park-and-ride lot within the corridor is a section of the parking lot at the Sundome Center for the Performing Arts. The recently completed MAG Park-and-Ride Site Selection Study recommended a park-and-ride lot for the southwest corner of Dysart Road and Bell Road.

Rail

The BNSF Railroad Phoenix Division is a predominantly single-track line that traverses the project area parallel to Grand Avenue. This line is an important freight route connecting Phoenix with the BNSF Railroad transcontinental mainline. A spur track leaves the mainline near El Mirage Road and proceeds generally southwest to 143rd/Olive Avenue, where it splits in two, with a western branch serving Olive Avenue and Cotton Lane, and an eastern branch to LAFB.

The BNSF Railroad mainline is a very active facility that plays a key role in the Phoenix area's freight transportation system. The line currently carries approximately 13 million tons of freight per year on ten trains per day between Wickenburg and Glendale. Although specific traffic forecasts are not available, freight volumes carried by this line are expected to increase as Maricopa County continues its growth. No rail passenger service exists within the study area or elsewhere in the Phoenix metropolitan area. Light rail service in the metropolitan area is being studied and planned.

One intermodal freight facility was identified within the study area. The El Mirage Auto Distribution Facility, owned and operated by the BNSF Railroad, is located north of Grand Avenue near Greenway Road.

There are 10 at-grade mainline railroad crossings in the study area. All but one of them are protected by flashers and gates. There are no grade separations with the railroad in the study area; however, the Loop 303 grade separation is under construction.

Alternative Modes of Travel

There are few bicycle facilities within the study area. Bike lanes are located on El Mirage Road between Thunderbird Road and Santa Fe Lane. Between Greenway Road and Waddell Road, bike routes are designated along Dysart Road and 133rd Avenue. Several bicycle facilities are planned for the corridor.

The only pedestrian facilities within the corridor include some sidewalks along the southwest side of Grand Avenue. Sidewalks are present along new development (shopping centers) in Surprise, across the bridge over the Agua Fria River, through Youngtown, near 103rd Avenue and across the bridges over the New River and Loop 101. Sidewalks are also present along the frontage road in El Mirage. MAG and ADOT are evaluating and planning a 42-mile non-motorized system of trails along the New River and Lower Agua Fria River. The Flood Control District of Maricopa County is conducting an Agua Fria Watercourse Master Plan, which includes a trail along the Agua Fria River.

Golf carts are another mode of travel widely used within the corridor. Residents of the adjacent retirement communities use golf carts along the arterial streets adjacent to the Grand Avenue corridor. Although golf carts are not allowed on Grand Avenue, they are frequently used to cross Grand Avenue at signalized intersections throughout the corridor.

1.0 INTRODUCTION

This working paper documents the current transportation facilities and conditions within the study area. The corridor study area extends approximately 11.5 miles from Loop 303 – Estrella Parkway to Loop 101 – Agua Fria Freeway. A larger influence area was looked at for traffic demand modeling purposes. The Grand Avenue Northwest model area is bounded by SR 74 on the north; Northern Avenue on the south; 67th Avenue on the east; and Rooks Road on the west.

2.0 ROADWAY FACILITIES

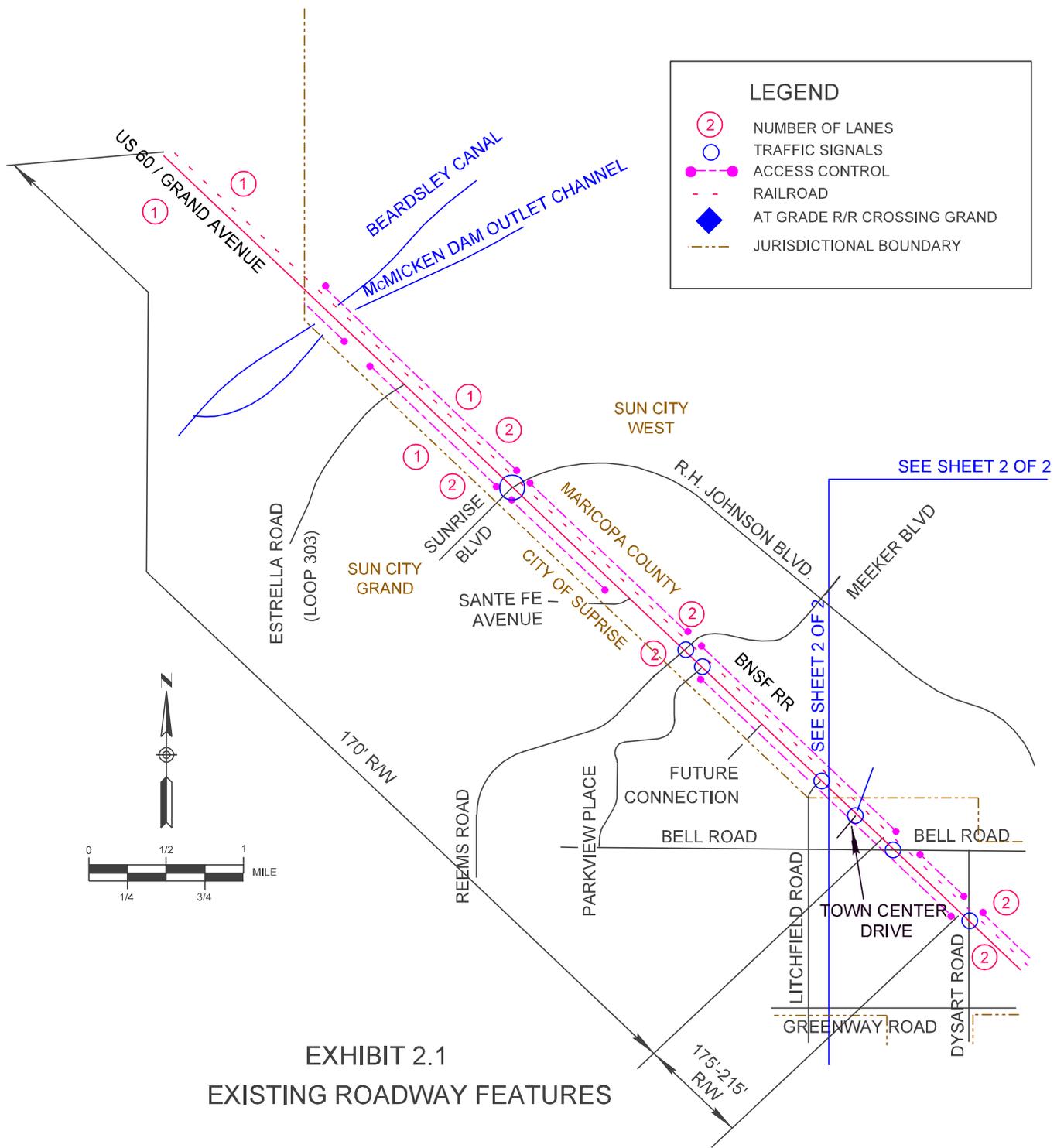
2.1 Grand Avenue

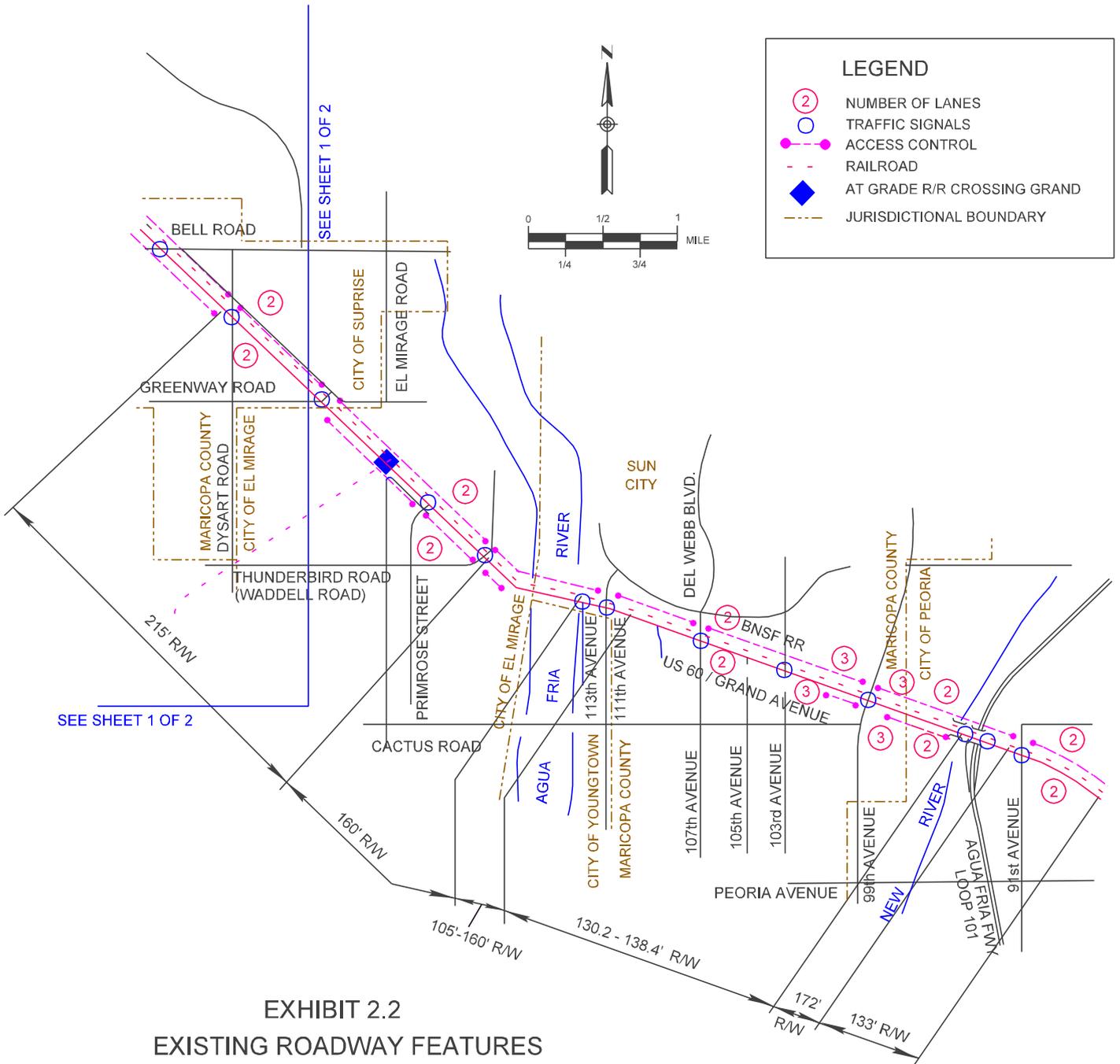
Grand Avenue is a four- to six-lane arterial street that enters the Greater Phoenix Metropolitan Area in the northwest corner and extends diagonally southeastward to downtown Phoenix. Grand Avenue was initially opened to traffic in 1888 to link the agricultural areas in the West Valley to Phoenix. The BNSF Railroad was subsequently built adjacent to Grand Avenue. Grand Avenue is designated as US 60. It serves a modest amount of through traffic, a more significant amount of traffic between the metropolitan area and points northwest, and serves mostly moderately length urban trips that begin and end in the urban area.

An inventory of existing roadway features along Grand Avenue is shown in Exhibits 2.1 and 2.2. Generally, Grand Avenue is a four-lane divided highway/urban arterial street through the study area. Six lanes exist between approximately 103rd Avenue and 99th Avenue. A two-way frontage road parallels Grand Avenue between Dysart Road and the Agua Fria River. There is 170 feet of right-of-way along Grand Avenue between Loop 303 and Bell Road. The right-of-way then widens to 215 feet at Dysart Road for the frontage road. Between Dysart Road and Thunderbird, 215 feet of right-of-way is available. East of Thunderbird Road to 111th Avenue, right-of-way width varies from 105 to 160 feet. Between 111th Avenue and the New River, right-of-way varies between 130.8 to 138.4 feet. A series of cross-sections along the corridor are contained in the Appendix.

A total of 17 signalized intersections (including two at Loop 101) are located along Grand Avenue within the study area. An additional 9 unsignalized intersections or median breaks are located within the study area. All the intersections have exclusive left turn lanes while many also have exclusive right turn lanes. Exhibit 2.3 summarizes the intersections within the study area and the number of lanes for each intersection approach leg.

Additional access along the northeast side of Grand Avenue is restricted due to the railroad to intersecting streets only. Access on the southwest side of Grand Avenue is generally unrestricted in Surprise. In El Mirage, a drainage channel restricts access to intersecting streets. Through the Sun City area of Maricopa County, access is only restricted at walls surrounding adjacent neighborhoods.





Grand Avenue crosses the Agua Fria River, the New River and Loop 101 on bridges. Four lanes of travel (two in each direction) are provided over all of the bridges. The bridges over the Agua Fria River and Loop 101 are wide enough to accommodate six travel lanes (three in each direction). A railroad spur, Ennis Spur, crosses Grand Avenue at grade just north of Primrose Street.

2.2 Surrounding Grid System

The metropolitan grid system of one-mile spaced arterial streets is disrupted in the Northwest Valley area because of the BNSF Railroad, development patterns, LAFB, Agua Fria River and the New River. North of Camelback Road, only Grand Avenue, Northern Avenue, Olive Avenue, and Bell Road are continuous between Loop 101 and Loop 303. In the north-south direction, only 99th Avenue and 107th Avenue cross Grand Avenue and provide continuous extended travel (several miles) both north and south of Grand Avenue. Loop 303 is an existing County-maintained two-lane highway from Grand Avenue south to I-10. SR 74 is an existing two-lane highway that connects Grand Avenue to I-17 north of the study area. The absence of a more complete street network places extra traffic burden on those few continuous streets including Grand Avenue, Bell Road, and 99th Avenue. Exhibit 2.4 shows the continuous routes within the study area.

2.3 Programmed Roadway Improvements

The following projects are programmed for the corridor outside of the study area. The projects are illustrated in Exhibit 2.5. Federal legislation already specifies US 93 in the vicinity of Phoenix to be part of the Canada-to-Mexico “CANAMEX” Highway. The route within the Maricopa region has not been specified in federal legislation yet. MAG has recently taken action to recommend the designation of the route through the Maricopa region to include I-8, SR 85, an alignment in the vicinity of the existing Wickenburg Road/Vulture Mine Road, connecting to the Wickenburg Bypass, and the Bypass west from that point connecting to US 93. ADOT is spending over \$250 million to upgrade US 93 to a four-lane divided highway through its entire length in Arizona. US 93 connects with US 60 in Wickenburg. In addition, ADOT is evaluating a bypass around Wickenburg to serve the US 93/US 60 through traffic.

ADOT will begin construction on the portion of Grand Avenue (US 60) from north of the Beardsley Canal to near the Morristown railroad overpass. This project will complete Grand Avenue as a four- or six-lane roadway from Phoenix to Wickenburg.

On Grand Avenue east of Loop 101, ADOT has programmed to complete seven new grade separations to take one of the streets out of the six-legged intersections. Access to Loop 101 is also being improved at 91st Avenue. A northbound on-ramp and southbound off-ramp are being constructed. These improvements will help eliminate notorious bottlenecks on Grand Avenue and can affect traffic on Grand Avenue through the study area west of Loop 101.

EXHIBIT 2.4 CONTINUOUS ROUTES THROUGH STUDY AREA

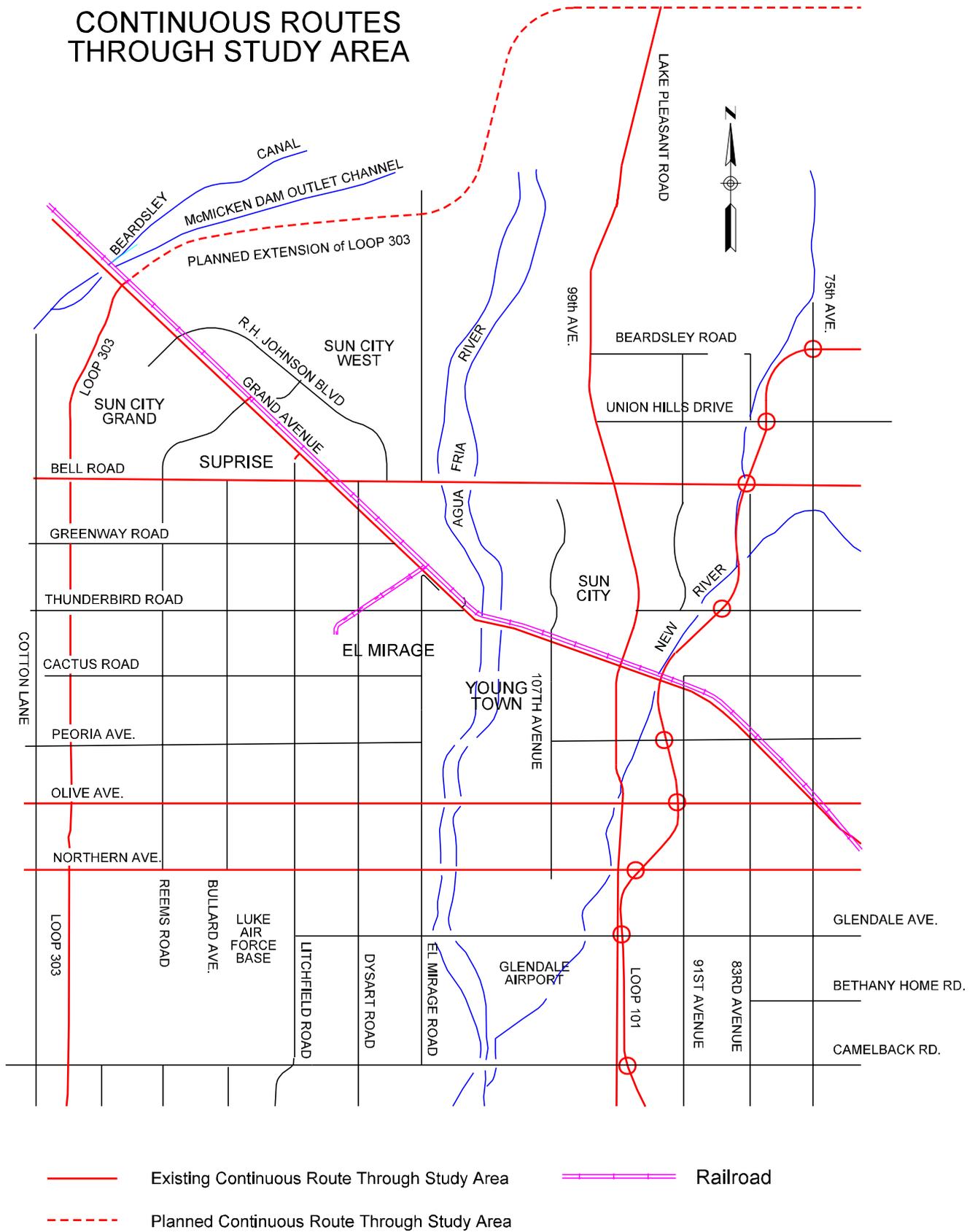
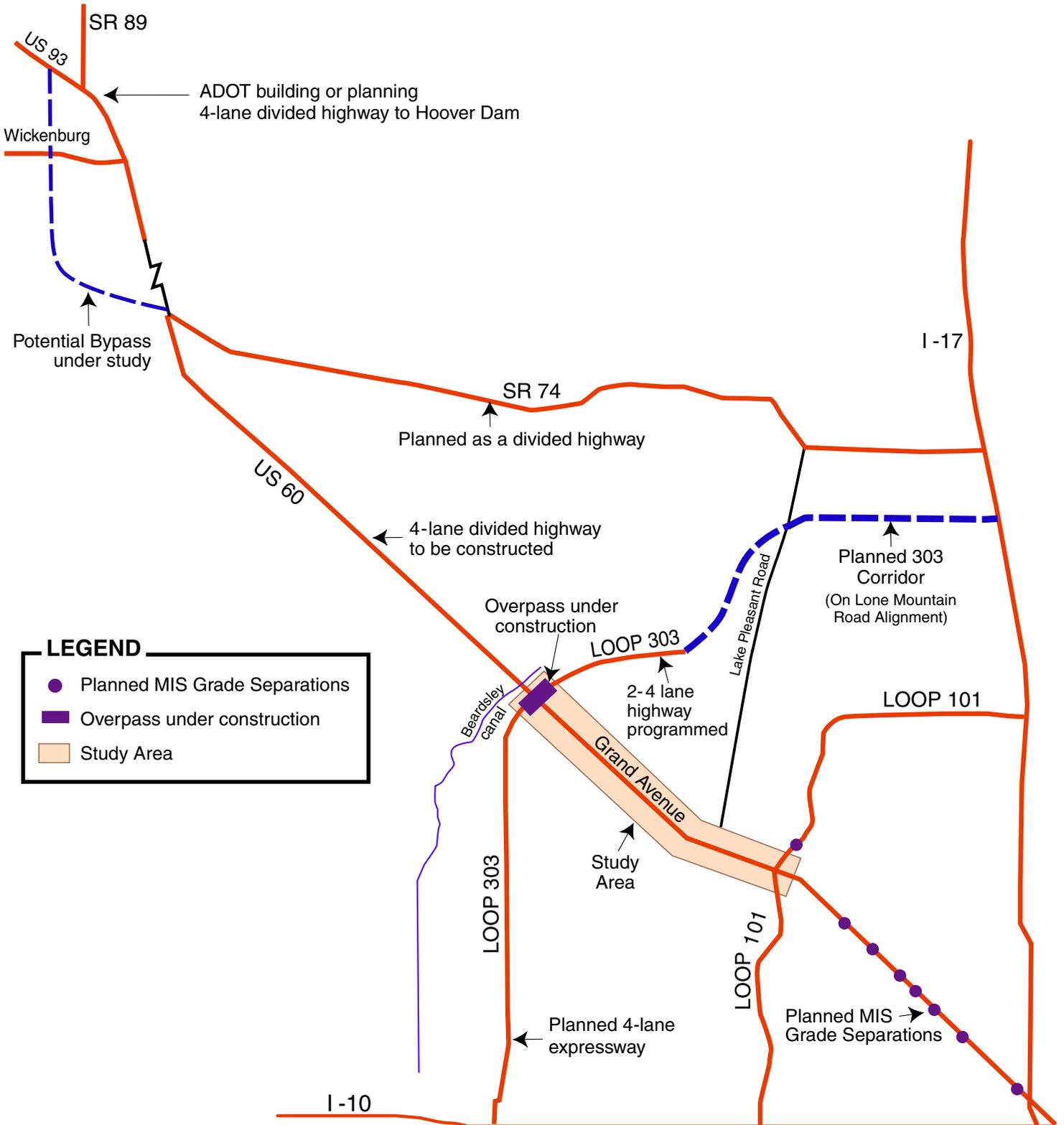


Exhibit 2.5 Planned Roadway Improvements



For Loop 303, an overpass over Grand Avenue and BNSF Railroad is under construction. The road will be extended to Lake Pleasant Road as a controlled access at-grade highway. Loop 303 will initially be four lanes between Grand Avenue and El Mirage Road and two lanes between El Mirage Road and Lake Pleasant Road. Loop 303 is planned to be upgraded to a four-lane divided highway and eventually extended from MC 85 to I-17. The current MAG Long Range Transportation Plan specifies this facility to be a four-lane controlled access expressway.

SR 74 is planned by ADOT as a four-lane divided limited access highway from US 60 Grand Avenue to I-17. The eastern portion of this route is also a candidate for the future location of Loop 303.

2.4 BNSF Railroad

The BNSF Railroad parallels Grand Avenue along the northeast side through the study area. The railroad right-of-way is 195-200 feet wide between Loop 303 and Dysart Road except near RH Johnson Boulevard where it bubbles out to +500 feet.

The right-of-way narrows to 100 feet between Dysart Road and the Agua Fria River. There is additional right-of-way at the El Mirage Auto Distribution Facility. Right-of-way between the Agua Fria River and 99th Avenue is approximately 85 feet.

The following at-grade railroad crossings and protection systems are provided:

RH Johnson Boulevard	Flashers and Gates
Meeker Boulevard	Flashers and Gates
Bell Road	Flashers and Gates
Dysart Road	Flashers and Gates
Greenway Road	Flashers and Gates
Thompson Ranch Road	Flashers
111 th Avenue	Flashers and Gates
107 th Avenue	Flashers and Gates
103 rd Avenue	Flashers and Gates
99 th Avenue	Flashers and Gates

The BNSF Railroad Ennis Spur crosses Grand Avenue near the El Mirage section line. Flashers and gates are provided on Grand Avenue.

3.0 TRAFFIC DATA

3.1 Existing Traffic Conditions

Daily traffic volumes along Grand Avenue range from 9,400 west of Loop 303 to 37,400 at 107th Avenue. Approximately 15% of the vehicles in the traffic stream are trucks. The percentage of traffic occurring during the peak hour is approximately 8%. Exhibit 3.1 summarizes the average daily traffic volumes for each segment of Grand Avenue between Loop 101 and Loop 303. Exhibit 3.2 lists the average daily traffic on the major cross streets intersecting with Grand Avenue. Existing volumes were not available for all of the cross streets, as a consistent traffic counting program does not exist for the study area. Average daily traffic volumes were estimated from peak hour counts for some cross streets. Bell Road carries the highest volume of traffic at 32,800 vehicles. 99th Avenue is the next highest.

Exhibit 3.1
Existing Traffic Volumes Along Grand Avenue

Segment	2000 Average Daily Traffic
West of Loop 303	9,400
Loop 303 to RH Johnson/Sunshine	13,500
RH Johnson to Meeker /Reems	17,600
Meeker to Litchfield	22,100
Litchfield to Bell	20,200
Bell to Dysart	23,300
Dysart to Greenway	27,100
Greenway to El Mirage Road	36,100
El Mirage to Thompson Ranch/ Thunderbird	25,400
Thunderbird to 107 th Ave	33,900
107 th Ave to 99 th Ave	37,400
99 th Ave to Loop 101	35,000
East of Loop 101	28,700

Source: ADOT, URS

Exhibit 3.2
Traffic Volumes At Grand Avenue

Segment	2000 Average Daily Traffic	
	Northeast of Grand	Southwest of Grand
Loop 303	NA	4,500
RH Johnson/Sunshine	10,400	7,900
Meeker/Reems	15,900	9,300
Litchfield Road	NA	4,400
Bell Road	32,800	25,600
Dysart Road	13,700	10,200
Greenway Road	11,800	5,700
Thompson Ranch/Thunderbird	NA	8,900
113 th Ave	NA	5,300
111 th Ave	8,500	9,200
107 th Ave	15,300	13,200
103 rd Ave	12,700	9,500
99 th Ave	17,800	10,500

Source: ADOT, MCDOT, and URS

Note: NA = Volumes not available because roadway does not exist on that side of Grand Avenue.

3.2 Intersection Level of Service

As defined in the 2000 *Highway Capacity Manual*, level of service is a quality measure describing operational conditions within a traffic stream. Six levels of services (LOS) are defined using letters for each type of roadway facilities. LOS A represents the best operating condition; LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions. In urban areas, LOS D is usually acceptable to the public.

The level of service of an arterial street is controlled by the how well vehicles can pass through the signalized intersection along the arterial. Therefore, level of service was calculated at the intersections along Grand Avenue using procedures from the 2000 *Highway Capacity Manual*. Intersection level of service is based on vehicle delay. Exhibit 3.3 summarizes the level of service at the major intersections along Grand Avenue for the A.M. and P.M. peak hours.

Exhibit 3.3
Year 2000 Intersection Level of Service

Segment	Level of Service	
	A.M. Peak	P.M. Peak
RH Johnson/Sunshine	B*	B
Meeker/Reems	D	D
Litchfield Road	B	B
Bell Road	E	E
Dysart Road	C	C
Greenway Road	C	D
Thompson Ranch/Thunderbird	C*	D
113 th Ave	A	A
111 th Ave	C	C
107 th Ave	D	F
103 rd Ave	D	D
99 th Ave	D	D

*Level of Service is estimated because existing turn movements were not available to calculate LOS.

The only two intersections that operate at an unacceptable level of service are Bell Road and 107th Avenue. The level of service at both intersections would improve to acceptable levels if Grand Avenue had three through lanes in each direction through the intersections.

3.3 Accident Summary

The latest three years of accident data along Grand Avenue between Loop 101 and Loop 303 were obtained from ADOT. The data cover the time period between November 1, 1997, and October 31, 2000. A total of 556 accidents occurred within the project area over the three-year period. Accidents were classified by severity and by type (see Exhibit 3.4). Slightly over half of the accidents (53%) resulted in property damage only. There were 11 fatal accidents. The remaining 45% involved injuries. The top four types of accidents were rear-ends (264 accidents), angle accidents (74 accidents), left-turn accidents (68 accidents), and sideswipes (67 accidents).

There were no accidents involving a train during the three years that accident data were compiled. Since the collection of data, a fatal accident involving a train occurred at Greenway Road.

Accident rates were also calculated. The accident rate on Grand Avenue between Loop 101 and Loop 303 is 1.7 accidents per million vehicle miles of travel (VMT). This rate is significantly lower than the City of Phoenix citywide average of 5.0 accidents per million VMT. The percentage of total accidents involving pedestrians (1.25%) and bicycles (0.2%) along the Grand Avenue corridor are less than the average for urban areas in Arizona in 1999 (pedestrians [1.4%] and bicycles [2.1%]).

The fatal crash rate for the corridor is 3.4 fatal accidents per 100 million VMT. This is higher than the State of Arizona rate of 1.9 fatal accidents per 100 million VMT.

Exhibit 3.4
Accidents on Grand Avenue Between Loop 101 and Loop 303
(11-01-97 to 10-31-00)

Type of Accident	Number of Accidents
Rear-End	264
Angle	74
Left Turn	68
Sideswipe	67
Hit Fixed Object	38
Other	16
Overturning	8
Collision with Pedestrian	7
U-Turn	5
Head-On	4
Backing	4
Collision with Bicycle	1
Total	556
Accident Severity	Number of Accidents
Property Damage Only	294
Injury	251
Fatal	11
Total	556

4.0 INTELLIGENT TRANSPORTATION SYSTEMS

MAG recently completed a 12-month study that produced a detailed plan for deploying Intelligent Transportation System (ITS) projects and programs throughout the region over the next 20 years. This update revised the original ITS Strategic Plan completed in 1995. Key elements of the Update include:

- ITS solutions to be deployed over the next 20 years to meet regional transportation needs.
- A System Architecture to show how all of the systems, subsystems and field elements work together.
- A Telecommunications Plan to support the candidate technologies (many of which are already in place on key freeways and arterial roadways).
- An Implementation Plan for short-, medium- and long-range ITS deployment.

- Operational and Implementation Strategies to outline agency roles, responsibilities and resources needed to support long-term ITS operations.

Grand Avenue from Van Buren Street to Bell Road was previously identified in the AZTech Model Deployment Initiative as one of 24 regional SMART corridors. These corridors are key arterial links that pass through multiple jurisdictions. ITS technologies to be implemented in SMART corridors include traffic detection, closed circuit television cameras and variable message signs. Traffic signals are coordinated across jurisdictional boundaries and freeway interchange signals are coordinated with arterial street signal systems. Grand Avenue between Loop 101 and Bell Road, as well as the portion southeast of the study area, is a Phase I corridor, meaning that ITS implementation has begun. Bell Road to the east of Grand Avenue is also a Phase I ITS corridor. Signal coordination has been implemented along Bell Road. Currently, the signals along Grand Avenue are not coordinated.

The following planned projects identified in the MAG ITS Strategic Plan are likely to affect the study corridor:

- Install Freeway Management System (FMS) components on Loop 101, Grand Avenue to I-17 (mid-term project, 2007-2011).
- Upgrade components on existing SMART corridors and add additional components as needed (long-term project, 2012-2021).
- Improve signal coordination along SMART corridors (long-term project, 2012-2021).
- Install Freeway Management System (FMS) components on Loop 101, I-10 to Grand Avenue (mid-term project, 2007-2011).

5.0 PUBLIC TRANSIT

5.1 Fixed Route Services

The Regional Public Transportation Authority (RPTA) provides limited public bus service within the project area. The only route provided is Route 106, which begins at 105th Avenue and Santa Fe Drive (adjacent to Boswell Memorial Hospital), travels west to 111th Avenue, south to Peoria Avenue and then east to Metrocenter Transit Center. In downtown Peoria, it intersects the Yellow Line, which travels down Grand Avenue through downtown Glendale to downtown Phoenix and Tempe. Route 106 operates weekdays every 30 to 90 minutes from 4:30 A.M. to 9:00 P.M. The November 2000 Valley Metro Ridership Report shows 108 daily boardings in Sun City and 194 in Peoria. There is no express bus service within the area.

5.2 Demand Responsive Service

Demand responsive (also known as paratransit) service is characterized by the lack of a pre-determined route or schedule. Paratransit service is similar to taxi service in that passengers may board at any origin and be transported to any destination, as long as the origin and destination are

within a specified service area. Unlike taxi riders, however, paratransit users may have to share their trip with other passengers who have a similar origin or destination.

Exhibit 5.1 lists paratransit systems operating in the study corridor. These services comply with the requirements of the Americans with Disabilities Act (ADA) to provide paratransit service complementary to local bus service for persons certified as ADA-eligible. They also serve non-certified elderly and disabled persons and, in some cases, the general public. Service typically operates from 8 to 12 hours a day.

Unlike bus routes, these paratransit systems typically do not cross municipal boundaries. An exception is Maricopa County Special Transportation Services, operated by the American Red Cross, which emphasizes medical trips and trips to senior centers.

**Exhibit 5.1
Paratransit Systems Serving Grand Avenue Corridor**

System	Eligibility	Vehicles	Days of Service	No. of Annual Boardings
El Mirage Dial-a-Ride	General Public	Not Available	Mon- Fri	3,318
Maricopa County/ American Red Cross	Elderly, Disabled, Low Income	70	Mon-Fri	132,490
Peoria Dial-a-Ride	General Public	9	Mon-Fri	30,395
Sun Cities Area Transit*	General Public	15	Daily**	59,777
Surprise Dial-a-Ride	General Public	4	Mon-Fri	7,261

* Serves the Sun City, Sun City West and Youngtown areas.
 **ADA service weekdays only.
 Sources: Valley Metro Short Range Transit Report for Fiscal Years 2001 through 2005; March 2001 BusBook; Regional Dial-a-Ride Guide.

5.3 Interstate Bus Service

Several Greyhound buses per day on the Phoenix-Las Vegas and Phoenix-Los Angeles routes serve Youngtown. K-T Services operates several daily Phoenix-Las Vegas trips that stop at the same location, where passengers can connect with local bus route 106. The buses use Grand Avenue on their way to and from Phoenix.

5.4 Rail

The BNSF Railroad Phoenix Division is a predominantly single-track line that traverses the project area parallel to Grand Avenue. This line is an important freight route connecting Phoenix with the BNSF Railroad transcontinental mainline via the Peavine route and with southern California via the Arizona & California Railroad. The railroad bridges the Agua Fria River, New River and Loop 101. A spur track leaves the mainline near El Mirage Road and proceeding generally southwest to 143rd/Olive Avenue, where it splits in two, with a western branch serving Olive Avenue and Cotton Lane, and an eastern branch to LAFB.

The BNSF Railroad mainline is a very active facility that plays a key role in the Phoenix area's freight transportation system. The line currently carries approximately 13 million tons of freight per year on ten trains per day between Wickenburg and Glendale. Although specific traffic forecasts are not available, freight volumes carried by this line are expected to increase as Maricopa County continues its growth. The Grand Avenue route provides the only rail connection with the BNSF Railroad transcontinental mainline through Flagstaff, which carries approximately 140 million tons per year. The line also connects with the Union Pacific Railroad in central Phoenix, although more than 95% of Grand Avenue trains originate or terminate in the Phoenix market.

No rail passenger service exists within the study area or elsewhere in the Phoenix metropolitan area. ADOT has studied both commuter and long distance (Phoenix-Grand Canyon) passenger service in the Grand Avenue corridor. Passenger rail service along the BNSF Railroad tracks would face many challenges. The single-track route, heavy freight traffic and busy grade crossings at intersections would make passenger service difficult to operate in this corridor.

The RPTA recently completed a Major Investment Study of a proposed light rail line from the Central/Camelback area in Phoenix to downtown Glendale and Metrocenter. The line would be an extension of a starter route from central Phoenix to Mesa, and could in turn be extended into Glendale in the more distant future. In addition, MAG prepared a Fixed Guideway System Plan to evaluate potential high-speed transit corridors throughout the Phoenix metropolitan area. MAG and RPTA have estimated that the current bus system would have to be at least doubled to support a viable light rail system. Such an expansion of the existing transit system would require development of a dedicated funding source.

The City of Glendale has requested that MAG conduct a feasibility study to address elevated transit concepts along Grand Avenue. The study should review and assess alternative elevated transit technologies that may prove viable in providing high-speed transit service to the Northwest Valley. The feasibility of elevated technologies needs to be considered and weighed against the feasibility of more traditional options, including extension of the planned LRT system beyond downtown Glendale.

5.5 Intermodal Facilities

Intermodal facilities are places where persons or goods can transfer or be transferred between modes of transportation. Passenger facilities include transit centers, park-and-ride lots, airports, intercity bus terminals and rail passenger stations. Freight facilities include airports, rail freight terminals, truck terminals, and pipeline terminals.

The MAG Intermodal Management System (April 1995) identifies one intermodal freight facility within the study area. The El Mirage Auto Distribution Facility, owned and operated by the BNSF Railroad, is located east of Grand Avenue near Greenway Road. The automobiles handled by this facility are significant only as freight carried by trains and trucks, not as transportation vehicles.

The MAG Intermodal Management System lists the following study area roadways as intermodal access routes for the Phoenix region:

- Grand Avenue
- SR 101L
- Loop 303
- Bell Road from Loop 101 to Loop 303

5.6 Park-and-Ride Lots

The only facility within the corridor designated as a park-and-ride lot is a section of the parking lot at Sundome Center for the Performing Arts located at 19402 RH Johnson Boulevard in Sun City West. The lot currently has no bus service but 25 parking spaces are open for carpools and vanpools. The recently completed MAG Park-and-Ride Site Selection Study recommended a park-and-ride lot for the southwest corner of Dysart Road and Bell Road. This park-and-ride location is planned to be included in the next update of the MAG Long Range Transportation Plan.

5.7 Programmed Transit Capital Improvements

Exhibit 5.2 lists transit capital improvements programmed by jurisdictions within the corridor for fiscal years 2001 through 2005. Most projects are funded by a combination of federal and local sources. The new buses scheduled for purchase will replace existing older buses. No expansion of services or increase in service frequency is programmed.

**Exhibit 5.2
Programmed Transit Improvements, 2001-2005**

Jurisdiction	Year	Cost	Description
Peoria	2001	\$ 130,000	Purchase 2 medium duty buses (replacement)
RPTA	2001	\$ 195,000	Purchase 3 buses for Sun City (replacement)
Peoria	2002	\$ 65,000	Purchase 1 medium duty bus.
Peoria	2003	\$ 195,000	Purchase 3 medium duty buses (replacement).
Peoria	2004	\$ 260,000	Purchase 4 medium duty buses (replacement).
RPTA	2002	\$ 195,000	Purchase 3 buses for Sun City (replacement).
RPTA	2003	\$ 195,000	Purchase 3 buses for Sun City (2 replacements and 1 new).
RPTA	2004	\$ 195,000	Purchase 3 buses for Sun City (replacement).
RPTA	2005	\$ 210,000	Purchase 3 buses for Sun City (replacement).
Total Cost		\$1,640,000	

Source: MAG TIP for Fiscal Years 2001 through 2005.

6.0 ALTERNATIVE MODES OF TRAVEL

There are few bicycle facilities within the study area. Bike lanes are located on El Mirage Road between Thunderbird Road and Santa Fe Lane. Between Greenway Road and Waddell Road, bike routes are designated along Dysart Road and 133rd Avenue.

Planned bicycle facilities in the MAG Long Range Transportation Plan include bicycle facilities along Grand Avenue, Bell Road, 99th Avenue and Litchfield Road. In addition, the New River, Agua Fria River, and Beardsley Canal are shown as potential off-road bikeways. The type of facility is not defined. Additional bike lanes are planned within the corridor as shown in the *City of Surprise 2000 General Plan*: Reems Road, Greenway Road, Waddell Road, Dysart Road, Mountain View Road and El Mirage Road.

The Maricopa County Department of Transportation (MCDOT) Bicycle System Plan includes the following facilities:

- Waddell Road, Cotton Lane to Dysart Road
- Loop 303 Access Road, Waddell Road to Lake Pleasant Road
- 99th Avenue, Olive Avenue to Bell Road
- 103rd Avenue, Grand Avenue to Boswell Boulevard
- El Mirage Road, Bell Road to Deer Valley Road
- Thunderbird Road, 99th Avenue to Peoria City Limits

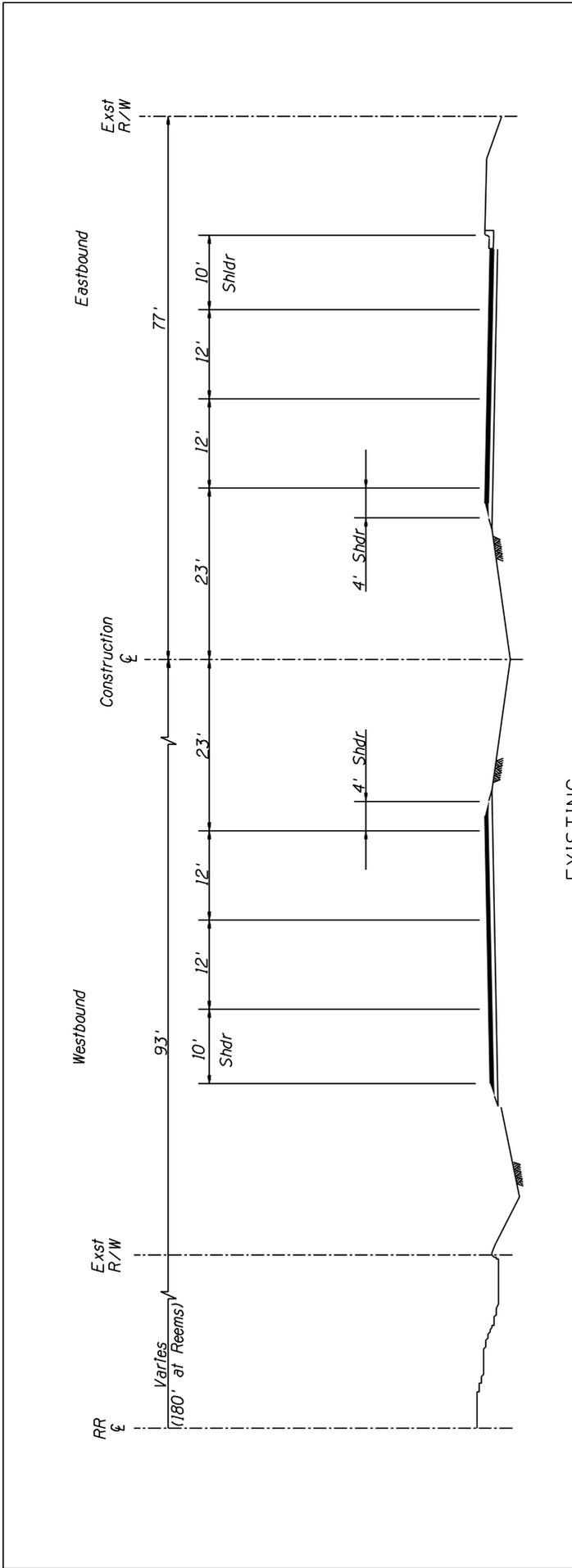
The only pedestrian facilities within the corridor include some sidewalks along the southwest side of Grand Avenue. Sidewalks are present along new development (shopping centers) in Surprise, across the bridge over the Agua Fria River, through Youngtown, near 103rd Avenue and across the bridges over the New River and Loop 101. Sidewalks are also present along the frontage road in El Mirage. Evaluation of existing pedestrian facilities and needs is discussed in Working Paper No. 7, Alternative Mode Needs.

MAG and ADOT are conducting a New River and Lower Agua Fria River Multi-modal Corridor Study. The study is evaluating and planning a 42-mile non-motorized system of urban and rural trails along the New River and Lower Agua Fria River. The trails are being designed for pedestrians, hikers, bicyclists, and equestrian activities. With the completion of this study, local jurisdictions will be responsible for the design and implementation of each segment of the trails. The Flood Control District of Maricopa County is conducting an Agua Fria Watercourse Master Plan, which includes a trail along the Agua Fria River.

Golf carts are another mode of travel widely used within the corridor. Residents of the adjacent retirement communities use golf carts along the arterial streets adjacent to the Grand Avenue corridor. Although golf carts are not allowed on Grand Avenue, they are frequently used to cross Grand Avenue at signalized intersections throughout the corridor.

APPENDIX

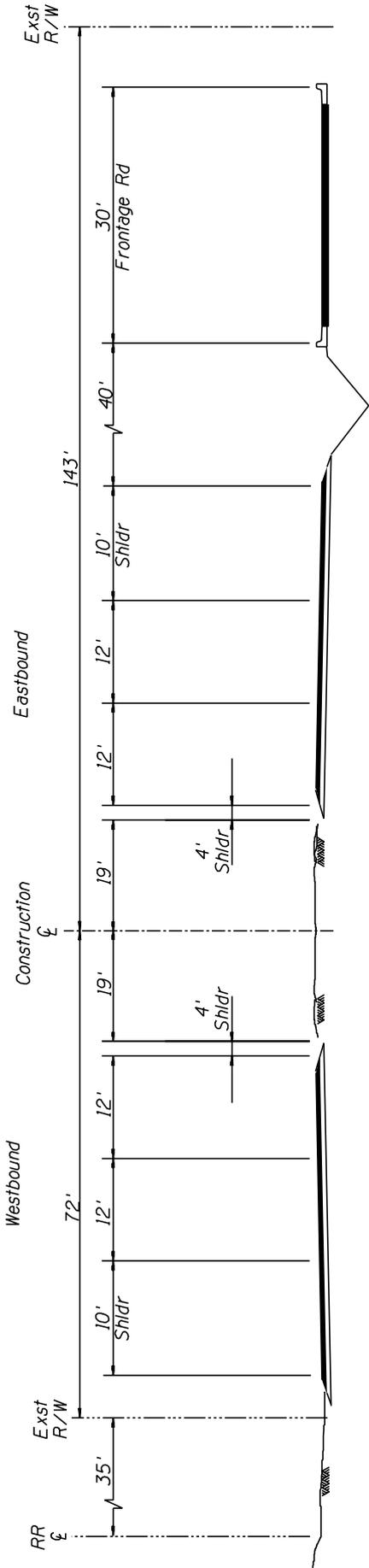
Cross-Sections Along Grand Avenue



EXISTING
 TYPICAL SECTION
 (Looking SE)
 Section 1: Vicinity of
 Reems Rd to Bell Rd

**GRAND AVENUE
 NORTHWEST CORRIDOR STUDY**

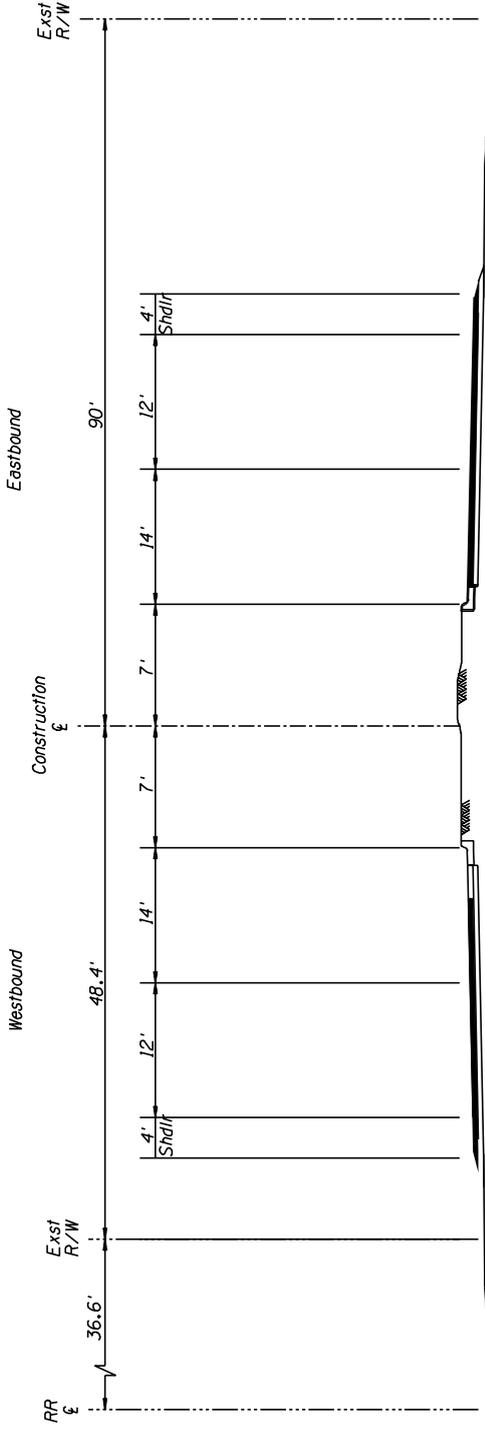




EXISTING
 TYPICAL SECTION
 (Looking SE)
 Section 2: Vicinity of
 Dysart Rd to Thunderbird Rd

**GRAND AVENUE
 NORTHWEST CORRIDOR STUDY**

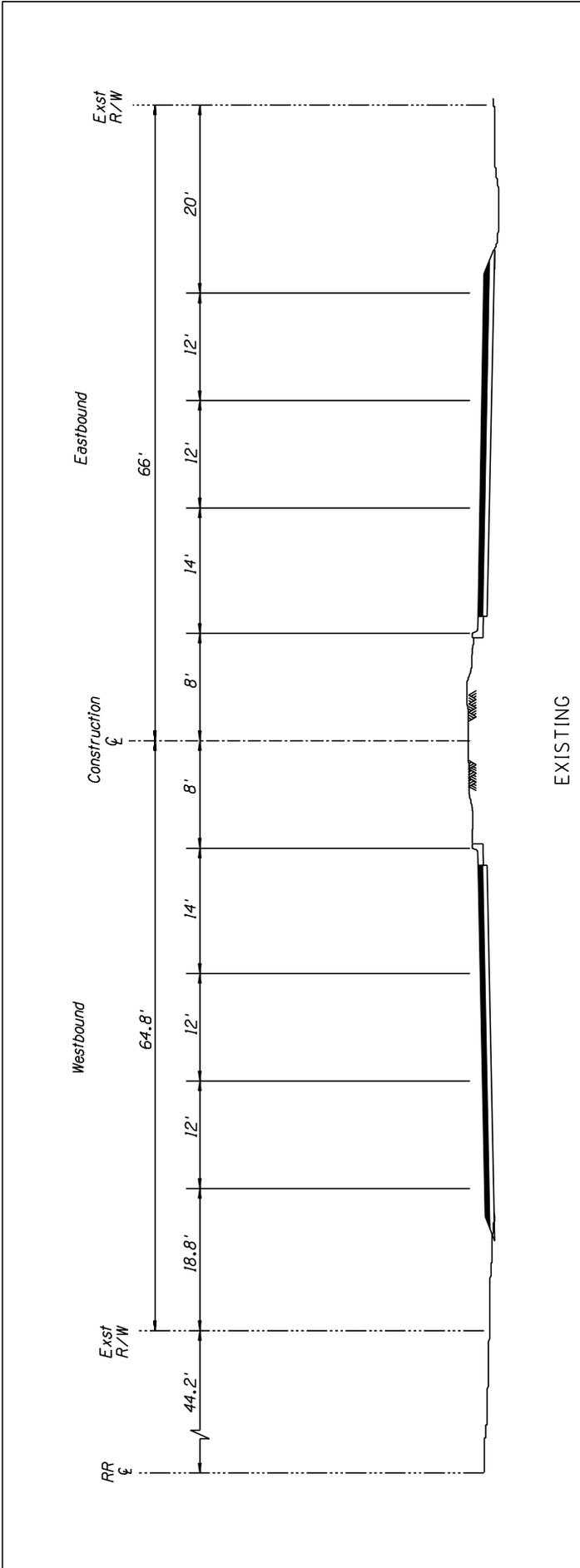




EXISTING
 TYPICAL SECTION
 (Looking SE)
 Section 3: Vicinity
 of 107th Avenue

**GRAND AVENUE
 NORTHWEST CORRIDOR STUDY**





EXISTING
 TYPICAL SECTION
 (Looking SE)
 Section 4: Vicinity
 Of 99th Avenue

**GRAND AVENUE
 NORTHWEST CORRIDOR STUDY**

