

INITIAL DRAFT

GRAND AVENUE MIS PHASE II

WORKING PAPER #3

**EXISTING, PROGRAMMED AND
PLANNED FACILITIES AND
CONDITIONS**

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TABLE OF CONTENTS

3.0 INTRODUCTION 1

3.1 EXISTING ROADWAY INFRASTRUCTURE 5

3.1.1 Right-of-Way12

3.1.2 Number of Lanes.....15

3.1.3 Signalized and Unsignalized Intersections15

3.1.4 Median Dividers.....23

3.1.5 Grade Separations.....23

3.1.6 Access Control.....24

3.1.7 BNSF Railroad.....28

3.1.8 Pedestrian Facilities28

3.1.9 Bicycle Facilities.....30

3.1.10 Canal Crossings33

3.1.11 Landscaping.....33

3.1.12 Lighting.....37

3.1.13 Freight Facilities37

3.2 EXISTING AND HISTORICAL TRAFFIC 38

3.2.1 Data Collection38

3.2.2 Average Weekday Daily Traffic Volumes38

3.2.3 Peak Hour Traffic Volumes and Turning Movement Counts.....40

3.3 EXISTING TRAFFIC OPERATING CONDITIONS 43

3.3.1 Congestion and Level of Service (LOS).....43

3.3.2 Origins / Destinations (SELINK).....44

3.3.3 Travel Time and Speed.....44

3.3.4 Crash Analysis44

3.4 EXISTING AND PLANNED MULTI-MODAL FACILITIES AND USAGE 47

3.4.1 Public Transit Service47

3.4.2 Non-Motorized Transportation Facilities57

3.4.3 Pedestrian Facilities and Restrictions60

3.4.4 Rail Facilities and Services.....61

3.5 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) 61

3.6 RIGHT-OF-WAY / PROPERTY BOUNDARIES..... 63

3.7 DRAINAGE FACILITIES 63

3.8 FUTURE CONDITIONS 63

3.8.1 Future Volumes.....64

3.8.2 Future Level of Service (LOS)64

DRAFT

List of Exhibits

Exhibit	Title	Page
3.1	Vicinity Map	2
3.2	Study Area Map	3
3.3	Roadway Infrastructure – Peoria Section	7
3.4	Roadway Infrastructure – Glendale Section	8
3.5	Roadway Infrastructure – Phoenix Section	9
3.6	Major Arterial Street Existing Number of Lanes	10
3.7	Traffic Signal Locations	11
3.8	Existing Right-of-Way along Grand Avenue within Study Area	13
3.9	Intersections along Grand Avenue within Study Area	17
3.10	Intersections – Peoria Section	20
3.11	Intersections – Glendale Section	21
3.12	Intersections – Phoenix Section	22
3.13	Median Breaks and Driveways – Peoria Section	25
3.14	Median Breaks and Driveways – Glendale Section	26
3.15	Median Breaks and Driveways – Phoenix Section	27
3.16	Existing Pedestrian Facilities	29
3.17	Bicycle Routes	32
3.18	Existing Landscaping along Grand Avenue within Study Area	33
3.19	Existing Landscaping	36
3.20	2002 Average Daily Weekday Traffic	40
3.21	Difference in Daily Traffic Volume 1998 to 2002	41
3.22	Grand Avenue Traffic Volume Comparison Year 1998 and 2002	38
3.23	<i>To be completed prior to Final submittal of Working Paper No. 3.</i>	
3.24	<i>To be completed prior to Final submittal of Working Paper No. 3.</i>	
3.25	<i>To be completed prior to Final submittal of Working Paper No. 3.</i>	
3.26	Crashes by Severity on Grand Avenue at Major Intersections	44
3.27	Crashes by Severity on Grand Avenue between Major Intersections	45
3.28	Existing Valley Metro Bus Routes	48
3.29	Bus Routes	49
3.30	Bus Route Boardings by Municipality	50
3.31	Paratransit Systems Serving the Grand Avenue Corridor	53
3.32	Park-and-Ride Lots	54
3.33	Programmed Transit Capital and Operating Improvements: FY 2004	55
3.34	Regional Transportation Plan	56
3.35	Existing Bikeways and Trails	57
3.36	Programmed Bicycle / Pedestrian Improvements 2004 – 2007	58
3.37	Planned Bikeways and Trails	59
3.38	Volume Comparison 2002 Model versus 2030 Model	64
3.39	<i>2030 Traffic Volumes – Base Conditions (map)</i> <i>To be completed prior to Final submittal of Working Paper No. 3</i>	

DRAFT

<u>Exhibit</u>	<u>Title</u>	<u>Page</u>
3.40	Intersection Level of Service (LOS) Comparison 2002 Model versus 2030 Model	64
3.41	<i>2030 Intersection LOS – Base Conditions (map)</i> <i>To be completed prior to Final submittal of Working Paper No. 3.</i>	

List of Acronyms

ADA	Americans with Disabilities Act
ADOT	Arizona Department of Transportation
ASG	Agency Steering Group
BNSF	Burlington Northern Santa Fe Railway
CCTV	Closed-Circuit Television
CIP	Capital Improvement Plan / Program
CMAQ	Congestion Mitigation and Air Quality
DCR	Design Concept Report
FY	Fiscal Year
GUS	Glendale Urban Shuttle
HOV	High Occupancy Vehicle
ITS	Intelligent Transportation Systems
LOS	Level of Service
MAG	Maricopa Association of Governments
MIS	Major Investment Study
MMDI	Metropolitan Model Deployment Initiative
PDO	Property Damage Only
ROSS	Regional Off-Street System
ROW	Right-of-Way
RPTA	Regional Public Transportation Authority
RTP	Regional Transportation Plan
SMART	Strategically Managed Arterial
SR	State Route
TMC	Traffic Management Center
VMS	Variable Message Signs

3.0 INTRODUCTION

Originally constructed in the late 1800's, Grand Avenue served as a major connection between the agricultural communities of the West Valley and the business community in downtown Phoenix. With the introduction of rail activity parallel to Grand Avenue, the West Valley continued to develop and began to transform from an agriculture-centered region to an industrial/agriculture-centered region. This change in land use and economic generators, along with the population growth that the West Valley began to experience, has led to the overall reduction in service provided along Grand Avenue, both in terms of motorized and non-motorized transportation.

Over the years, Grand Avenue has ceased to produce the benefits it was originally intended to provide. The diagonal orientation of Grand Avenue and the associated skewed and six-legged intersections it produces have resulted in major blockage of north-south and east-west arterials and excessive signal timing cycle delays. In addition, delays and congestion are magnified by delays due to train activity (at-grade railroad crossings) with respect to the BNSF Railroad. These delays often result in heightened driver irritation and potential blockage of emergency vehicle routes.

This Working Paper seeks to provide a review of existing roadway and traffic conditions as well as documentation pertaining to transit, bicycle, and pedestrian facilities and usage within the Study Area (See **Exhibits 3.1 and 3.2**). (The Study Area parallels Grand Avenue from 19th Avenue in the southeast to Loop 101 in the northwest.) Future roadway conditions are also documented. Later in this study (Summer 2004), future traffic conditions will be included in an updated version of this Working Paper.

Below is a summary of the existing roadway, railroad and traffic conditions within the Study Area and the interrelationships of existing multi-modal elements.

Existing Roadway and Railroad Conditions

Grand Avenue

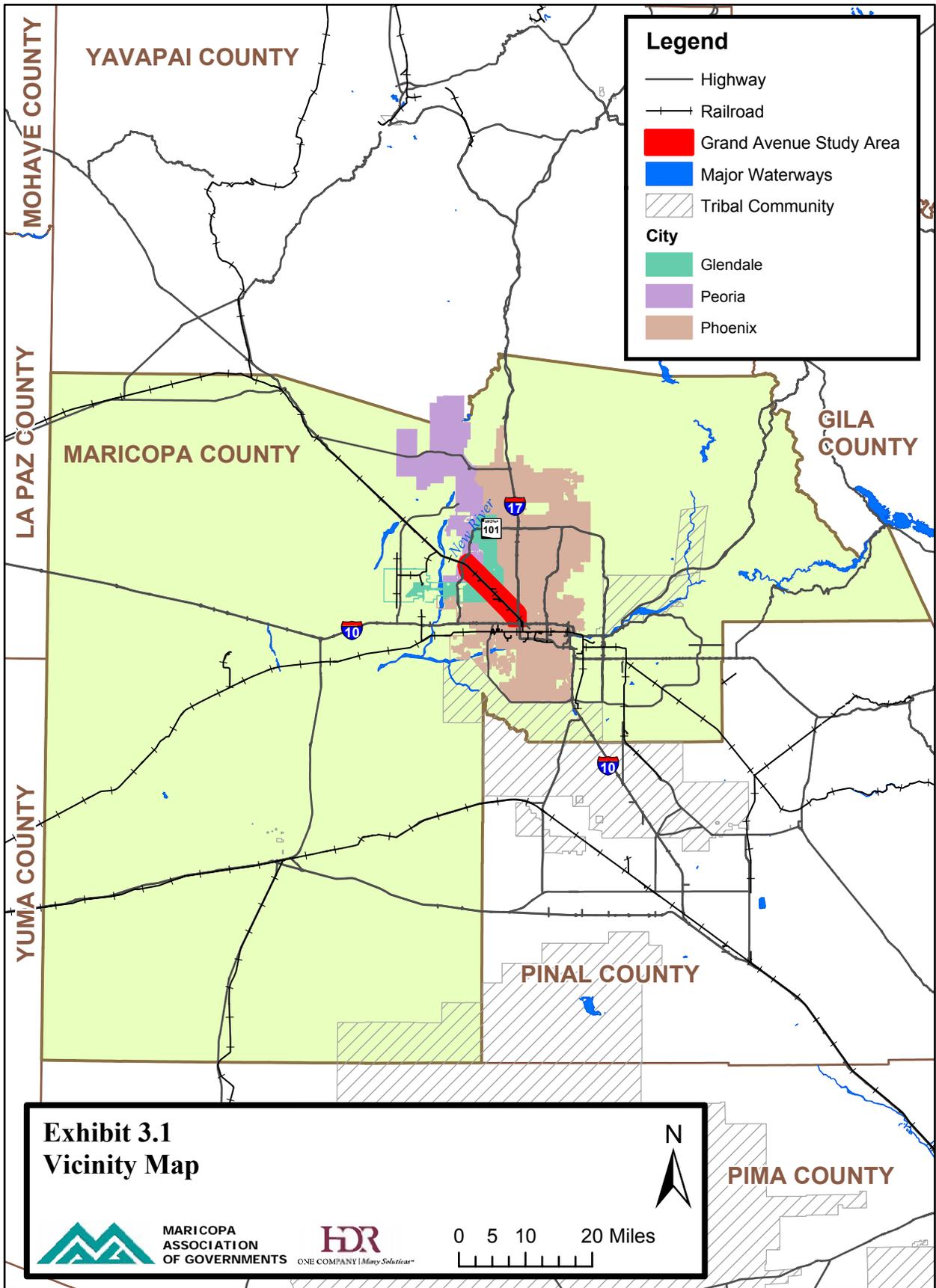
- Two to three travel lanes in each direction with raised median
- Right-of-way width of 90 to 100 feet
- Access control at grade-separations and on railroad side only
- 20 traffic signals along Grand Avenue

Grade Separations

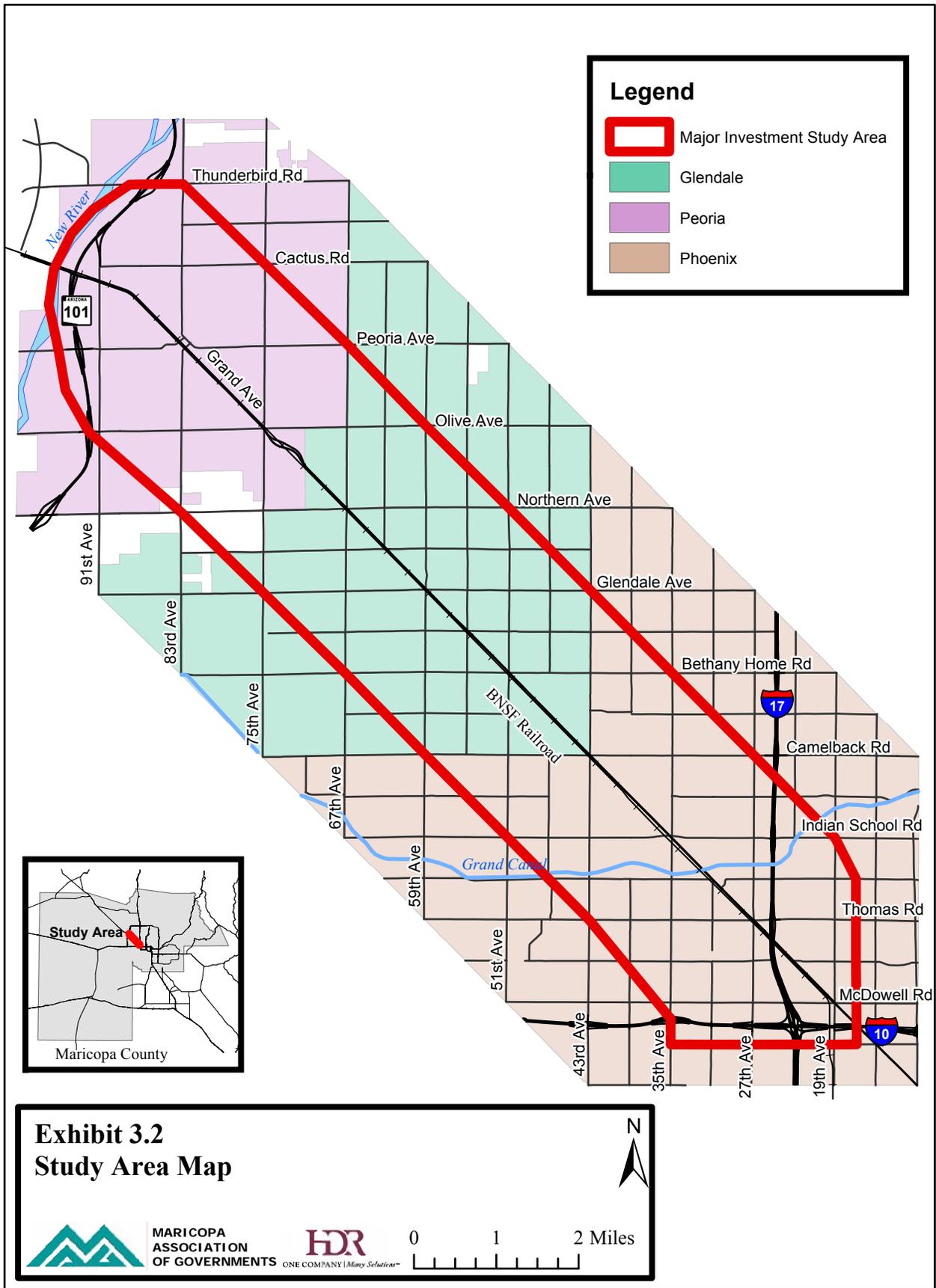
- Grand Ave over 27th Ave / Thomas Rd
- Indian School Rd over 35th Ave/ Grand Ave

BNSF

- Railroad parallels Grand Avenue within Study Area
- Spur tracks cross Grand Avenue at one location south of Northern Avenue



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Existing Roadway and Railroad Conditions (Continued)

Six-Legged Intersections

- 19th Ave/ McDowell Rd/ Grand Ave
- 43rd Ave/ Camelback Rd/ Grand Ave
- 51st Ave/ Bethany Home Rd/ Grand Ave
- 55th Ave/ Maryland Ave/ Grand Ave
- 59th Ave/ Glendale Ave/ Grand Ave
- 67th Ave/ Northern Ave/ Grand Ave
- 75th Ave/ Olive Ave/ Grand Ave

Arterial Cross-Streets

- Typically three travel lanes northbound and westbound
- Typically two travel lanes southbound and eastbound
- Center two-way left-turn lane

Existing Traffic Conditions

Traffic Volumes

- Existing volumes on Grand Avenue: 20,000 to 35,000 vehicles per day
Changes in volume in past 5 years

Arterial Cross-Streets

- Limited capacity due to delay at six-legged intersections
- Projected volumes on Grand Avenue:
Inserted following analysis

Congestion and Delay

- Six-legged intersections operate at LOS E or F during peak hours
- Train activity increases delay at some approaches by up to three minutes

Crashes

- Over 1,300 crashes on Grand Ave within Study Area in last three years

Existing Multi-Modal Elements

Transit Service

- Grand Avenue Limited serves 138 passengers per day and provides local bus service along Grand Avenue; its passenger per mile ratio is below the metropolitan average
- Transfer points at six-legged intersections are difficult for pedestrians; particularly those with disabilities
- Paratransit / vanpool service exist
- Three park-and-ride lots exist

Planned Improvements

- Light rail transit to downtown Glendale
- Increased local / express bus service
- Additional bike facilities

Other Facilities

- Existing bike facilities include bike lanes, bike routes and multi-use paths
- Six-legged intersections are difficult for pedestrians to cross because of long cross distances
- Sidewalks are not continuous within the Study Area

Intelligent Transportation Systems

- Grand Avenue and Northern Avenue are AZTech “SMART Corridors”
- Enhanced traffic detection, data collection and signal coordination will be implemented

3.1 EXISTING ROADWAY INFRASTRUCTURE

Grand Avenue exists as a four- to six-lane major arterial street that runs diagonally across the one-mile grid system of arterial streets that make up the roadway network in Phoenix's greater metropolitan area. On its diagonal route through Maricopa County, US 60 (Grand Avenue) begins near the Town of Wickenburg and travels southeast through the communities of Sun City West, Surprise, El Mirage, Sun City, Peoria, Glendale and Phoenix. As a result of its diagonal orientation, Grand Avenue creates six-legged intersections where it crosses the one-mile grid of arterial streets. Seven six-legged arterial intersections exist within the Study Area, of which three are currently under construction to provide a grade separation for one of the movements (two of the legs). There are also numerous four- or five-legged intersections created where Grand Avenue crosses collector streets.

Within the Study Area, the BNSF Railroad has track parallel to Grand Avenue. The track is located north of Grand Avenue between Loop 101 and 75th Avenue. To the east of 75th Avenue, the track crosses over westbound Grand Avenue and under eastbound Grand Avenue. The track then travels along the southern side of Grand Avenue until 19th Avenue, where it travels south and enters Mobest Yard. At each of the multi-legged intersections, the track crosses at least one approach to the intersection. The railroad crossings are at-grade and are typically controlled by flashing warning signals; automatic gates are not located at a majority of the crossings. There is one at-grade crossing of Grand Avenue by spur tracks located south of Northern Avenue. Along Grand Avenue, access is generally prohibited along the railroad side with the exception of mile and half-mile arterial streets. The side opposite the railroad track generally does not limit access.

Grand Avenue has six travel lanes (three in each direction) the majority of its length within the Study Area. Between Loop 101 and the 75th Avenue / Olive Avenue intersection, Grand Avenue is a four-lane arterial street except through downtown Peoria where it widens to six lanes (Grand Avenue is under construction between 81st Avenue and 75th Avenue to add a third through lane in each direction). Throughout the Study Area raised median typically separates eastbound and westbound traffic. Exclusive left-turn lanes are provided at most median breaks and intersections. Recently, the Arizona Department of Transportation (ADOT) has completed and opened grade-separations at two of the six-legged intersection locations. Grand Avenue is now grade-separated over the 27th Avenue / Thomas Road intersection, and Indian School Road is grade-separated over the 35th Avenue / Grand Avenue intersection. In addition to these two locations, three other grade-separations are currently under construction and scheduled for completion in the summer of 2004. These locations include: Grand Avenue grade-separation over 43rd Avenue / Camelback Road intersection, 51st Avenue grade-separation over Grand Avenue / Bethany Home Road intersection, and Maryland Avenue grade-separation over 55th Avenue / Grand Avenue intersection. By the end of 2004, Olive Avenue is expected to be open as a grade-separation over the 75th Avenue / Grand Avenue intersection. Two other grade-separations are planned for completion by the fall of 2006, including 59th Avenue / Glendale Avenue / Grand Avenue and 67th Avenue / Northern Avenue / Grand Avenue.

There are a total of 20 traffic signals (including the pair of signals at the Loop 101 / Grand Avenue interchange) on Grand Avenue between Loop 101 and 19th Avenue. Traffic signal spacing varies between less than one-quarter mile to over one mile. The right-of-way for Grand Avenue is generally 90 to 100 feet wide within the Study Area. It is as narrow as 85 feet at 75th Avenue and as wide as 166 feet near downtown Peoria. The roadway width for Grand Avenue is typically 84 feet wide. Near I-17, Grand Avenue widens to between 88 and 90 feet wide.

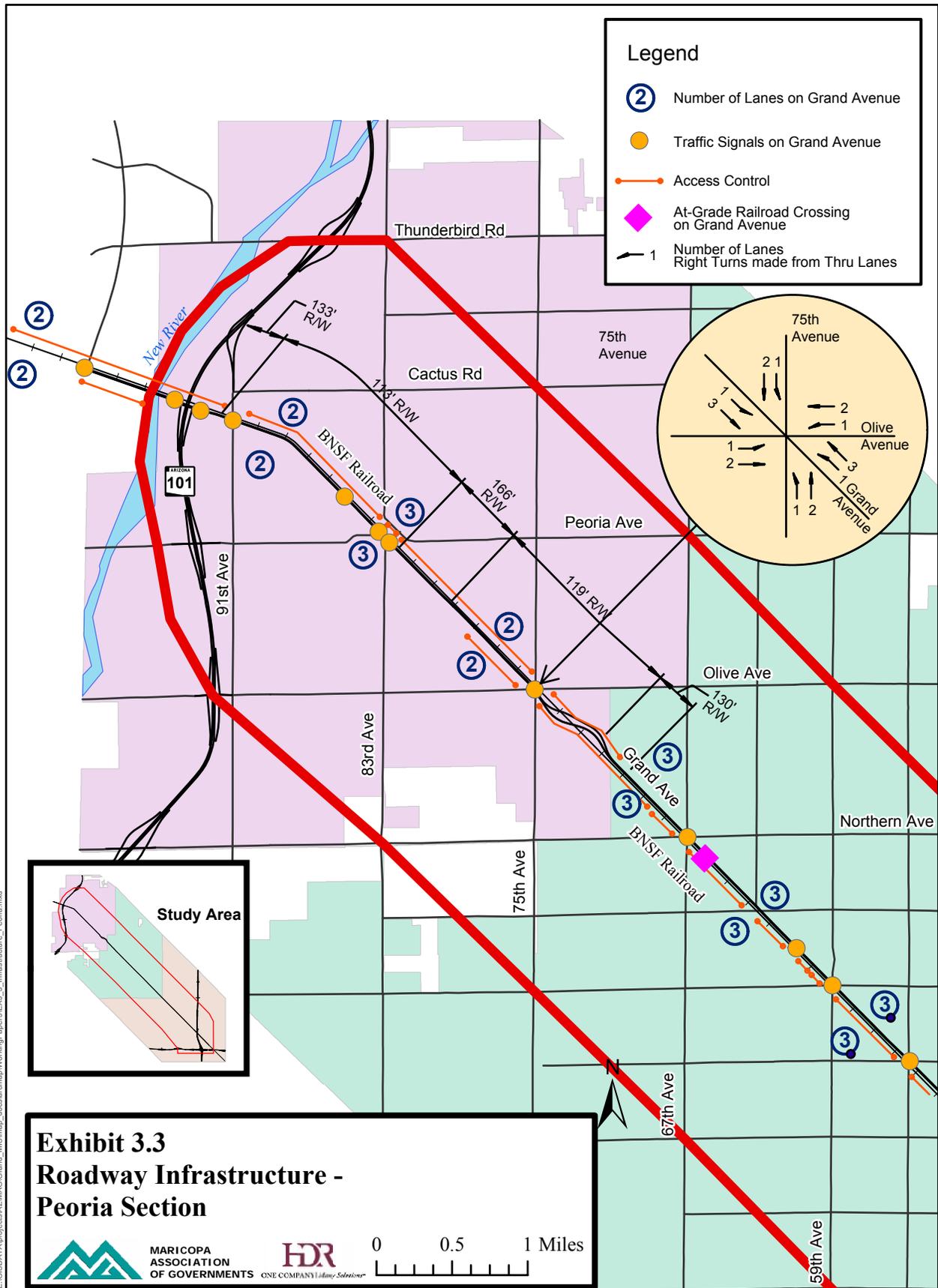
Exhibits 3.3, 3.4, and 3.5 show the existing roadway infrastructure along Grand Avenue within the cities of Peoria, Glendale, and Phoenix, respectively. Roadway infrastructure shown includes right-of-way width, number of lanes, number of turn lanes at major six-legged intersections, traffic signal locations, railroad track locations, at-grade railroad crossings, and access control. Access control lines designate areas where access to and from Grand Avenue is prohibited due to jurisdictional or physical constraints.

Exhibit 3.6 shows the existing number of lanes for the major arterial streets that intersect Grand Avenue within the Study Area. Within Phoenix, arterial streets generally have five travel lanes with an additional center lane functioning as a two-way left-turn lane. North-south arterial streets typically have three northbound lanes and two southbound lanes. East-west arterial streets typically have three westbound lanes and two eastbound lanes. Many of the major arterial streets in Glendale and Peoria have four travel lanes (two in each direction) with a center lane functioning as a two-way left-turn lane. In Peoria, there are some two-lane arterial streets within the Study Area.

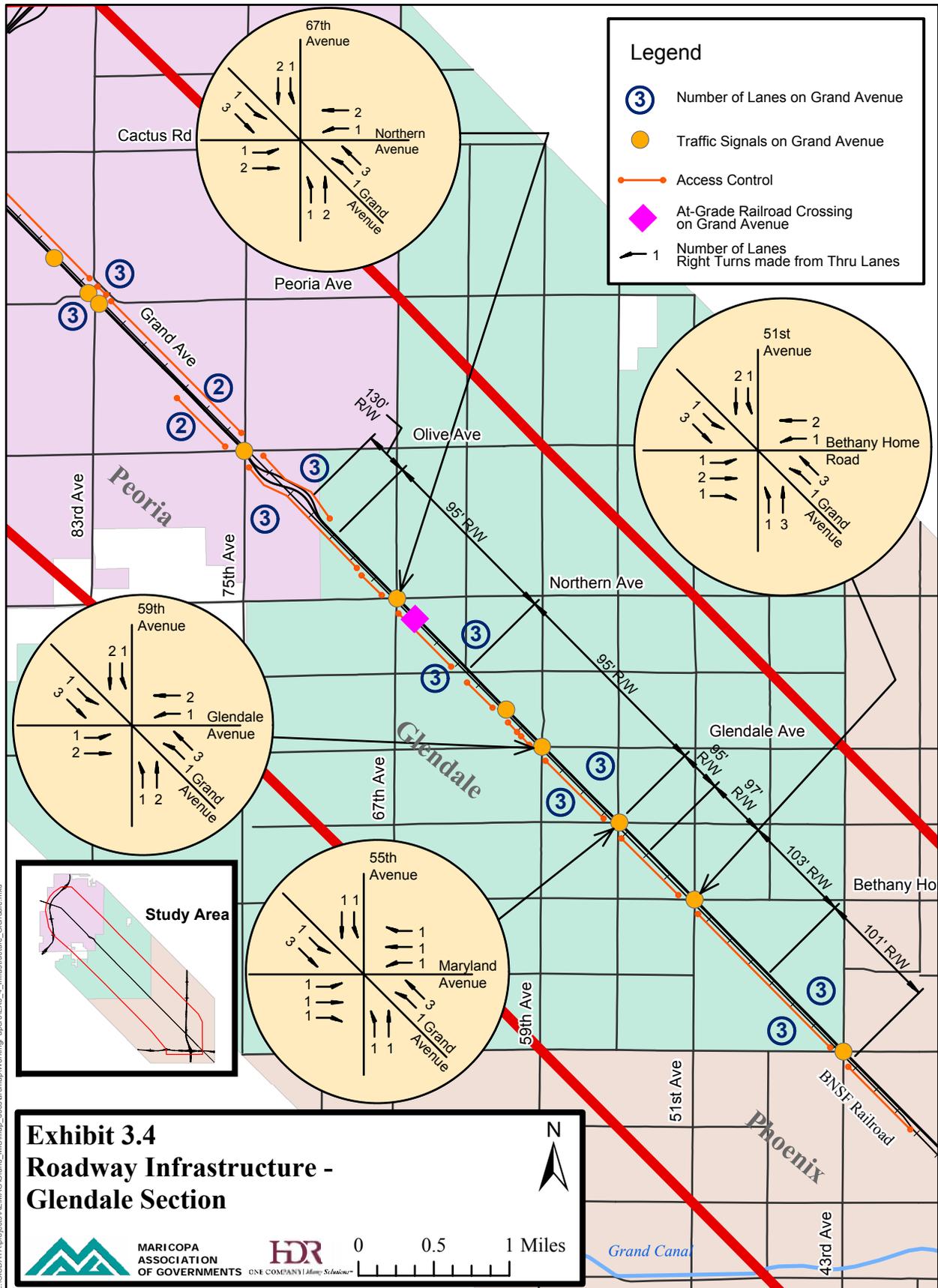
As noted, there are 20 traffic signals along Grand Avenue within the Study Area. Additionally, there are over 140 traffic signals on arterials and collectors within the Study Area. **Exhibit 3.7** illustrates the location of all of these signals.

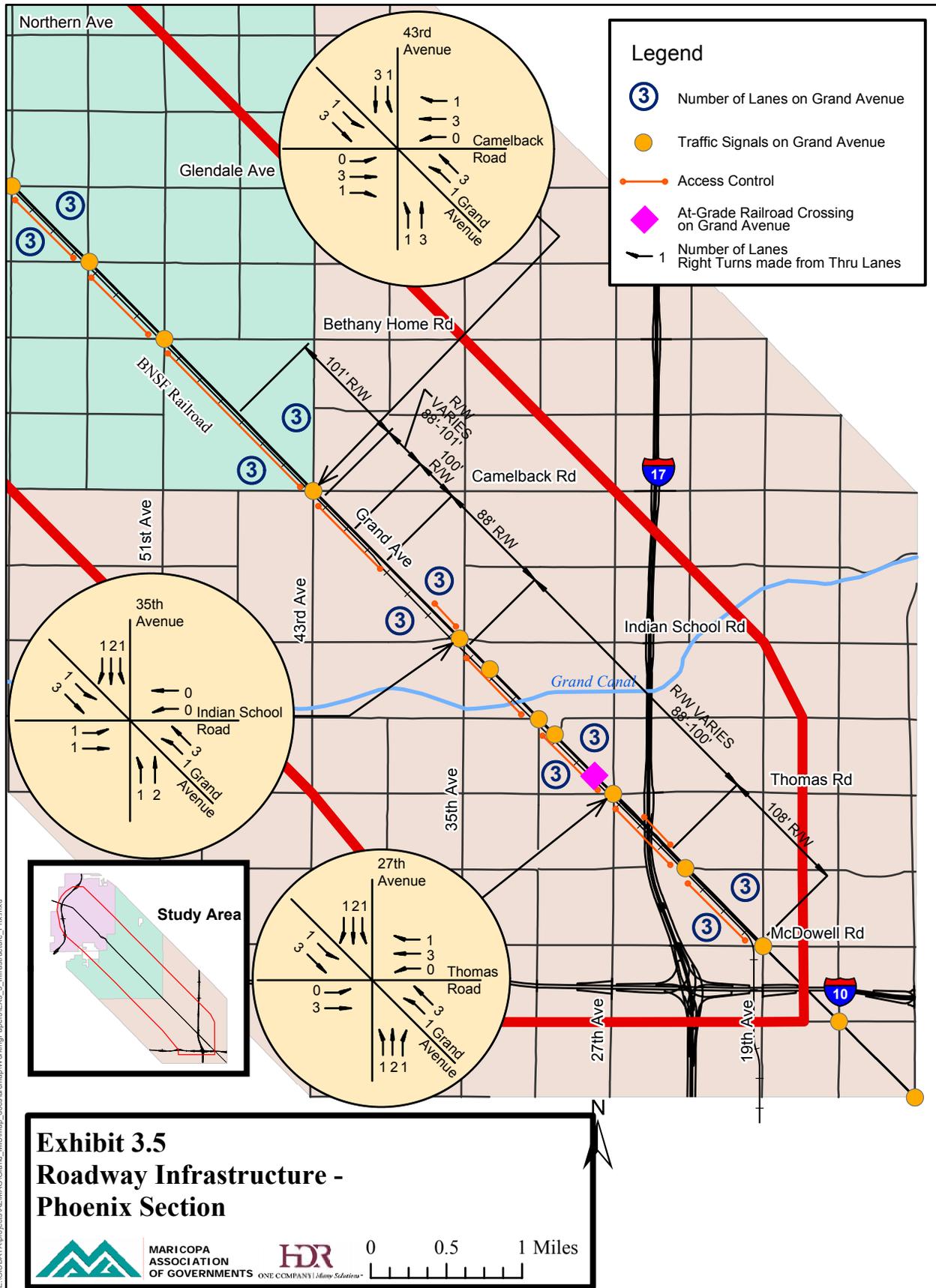
Prior to the initiation of grade-separated structures along the Grand Avenue corridor, most modifications to Grand Avenue have been modest over the past 25 years. The two grade-separations that are currently open to traffic and the three that are planned to be opened this summer represent a major investment in Grand Avenue. In addition, major improvements have been made to the regional transportation network during this time period. A summary of the improvements and changes to the regional transportation network that affect travel on Grand Avenue is provided below:

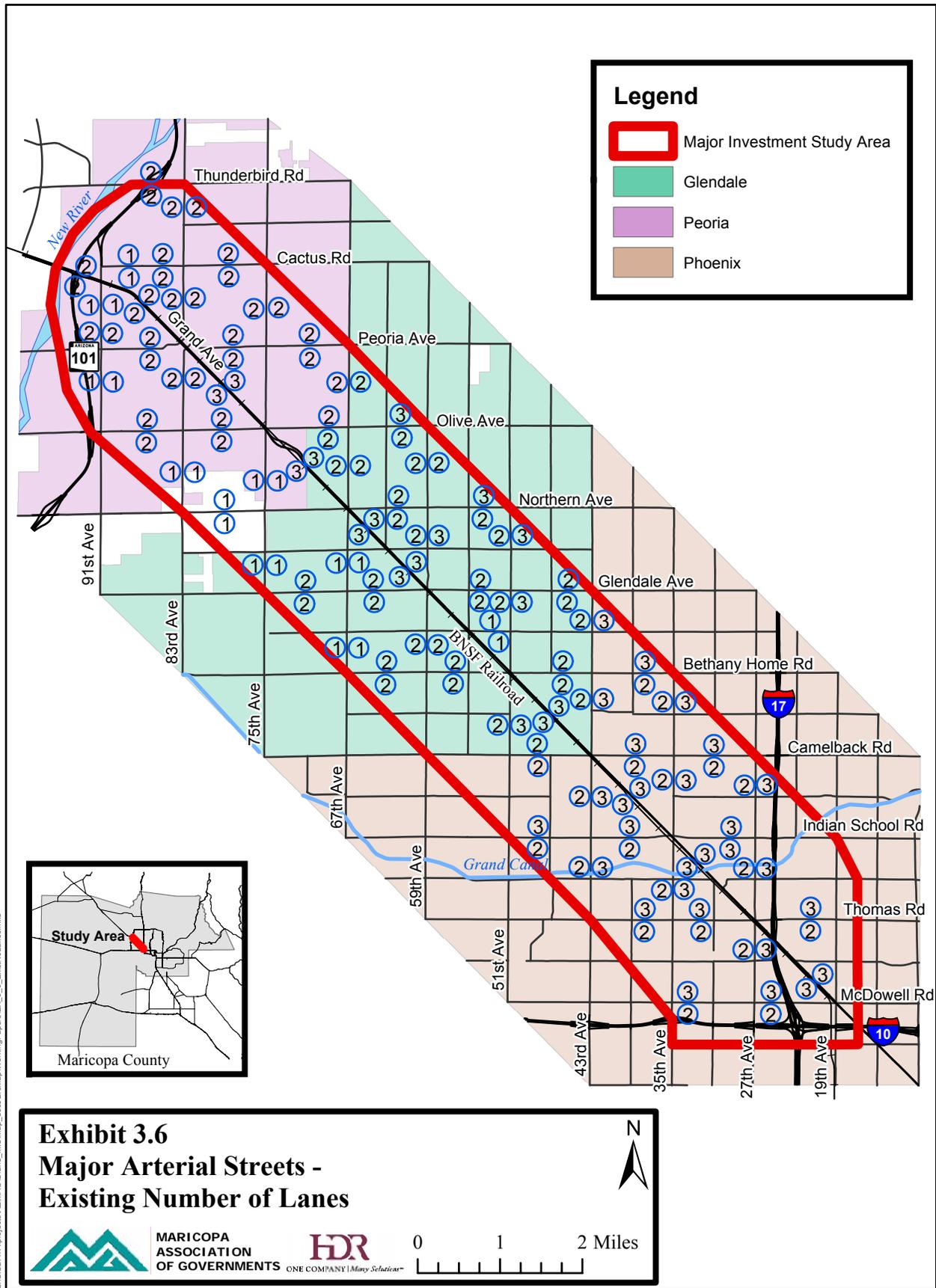
- Grand Avenue has been widened to a four-lane divided highway (from two-lanes, undivided) from the Agua Fria River north to the RH Johnson Boulevard intersection through the cities of El Mirage and Surprise and Sun City West.
- New traffic signal bridges have been constructed at six-legged intersections along with operational improvements.



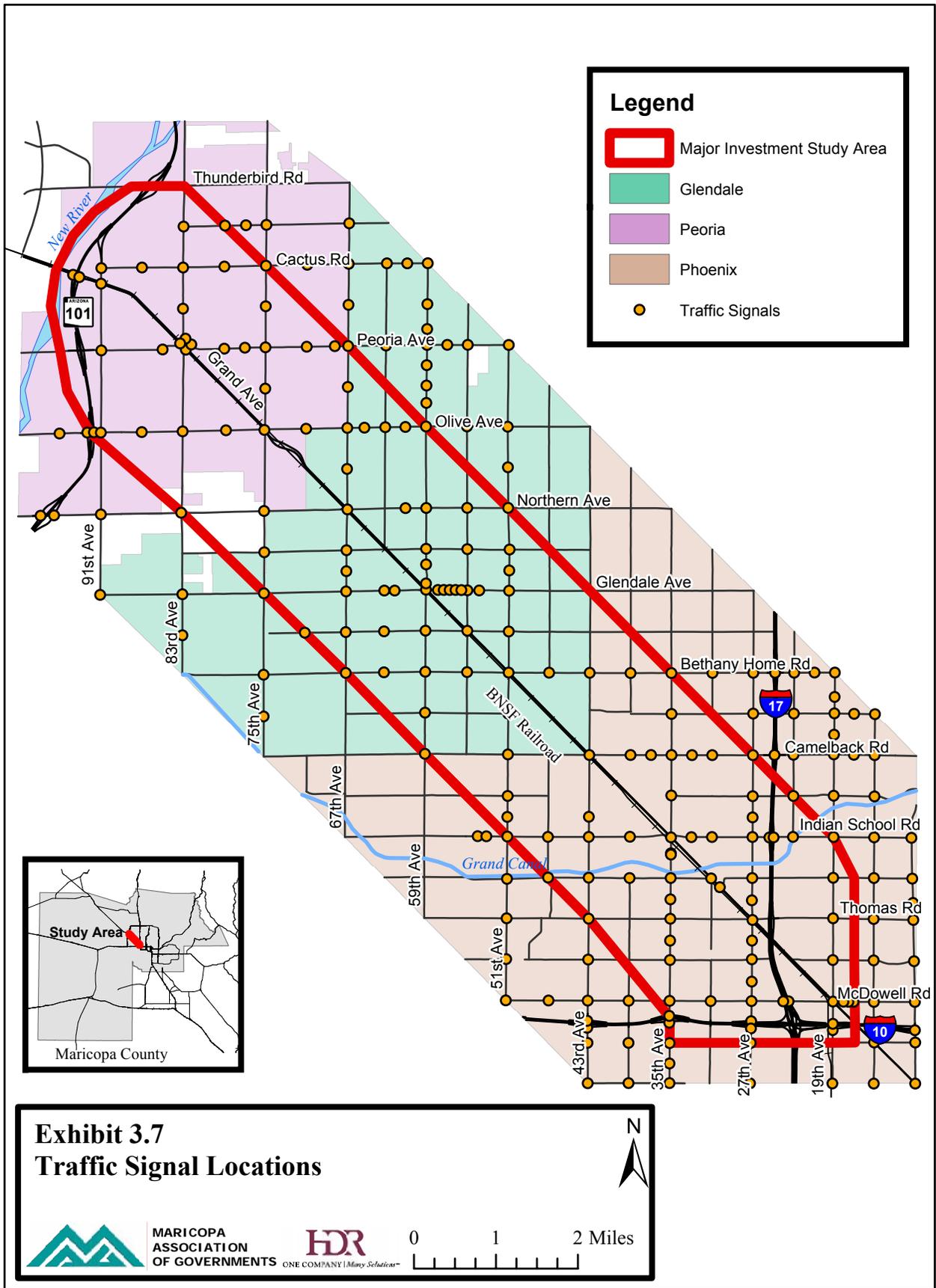
Grand Avenue MIS Phase II
Existing, Programmed and Planned Facilities and Conditions







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- The Agua Fria Freeway (Loop 101) has been completed from the Black Canyon Freeway (I-17) to the Papago Freeway (I-10). Ramps exiting northbound Loop 101 and entering southbound Loop 101 are provided for along Grand Avenue and are controlled by traffic signals. Ramps exiting southbound Loop 101 and entering northbound Loop 101 are provided for along 91st Avenue and operate as direct connection ramps.
- High Occupancy Vehicle (HOV) lanes and auxiliary lanes have been constructed along I-17 between Thomas Road and Peoria Avenue. The traffic interchanges along this stretch have also been reconstructed.
- Grand Avenue southeast of McDowell Road / 19th Avenue has been refurbished with new curb, gutter, sidewalk and landscaping and has been turned over to the City of Phoenix.
- Loop 303 (Estrella Road) was built as a two-lane highway approximately nine miles west of the Study Area. It was removed from the planned freeway system but has since been included in the planned freeway system and portions of the alignment are now in ADOT's jurisdiction again.
- I-10 has been completed through the West Valley and downtown Phoenix, and the I-10 / I-17 full-directional interchange is in operation.
- ADOT has installed new traffic signal controllers along Grand Avenue with plans to coordinate the signals.

Two field reviews have occurred thus far to get a better understanding of the existing infrastructure on and adjacent to Grand Avenue. The first field review, on January 20, 2004, focused on the signalized and unsignalized intersections along the entire corridor. Special attention was given to the six-legged intersections. The second field review, on March 16, 2004, focused on the existing infrastructure along Grand Avenue, including sidewalks, lighting, railroad facilities, lane configurations and intersection control. Findings from both field reviews are summarized below.

3.1.1 Right-of-Way

The original Grand Avenue Major Investment Study (MIS) (ADOT, 1999) indicated that right-of-way (ROW) for Grand Avenue is typically 90 to 100 feet wide within its Study Area. As-built plans were acquired from ADOT Engineering Records to confirm information contained in previous reports. In addition to the as-built plans, parcel information was obtained from the Maricopa County Assessor that delineates property boundaries along the corridor.

The existing right-of-way along Grand Avenue varies within the Study Area as listed below in Exhibit 3.8. This information is shown graphically in **Exhibits 3.3, 3.4 and 3.5**.

Exhibit 3.8 Existing Right-of-Way along Grand Avenue within Study Area	
Arterial Limits	Existing Grand Avenue ROW
Loop 101 – 91 st Avenue	133 feet
91 st Avenue – 83 rd Avenue	113 feet
83 rd Avenue – Monroe Street	166 feet
Monroe Street – Peoria/Glendale Boundary	119 feet
Peoria/Glendale Boundary – 71 st Avenue	130 feet
71 st Avenue – 63 rd Avenue	95 feet
63 rd Avenue – 55 th Avenue	93 feet
55 th Avenue – 54 th Avenue	95 feet
54 th Avenue – 51 st Avenue	97 feet
51 st Avenue – Missouri Avenue	103 feet
Missouri Avenue – 43 rd Avenue	101 feet
43 rd Avenue – 41 st Avenue	88 feet – 101 feet
41 st Avenue – 39 th Avenue	100 feet
39 th Avenue – 33 rd Avenue	88 feet
33 rd Avenue – 24 th Drive	88 feet – 100 feet
24 th Drive – 19 th Avenue	108 feet

A review of the most current General Plans, Engineering Standards and Standard Details for the three cities within the Study Area was undertaken to determine their recommended right-of-way widths along roadways that intersect Grand Avenue. The following information is presented as city “recommendations” and does not guarantee that all existing roadways that intersect Grand Avenue conform to these recommendations.

City of Phoenix

<i>Roadway Type</i>	<i>Minimum Right-of-Way Width</i>
Arterial Street	100 – 140 feet
Collector Street	60 – 100 feet
Local Street	50 – 60 feet

Source: 1998 City of Phoenix Supplement to the MAG Uniform Standards, Specifications and Details, City of Phoenix, October 1, 1998.

City of Glendale

<i>Roadway Type</i>	<i>Minimum Right-of-Way Width</i>
Major Arterial Street	110 – 130 feet
Arterial Street	110 feet
Collector Street	60 – 70 feet
Residential Street	50 feet
Residential Cul-de-Sac	50 feet

Source: 2002 Design and Construction Standards, City of Glendale, June 2002.

City of Peoria

<i>Roadway Type</i>	<i>Minimum Right-of-Way Width</i>
Principal Arterial Street	150 feet
Arterial Street	110 – 130 feet
Collector Street	60 feet
Rural Collector Street	60 feet
Local Street	50 feet
Rural Local Street	50 feet

Source: Peoria General Plan, City of Peoria, 2002.

Based on information contained in their Capital Improvement Plans/Programs (CIP) the cities of Phoenix, Glendale and Peoria have roadway widening or right-of-way acquisition improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix’s 2003 – 2008 Capital Improvement Program includes funding for the acquisition of right-of-way near the Grand Canal crossing of I-17 for a bicycle bridge across the interstate.
- The City of Glendale’s 2003 – 2012 Capital Improvement Plan includes funding for right-of-way protection along Northern Avenue between Grand Avenue and Loop 303 for the Superstreet and selected widening along 59th Avenue that may or may not require additional right-of-way. 67th Avenue between Grand Avenue and Camelback Road is also identified for widening that may or may not require additional right-of-way.
- The City of Peoria’s FY 2004 Capital Improvement Program includes funding for the widening of Peoria Avenue near the Grand Avenue intersection that may or may not require additional right-of-way as well as the acquisition of right-of-way for the total reconstruction of 81st Avenue from Grand Avenue to Olive Avenue.

The ADOT Current Five-Year Transportation Facilities Construction Program (2004 – 2008) includes \$18 million for right-of-way acquisition along Grand Avenue.

The Regional Transportation Plan (RTP) allocates \$147 million to the portion of Grand Avenue between 19th Avenue and Loop 101. A portion of this amount is intended for roadway widening that may or may not result in the acquisition of additional right-of-way.

3.1.2 Number of Lanes

As noted previously, Grand Avenue has six through lanes (three in each direction) for a majority of its length through the Study Area. Where left turns are permitted off Grand Avenue, all signalized intersection locations provide dedicated left-turn lanes along Grand Avenue. Refer to **Exhibits 3.3, 3.4 and 3.5** for lane movement details at the major six-legged signalized intersections.

Exhibit 3.6 identifies the number of through lanes along each roadway within the Study Area.

Based on information contained in their CIPs the cities of Phoenix, Glendale and Peoria have roadway widening and/or lane addition improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix's 2003 – 2008 Capital Improvement Program includes funding to construct improvements to eliminate the bottleneck at Bethany Home Road / 43rd Avenue that may or may not result in additional lanes.
- The City of Glendale's 2003 – 2012 Capital Improvement Plan includes funding for intersection improvements such as lane extensions and turning lanes at the thirty most congested intersections as well as the elimination of drop lanes in congested areas (specifically noted along 59th Avenue).
- The City of Peoria's FY 2004 Capital Improvement Program includes funding for the improvement of Peoria Avenue / 83rd Avenue / Grand Avenue including street widening that may or may not result in additional lanes.

The ADOT Current Five-Year Transportation Facilities Construction Program (2004 – 2008) includes \$5 million for roadway widening projects along Grand Avenue.

The RTP allocates \$147 million to the portion of Grand Avenue between 19th Avenue and Loop 101. A portion of this amount is intended for roadway widening that may or may not add additional through lanes.

3.1.3 Signalized and Unsignalized Intersections

Within the Study Area, Grand Avenue is host to over 60 three-, four-, five- and six-legged intersections that are either stop controlled or signal controlled. A majority of these intersections are stop controlled along the minor roadway, allowing Grand Avenue traffic to flow freely.

The original Grand Avenue MIS (ADOT, 1999) identified a total of 148 traffic signals in its Study Area. Of these, 20 were located on Grand Avenue between Loop 101 and McDowell Road. The remainder were located within one mile of Grand Avenue along city arterials and collectors.

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Exhibit 3.7 illustrates the locations of traffic signals based on the field review and previous documentation.

A field review was conducted on January 20, 2004 to confirm the location of previously identified traffic signals as well as document any changes in traffic control within the Study Area. Refer to **Exhibit 3.9** for intersection information pertaining to location, type and traffic control. **Exhibits 3.10, 3.11 and 3.12** illustrate the location of each intersection along Grand Avenue within the Study Area.

All signalized intersections present during the writing of the 1999 MIS remain in their previously identified location. No new signalized intersections exist along Grand Avenue within the Study Area.

Based on information contained in their capital improvement plans (CIP) the cities of Phoenix, Glendale and Peoria have traffic signal and/or intersection improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix's 2003 – 2008 Capital Improvement Program includes funding for the installation of a new traffic signal at the intersection of 27th Avenue / Thomas Road, signal modernization including left-turn arrows and the installation of loop detectors, and the installation of warranted traffic signals at eight locations per year.
- The City of Glendale's 2003 – 2012 Capital Improvement Plan includes funding for the implementation of "Smart Traffic Signals" that include more left-turn arrows and the installation of traffic signals at various locations (two intersections in 2004 and four intersections per year thereafter).
- The City of Peoria's FY 2004 Capital Improvement Program includes funding for a new traffic signal 85th Avenue / Monroe Street.

Based on information contained in the RTP, and studied in several of the documents included in Working Paper No. 1, Northern Avenue is scheduled to be upgraded to a controlled access facility with grade-separations and a direct connection to Grand Avenue (Northern Avenue crosses Grand Avenue at 67th Avenue).

Exhibit 3.9				
Intersections along Grand Avenue within Study Area				
Number¹	Cross-street Names	Skewed / Perpendicular / Offset / Grade-separated²	Traffic Control	Exhibit Number
1	15 th Avenue / Roosevelt Road / Grand Avenue	Skewed	Signalized	3.12
2	Laurel Avenue / Linden Street / Grand Avenue	Skewed	Unsignalized	3.12
3	Latham Street / 16 th Avenue / Grand Avenue	Skewed	Unsignalized	3.12
4	Moreland Street / Grand Avenue	Skewed	Unsignalized	3.12
5	17 th Avenue / Spruce Street / Grand Avenue	Skewed	Unsignalized	3.12
6	17 th Drive / Culver Street / Grand Avenue	Skewed	Unsignalized	3.12
7	18 th Avenue / Willetta Street / Grand Avenue	Skewed	Unsignalized	3.12
8	19 th Avenue / McDowell Road / Grand Avenue	Skewed	Signalized	3.12
9	20 th Avenue / Grand Avenue	Skewed	Unsignalized	3.12
10	21 st Avenue / Grand Avenue	Skewed	Unsignalized	3.12
11	22 nd Avenue / Monte Vista Road / Grand Avenue	Skewed	Unsignalized	3.12
12	23 rd Avenue / Encanto Boulevard / Grand Avenue	Skewed	Signalized	3.12
13	24 th Avenue / Grand Avenue	Skewed	Unsignalized	3.12
14	24 th Drive / Grand Avenue	Skewed	Unsignalized	3.12
15	27 th Avenue / Thomas Road (Grand Avenue over)	Grade-separated	Signalized	3.12
16	29 th Drive / Grand Avenue	Closed	Unsignalized	3.12
17	Cherry Lynn / Grand Avenue	Closed	Unsignalized	3.12
18	Osborn Road / Grand Avenue	Perpendicular	Signalized	3.12
19	31 st Avenue / Osborn Road / Grand Avenue	Skewed	Signalized	3.12
20	Weldon Avenue / Grand Avenue	Perpendicular	Unsignalized	3.12
21	33 rd Avenue / Grand Avenue	Skewed	Signalized	3.12
22	35 th Avenue / Grand Avenue (Indian School Road over)	Grade-separated	Signalized	3.12
23	37 th Avenue / Grand Avenue	Skewed	Unsignalized	3.12
24	39 th Avenue / Grand Avenue	Skewed	Unsignalized	3.12

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Exhibit 3.9 (Continued)				
Intersections along Grand Avenue within Study Area				
Number¹	Cross-street Names	Skewed / Perpendicular / Offset / Grade-separated²	Traffic Control	Exhibit Number
25	42 nd Avenue / Grand Avenue	Skewed	Unsignalized	3.12
26	43 rd Avenue / Camelback Road (Grand Avenue over) ³	Grade-separated	Signalized	3.11
27	Missouri Avenue / Grand Avenue	Skewed	Unsignalized	3.11
28	Bethany Home Road / Grand Avenue (51 st Avenue over) ³	Grade-separated	Signalized	3.11
29	53 rd Avenue / Grand Avenue	Skewed	Unsignalized	3.11
30	55 th Avenue / Grand Avenue (Maryland Avenue over) ³	Grade-separated	Signalized	3.11
31	56 th Avenue / Grand Avenue	Skewed	Unsignalized	3.11
32	57 th Avenue / Grand Avenue	Skewed	Unsignalized	3.11
33	Ocotillo Road / Grand Avenue	Skewed	Unsignalized	3.11
34	57 th Drive / Grand Avenue	Skewed	Unsignalized	3.11
35	Lamar Road / 58 th Avenue / Grand Avenue	Skewed	Unsignalized	3.11
36	58 th Drive / Grand Avenue	Skewed	Unsignalized	3.11
37	59 th Avenue / Glendale Avenue / Grand Avenue	Skewed	Signalized	3.11
38	59 th Drive / Grand Avenue	Skewed	Unsignalized	3.11
39	Glenn Drive / Grand Avenue	Skewed	Unsignalized	3.11
40	60 th Avenue / Grand Avenue	Skewed	Unsignalized	3.11
41	Palmaire Avenue / Grand Avenue	Skewed	Unsignalized	3.11
42	61 st Avenue / Myrtle Avenue / Grand Avenue	Skewed	Signalized	3.11
43	Orangewood Avenue / Grand Avenue	Skewed	Unsignalized	3.11
44	63 rd Avenue / Grand Avenue	Skewed	Unsignalized	3.11
45	67 th Avenue / Northern Avenue / Grand Avenue	Skewed	Signalized	3.11
46	Butler Drive / Grand Avenue	Under Construction ⁴		3.11
47	71 st Avenue / Grand Avenue	Under Construction ⁴		3.10
48	75 th Avenue / Grand Avenue (Olive Avenue over) ⁵	Grade-separated	Signalized	3.10
49	Monroe Street / 81 st Avenue / Grand Avenue	Perpendicular	Unsignalized	3.10

Exhibit 3.9 (Continued)				
Intersections along Grand Avenue within Study Area				
Number¹	Cross-street Names	Skewed / Perpendicular / Offset / Grade-separated²	Traffic Control	Exhibit Number
50	82 nd Avenue / Jefferson Street / Grand Avenue	Skewed	Unsignalized	3.10
51	83 rd Avenue / Grand Avenue	Perpendicular	Signalized	3.10
52	Peoria Avenue / Grand Avenue	Perpendicular	Signalized	3.10
53	84 th Avenue / Grand Avenue	Perpendicular	Unsignalized	3.10
54	85 th Avenue / Grand Avenue	Perpendicular	Signalized	3.10
55	87 th Avenue / Grand Avenue	Perpendicular	Unsignalized	3.10
56	88 th Drive / Grand Avenue	Perpendicular	Unsignalized	3.10
57	91 st Avenue / Grand Avenue	Skewed	Signalized	3.10
58	92 nd Drive / Grand Avenue	Perpendicular	Unsignalized	3.10
59	Loop 101 Exit Ramp / Grand Avenue	Perpendicular	Signalized	3.10
60	Loop 101 Entrance Ramp / Grand Avenue	Perpendicular	Signalized	3.10
61	99 th Avenue / Grand Avenue	Perpendicular	Signalized	3.10

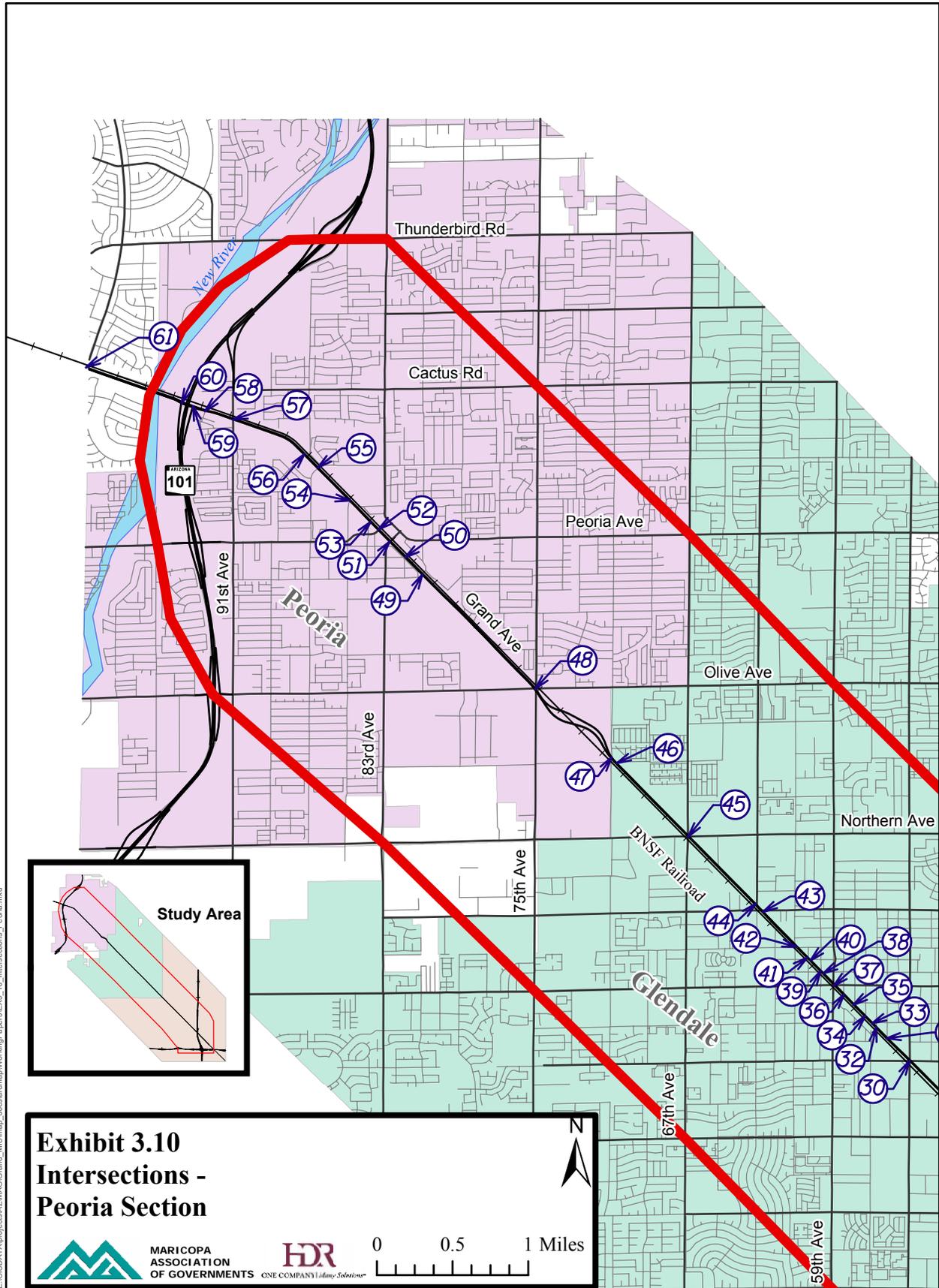
¹“Number” refers to the intersection number in Exhibits 3.10, 3.11, and 3.12.

²Refers to the orientation of the cross-street intersections to Grand Avenue.

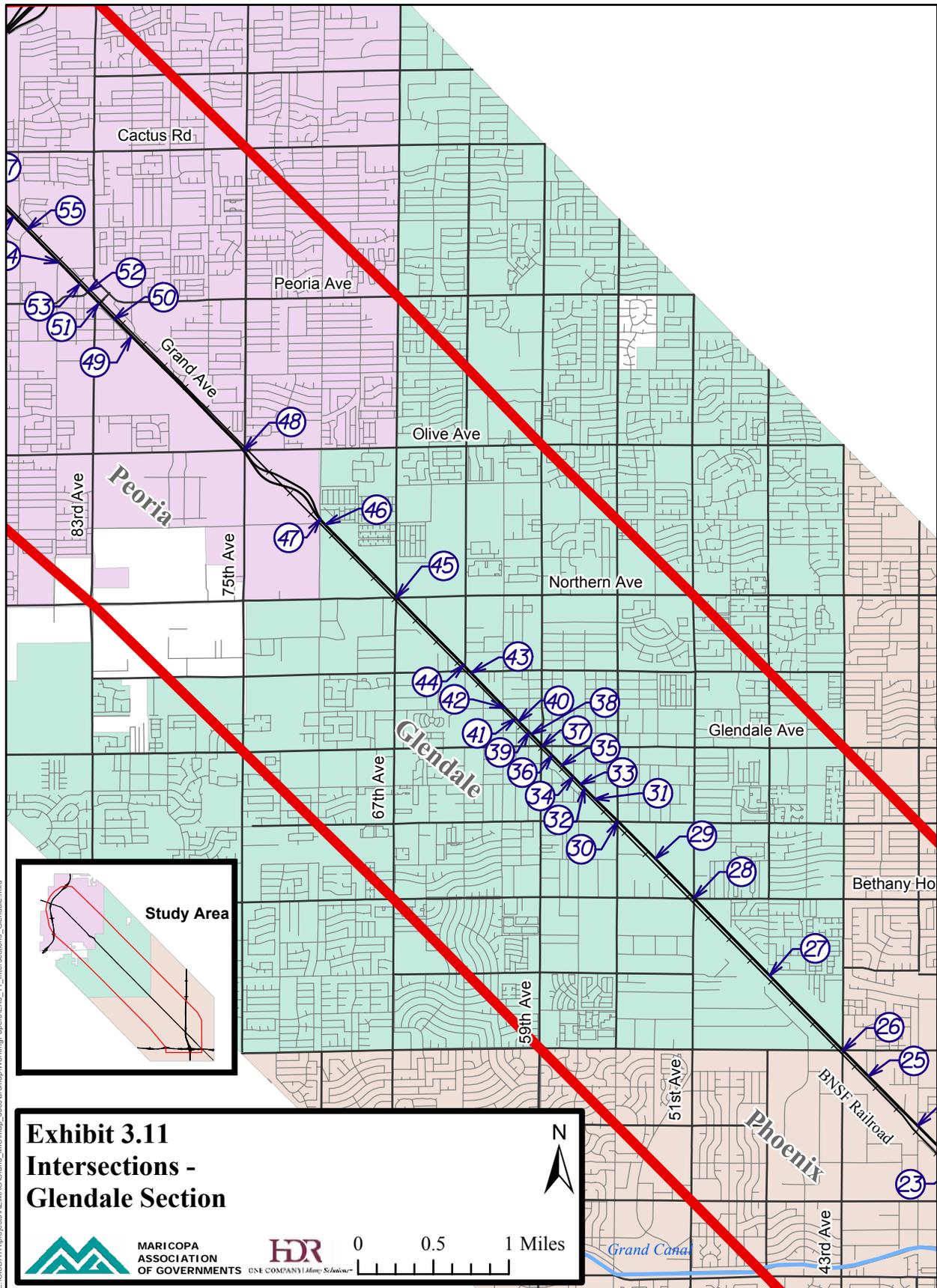
³Indicates grade-separations that are currently under construction and are expected to be open by the end of summer 2004.

⁴This portion of Grand Avenue is currently under construction.

⁵Indicates a grade-separation that is currently under construction and is expected to be open by the end of 2004.



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Grand Avenue MIS Phase II
Existing, Programmed and Planned Facilities and Conditions

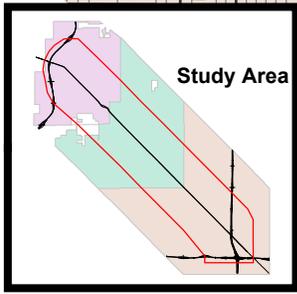
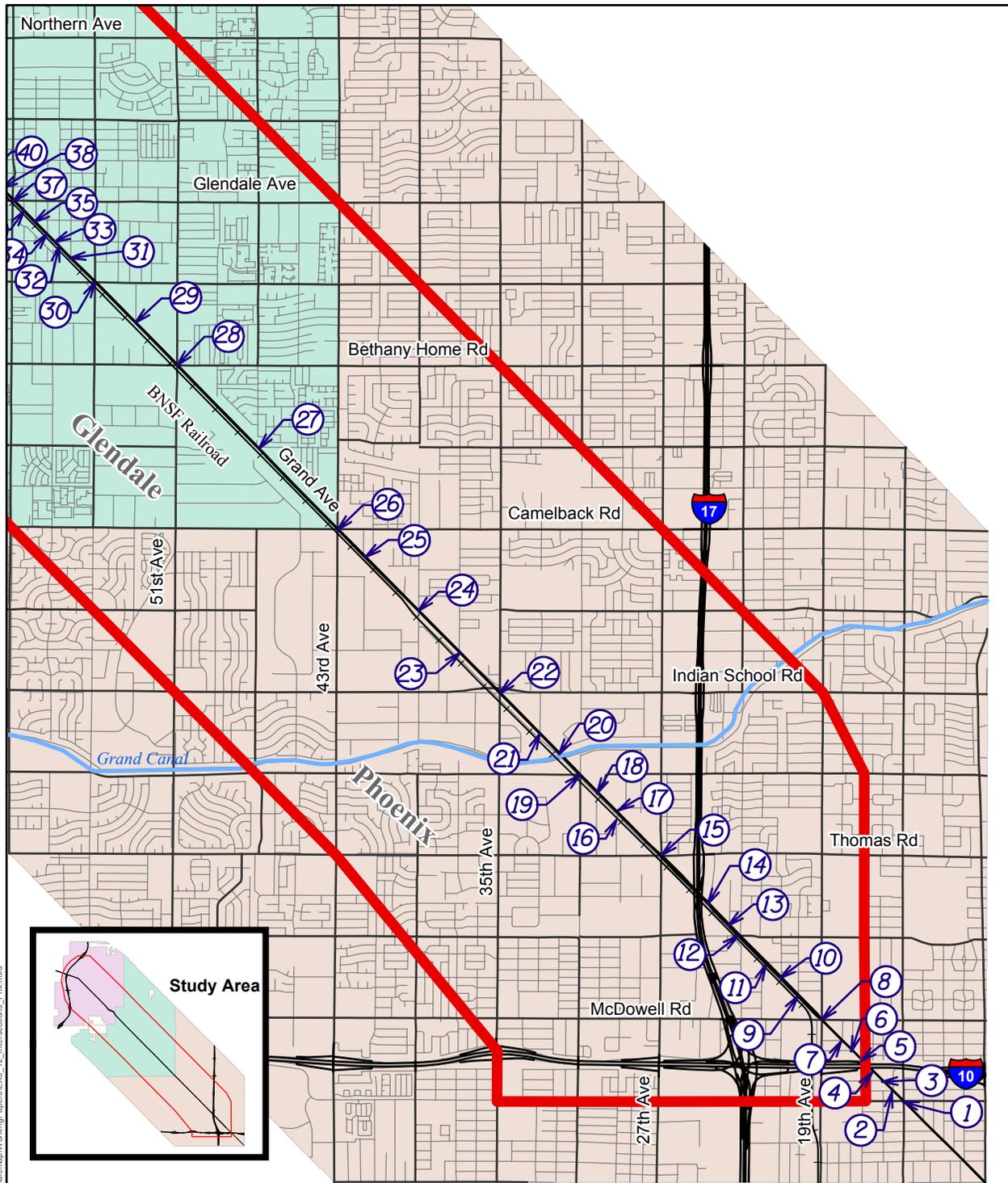


Exhibit 3.12
Intersections -
Phoenix Section

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MARICOPA ASSOCIATION OF GOVERNMENTS | HDR | 0 0.5 1 Miles

ONE COMPANY | Many Solutions™

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3.1.4 Median Dividers

Along its length through the Study Area, Grand Avenue exists as a divided highway with a raised median separating opposing traffic. In certain portions of the Study Area, the median is landscaped, while in other portions it exists as barren earth. Where median landscaping exists, it consists of sporadic, mature vegetation.

Median breaks along Grand Avenue are common. At each minor roadway connection that is not signalized, median breaks occur, preceded by a dedicated left-turn lane. There are approximately 50 median breaks for minor roadway connections within the Study Area.

Refer to **Exhibits 3.13, 3.14 and 3.15** for locations of existing median breaks.

Based on information contained in its CIPs the City of Glendale has median improvements planned for the near future on or near Grand Avenue:

- The City of Glendale's 2003 – 2012 Capital Improvement Plan includes funding for median improvements along 59th Avenue in conjunction with other spot improvements as well as the potential for median barriers at the thirty most congested intersections.

The RTP allocates \$147 million to the portion of Grand Avenue between 19th Avenue and Loop 101. A portion of this amount is intended for improvements to access control that may or may not result in the addition or deletion of median dividers along Grand Avenue.

3.1.5 Grade Separations

As previously discussed, ADOT is currently working to alleviate congestion and delays at the major six-legged intersections by grade-separating one of the movements from the other two. Two grade-separations have already been completed, four are currently under construction and two additional grade-separations are planned for the future.

Grade-separations that have been completed and are open include:

- Grand Avenue grade-separated over 27th Avenue / Thomas Road
- Indian School Road grade-separated over 35th Avenue / Grand Avenue

Grade-separations that are currently under construction include:

- Grand Avenue grade-separated over 43rd Avenue / Camelback Road
- 51st Avenue grade-separated over Bethany Home Road / Grand Avenue
- Maryland Avenue grade-separated over 55th Avenue / Grand Avenue
- Olive Avenue grade-separated over 75th Avenue / Grand Avenue

Grade-separations that are planned for the future include:

- Grand Avenue grade-separated under 59th Avenue / Glendale Avenue (2006)
- 67th Avenue grade-separated over Northern Avenue / Grand Avenue (2005)

Both grade-separations listed above as planned are included in the ADOT Current Five-Year Transportation Facilities Construction Program (2004 – 2008). The current Life Cycle Program includes \$37 million for the new grade-separation structures.

The RTP allocates \$147 million to the portion of Grand Avenue between 19th Avenue and Loop 101. A portion of this amount is intended for the construction of grade-separations.

The only six-legged intersection in the Study Area that is not currently planned for grade-separation is 19th Avenue / McDowell Road / Grand Avenue in the City of Phoenix.

3.1.6 Access Control

Within the Study Area, Grand Avenue exists as a limited access-controlled facility. The presence of the BNSF Railroad track parallel to Grand Avenue provides access control (with the exception of railroad maintenance / yard driveways) to and from Grand Avenue in many areas. This access control is typically only broken at major arterial street intersections with Grand Avenue, although a few minor roadways in all three cities do cross the tracks. There is one segment along Grand Avenue where commercial / industrial development exists between the BNSF track and Grand Avenue located south of Indian School Road. Along the Grand Avenue corridor, the BNSF track moves from the south side of Grand Avenue to the north side south of Olive Avenue (east of 75th Avenue). The access control the railroad provides moves with it.

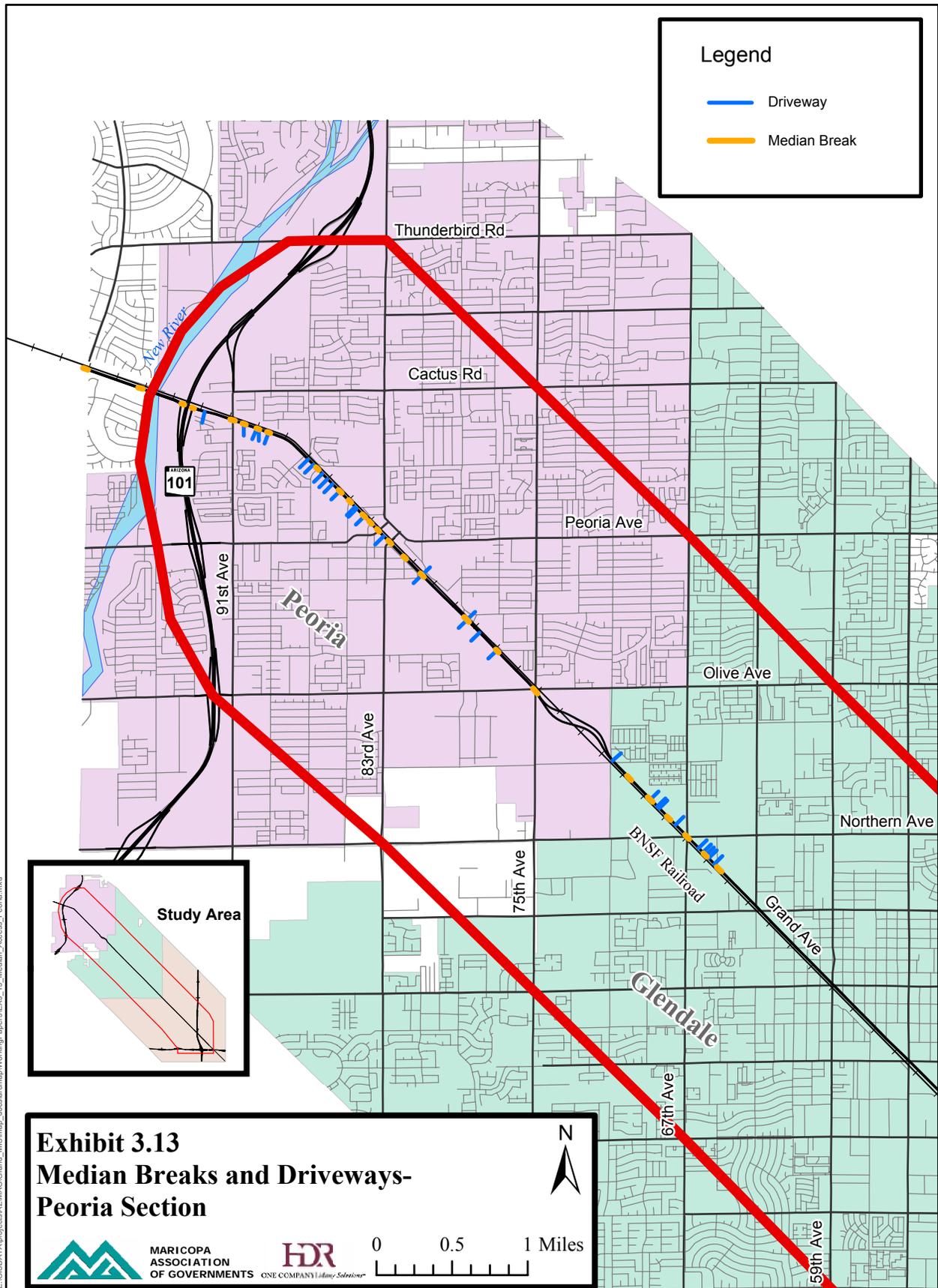
On the side opposite the railroad tracks, access is largely permitted and has resulted in the installation of hundreds of access points (collector / local street connections, alleys, driveways, etc.).

Refer to **Exhibits 3.3, 3.4 and 3.5** for the limits of access control along Grand Avenue within the Study Area. Refer to **Exhibits 3.13, 3.14 and 3.15** for locations of existing driveways.

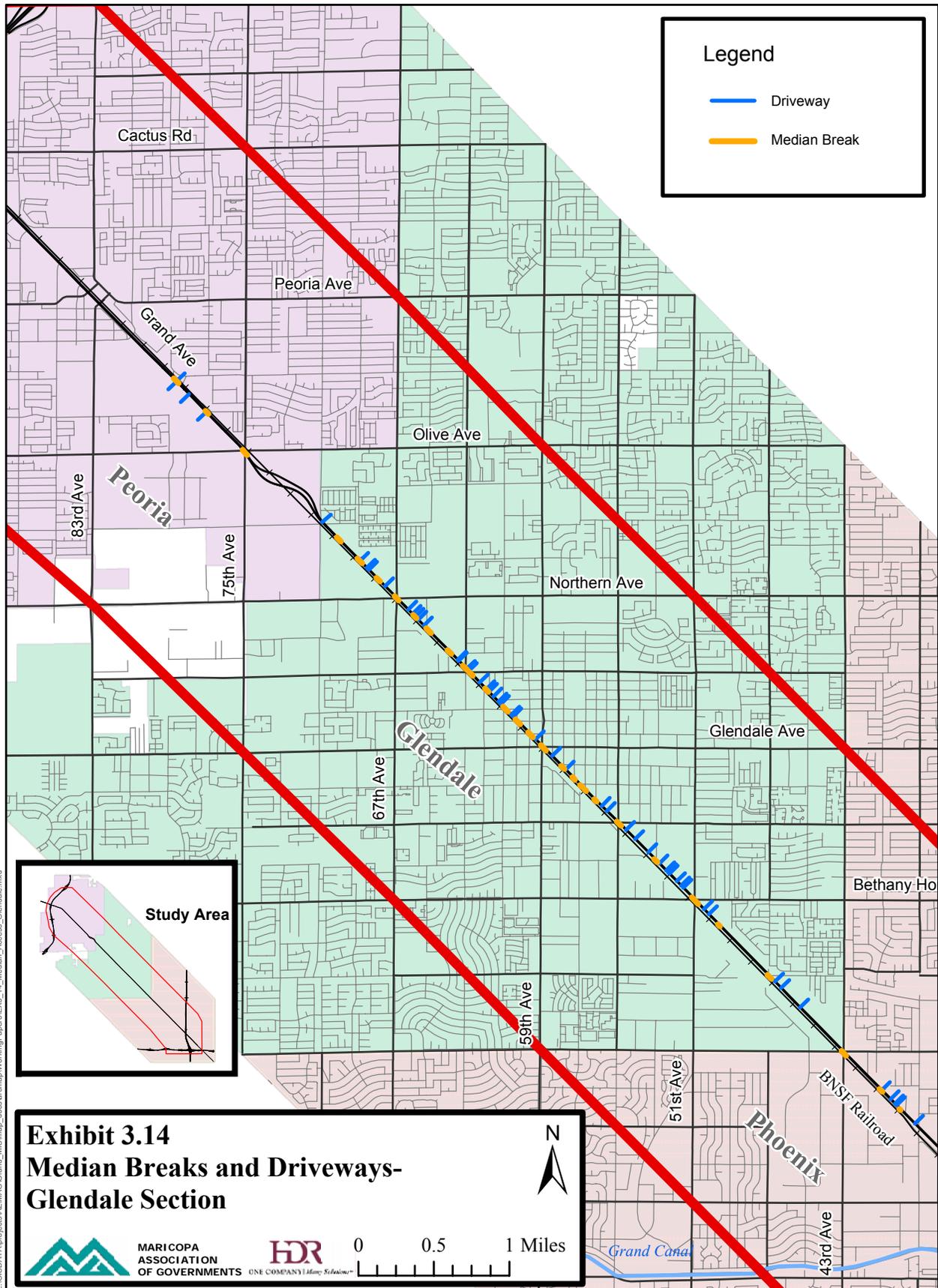
Based on information contained in their CIPs both the City of Glendale and the City of Peoria have access control improvements planned for the near future on or near Grand Avenue:

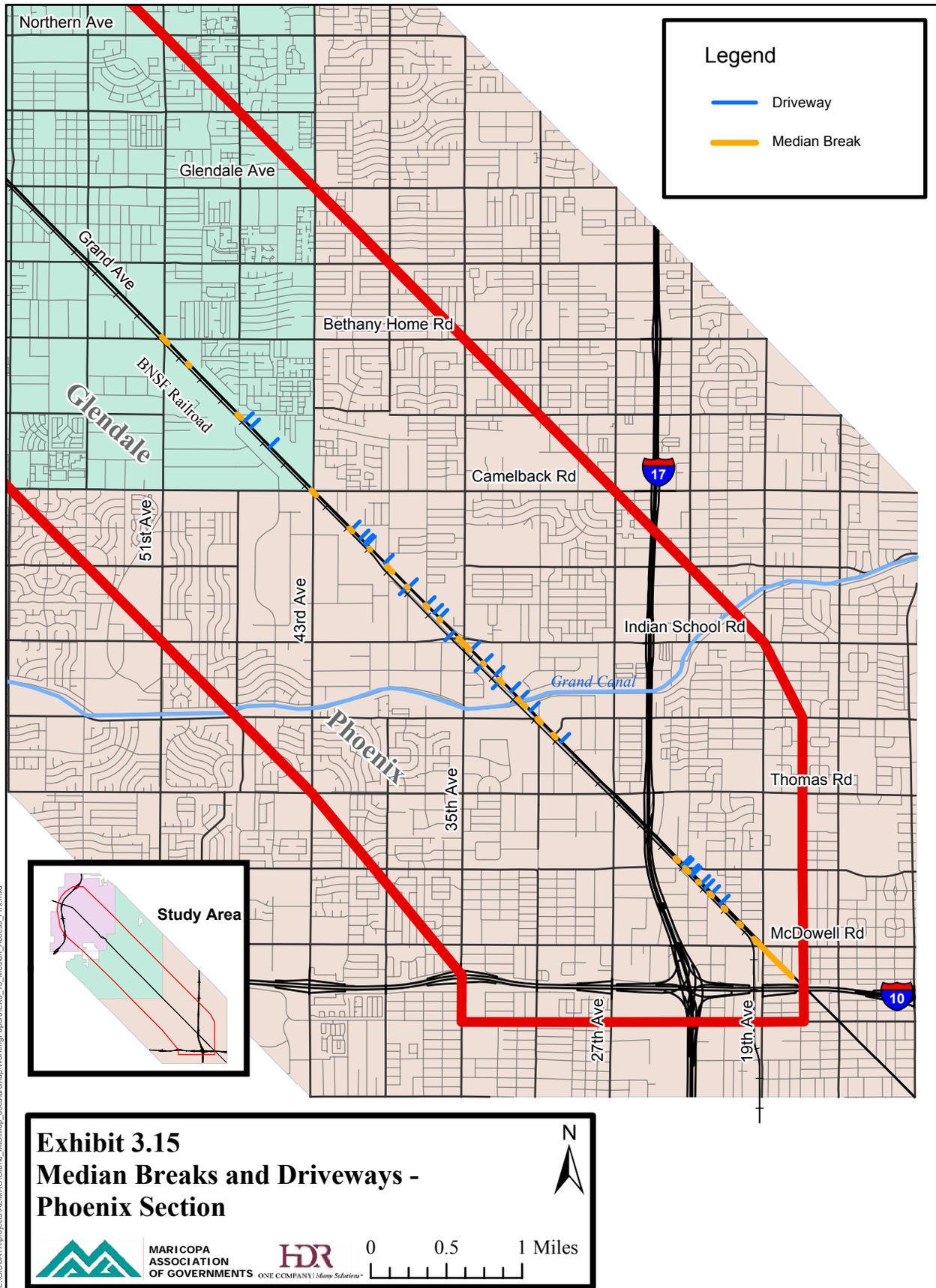
- The City of Glendale's 2003 – 2012 Capital Improvement Plan includes funding for street spot improvements for local access enhancements which may or may not occur along Grand Avenue or the arterials that cross it.
- The City of Peoria's FY 2004 Capital Improvement Program includes funding for a design concept report (DCR) for the realignment of 83rd Avenue that may result in a change of access along this arterial.

The RTP allocates \$147 million to the portion of Grand Avenue between 19th Avenue and Loop 101. A portion of this amount is intended for improvements to access control along Grand Avenue.



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3.1.7 BNSF Railroad

The BNSF Railroad has one track and several facilities located within the Study Area. The BNSF track parallels Grand Avenue over its entire length within the Study Area, resulting in numerous at-grade crossings. In only one location does the track cross Grand Avenue at-grade, this being a spur track located south of Northern Avenue. Prior to the Grand Avenue grade-separation at 27th Avenue / Thomas Road, there was one additional crossing north of Thomas Road, but this railroad crossing now occurs under the grade-separation.

Based on information contained in its CIP the City of Phoenix has railroad improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix's 2003 – 2008 Capital Improvement Program includes funding for railroad crossing improvements that may or may not affect Grand Avenue or the arterials that cross it.

3.1.8 Pedestrian Facilities

Pedestrian facilities, including sidewalks and multi-use paths, are limited along Grand Avenue. Along most of Grand Avenue, development is typically limited to the side opposite the BNSF. But even in these locations continuous sidewalk has not been installed to provide a linkage between developments, major arterial streets and the communities Grand Avenue connects.

Sidewalks have been provided at the following locations:

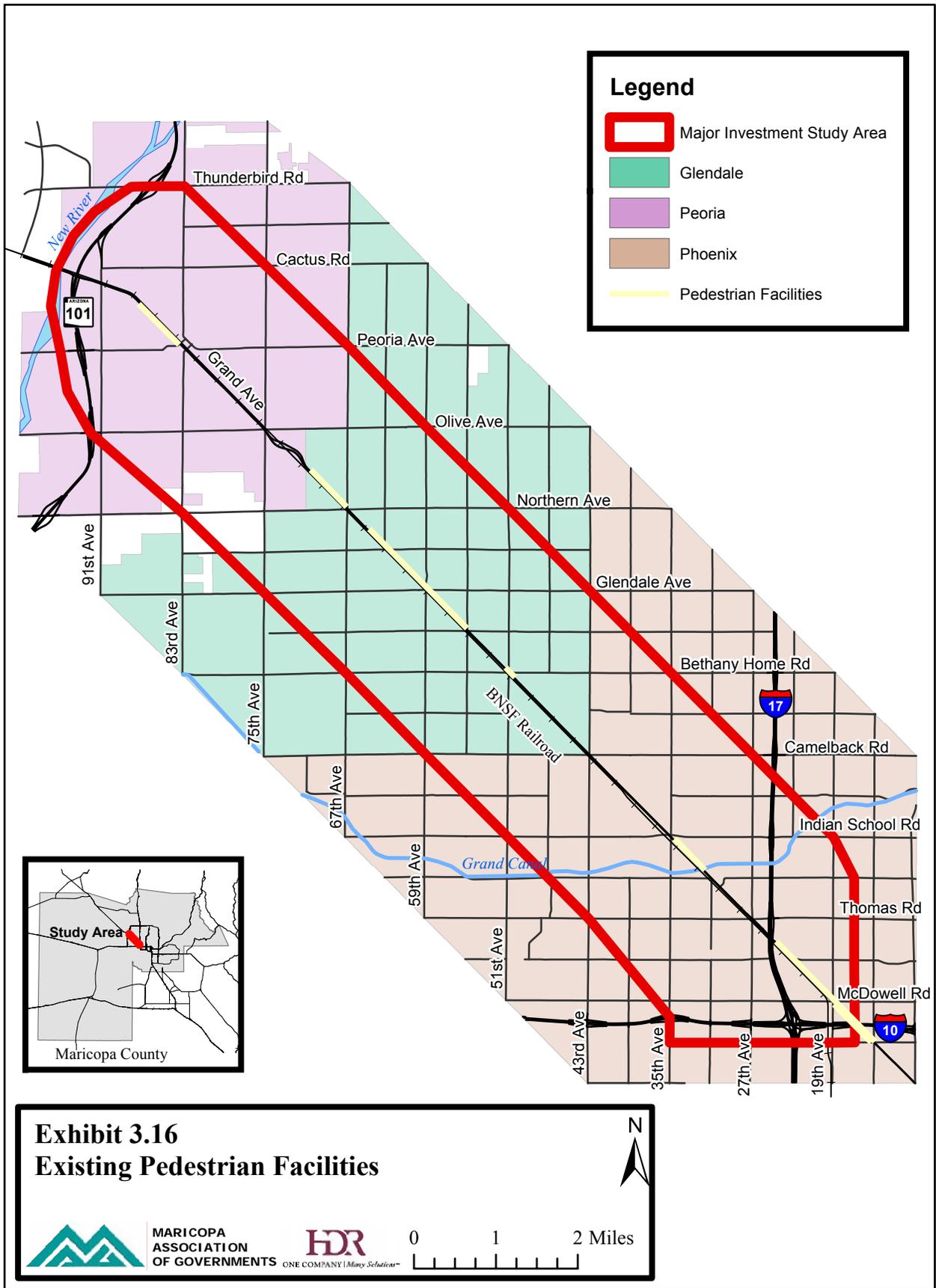
Westbound Grand Avenue

- 15th Avenue to 24th Avenue
- 24th Drive to Thomas Road (outside grade separation)
- 27th Avenue to east of Cherry Lynn Road (outside grade separation)
- Grand Canal to east of 37th Avenue (outside grade separation)
- Bethany Home Road / 51st Avenue intersection
- West of 55th Avenue to BNSF Railroad crossing (east of 67th Avenue)
- West of 67th Avenue to Butler Drive

Eastbound Grand Avenue

- 88th Drive to 83rd Avenue
- 19th Avenue to 15th Avenue

Refer to **Exhibit 3.16** for locations of existing sidewalk along Grand Avenue within the Study Area.



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Based on information contained in their CIPs the cities of Phoenix, Glendale and Peoria have pedestrian improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix’s 2003 – 2008 Capital Improvement Program includes funding for street modernization that includes the addition of sidewalks as well as a neighborhood sidewalk plan.
- The City of Glendale’s 2003 – 2012 Capital Improvement Plan includes funding for the addition of sidewalks along 51st Avenue between Camelback Road and Grand Avenue, Maryland Avenue between 51st Avenue and 59th Avenue, and 67th Avenue between Camelback Road and Grand Avenue.
- The City of Peoria’s FY 2004 Capital Improvement Program includes funding for handicap ramps as well as the Sidewalks Annual Program that funds pedestrian and sidewalk links where deficiencies exist. The CIP also includes the addition of sidewalks along the realigned 83rd Avenue and 71st Avenue between Grand Avenue and Olive Avenue. The Peoria Avenue / 83rd Avenue / Grand Avenue pedestrian project also includes improvements to sidewalks, sidewalk ramps and crosswalks at the intersections.

The ADOT Current Five-Year Transportation Facilities Construction Program (2004 – 2008) includes \$0.8 million for a pedestrian overpass along Grand Avenue.

The RTP does set aside money specifically for pedestrian / bicycle facilities. The money, over \$200 million, comes from CMAQ (federally allocated moneys for congestion and air quality relief) and local sources.

3.1.9 Bicycle Facilities

Several decades ago, the greater Phoenix metropolitan area, realizing the benefits provided by non-motorized transportation, began to develop a system of bike paths, routes and lanes that served to not only connect local neighborhoods but also different municipalities and regions.

Existing bicycle facilities for the cities of Peoria, Glendale and Phoenix are listed below:

City of Peoria

<i>Classification</i>	<i>Length (miles)</i>
On-street Bicycle Lane	110
Paved Multi-Use Path	53
Unpaved Multi-Use Path	52
Total	215

Source: Peoria General Plan, City of Peoria, 2002.

City of Glendale

<i>Classification</i>	<i>Length (miles)</i>
On-Street Bikeway	61
Off-Street Facilities	21
Total	82

Source: Glendale 2025 The Next Step – General Plan, City of Glendale, December 1, 2002.

City of Phoenix

<i>Classification</i>	<i>Length (miles)</i>
Bike Routes	187
On-Street Bike Lanes	222
Paved/Unpaved Paths	55
Total	464

Source: City of Phoenix General Plan, City of Phoenix, December 5, 2001.

Within the Study Area itself, there are no bike routes/lanes along Grand Avenue, but there are unpaved multi-use trails, on-street bike routes and popular undesignated routes that intersect and cross Grand Avenue. Based on information contained in the MAG Bikeways Map (2003), and confirmed with information contained in the original MIS (ADOT, 1999) as well as the General Plans for each of the three cities within the Study Area, the following facilities cross Grand Avenue:

- Grand Canal multi-use trail (unpaved) between Thomas Road and Indian School Road
- On-street bike route on Maryland Avenue
- Popular undesignated route along 61st Avenue

Refer to **Exhibit 3.17** for an illustration of existing bicycle facilities within the Study Area.

Based on information contained in their CIPs the cities of Phoenix and Glendale have bicycle facility improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix’s 2003 – 2008 Capital Improvement Program includes funding undetermined bikeways throughout the city to fill gaps in the bikeway system, improvements and additions of citizen requested bike lanes and the construction of a bicycle bridge at the Grand Canal and I-17 freeway.
- The City of Glendale’s 2003 – 2012 Capital Improvement Plan includes funding for bike route improvements along 63rd Avenue from Grand Avenue to Northern Avenue.

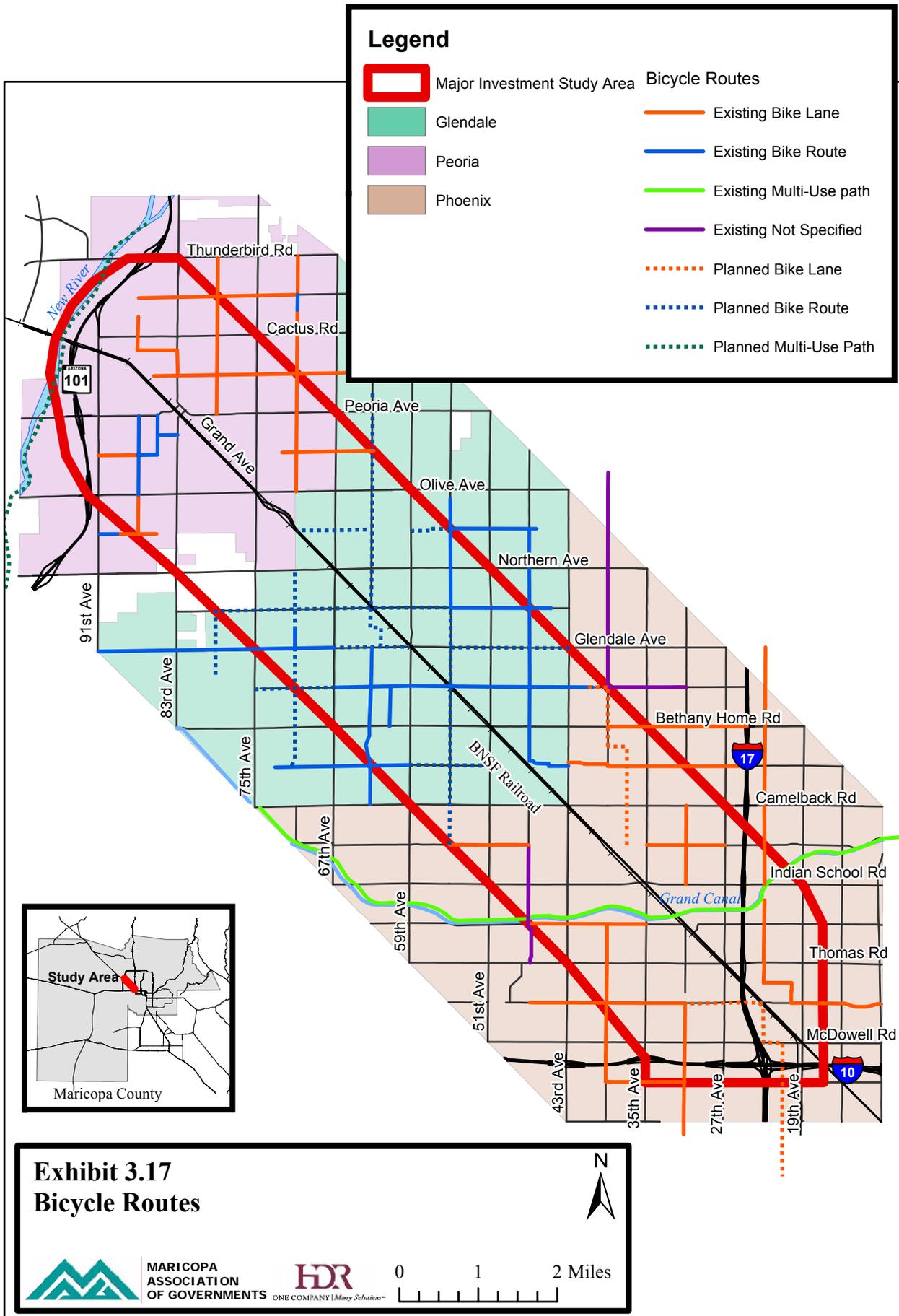


Exhibit 3.17
Bicycle Routes

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The RTP does set aside money specifically for pedestrian / bicycle facilities. The money, over \$200 million, comes from CMAQ (federally allocated moneys for congestion and air quality relief) and local sources.

The following planned bike routes were identified in the RTP:

- 29th Avenue – Fills in voids to create a complete system from Bell Road to Van Buren Street
- 51st Avenue – Bell Road to Riggs Road
- 67th Avenue (or 65th Avenue) – Happy Valley Road to Glendale Avenue
- Glendale Avenue – Litchfield Road to 7th Street
- 21st Avenue (or 23rd Avenue) – Bell Road to Van Buren Street
- Grand Avenue – Wickenburg to 7th Avenue / Van Buren Street

The following potential corridors were identified in the RTP:

- Along the BNSF railroad parallel to Grand Avenue
- Along the Grand Canal

3.1.10 Canal Crossings

Within the Study Area, Grand Avenue crosses only one canal, the Grand Canal, located between Thomas Road and Indian School Road. Planned in 1877 and constructed in 1878, the Grand Canal is the oldest remaining pioneer canal on the north side of the Salt River. While the Grand Canal is not designated to carry storm flows, it does convey stormwater and may be jurisdictional, which means the US Army Corps of Engineers could require a Section 404 permit for any work along Grand Avenue that may impact the canal. Further investigation will be necessary to determine the Grand Canal’s Section 404 status.

3.1.11 Landscaping

Within the Study Area, Grand Avenue is only minimally landscaped. Most of the existing landscaping is along the median, and this consists of a few trees planted hundreds of feet apart. At locations where grade separations are now open or being constructed, landscaping exists along the sides of Grand Avenue. Over a vast majority of its length, Grand Avenue is not landscaped. **Exhibit 3.18** below identifies locations where landscaping exists beginning at the southeastern termini of the Study Area and progressing to the northwest.

Exhibit 3.18			
Existing Landscaping along Grand Avenue within Study Area			
Location	Area	Type	Amount
15 th Avenue – 18 th Avenue	Outside	Trees Shrubs	~ 40 ~ 50
20 th Avenue – 21 st Avenue	Median	Shrubs	~ 10
Grand Avenue overpass at 27 th Avenue / Thomas Road	Outside	Trees Shrubs	* *

Exhibit 3.18 (Continued)			
Existing Landscaping along Grand Avenue within Study Area			
Location	Area	Type	Amount
Grand Avenue / Osborn Avenue intersection	Median	Palm Trees	3
Grand Avenue / Osborn Avenue / 31 st Avenue	Median	Palm Trees	4
East of 33 rd Avenue	Median	Palm Trees	3
West of 33 rd Avenue	Median	Palm Trees	1
East of Grand Avenue / Indian School Road / 35 th Avenue	Median	Palm Trees	3
East of 37 th Avenue	Median	Palm Trees	6
East of 39 th Avenue	Median	Palm Trees	4
West of 39 th Avenue	Median	Palm Trees	3
East of Grand Avenue / Camelback Road / 43 rd Avenue	Median	Palm Trees	1
East of Missouri Avenue	Median	Palm Trees	2
West of Missouri Avenue	Median	Palm Trees	4
East of Grand Avenue / Bethany Home Road / 51 st Avenue	Median	Palm Trees	7
		Trees	2
		Shrubs	1
West of Grand Avenue / Bethany Home Road / 51 st Avenue	Median	Palm Trees	4
East of 53 rd Avenue	Median	Palm Trees	1
West of 53 rd Avenue	Median	Palm Trees	4
East of Maryland Avenue / 55 th Avenue	Median	Palm Trees	4
55 th Avenue – 56 th Avenue	Median	Trees	~ 15
		Shrubs	~ 20
57 th Avenue	Median	Trees	1
		Shrubs	~ 10
West of Myrtle Avenue / 61 st Avenue	Median	Trees	~ 15
		Shrubs	~ 20
East of Northern Avenue / 67 th Avenue	Median	Trees	5
West of Northern Avenue / 67 th Avenue	Median	Trees	3
71 st Avenue – Olive Avenue / 75 th Avenue	Median / Outside	Trees	*
		Shrubs	*
Olive Avenue / 75 th Avenue – Monroe Street / 81 st Avenue (west of Grand Avenue)	Outside	Trees	*
		Shrubs	*
Monroe Street / 81 st Avenue – Peoria Avenue (east of Grand Avenue)	Outside	Trees	*
		Shrubs	*
East of 87 th Avenue	Median	Trees	3
West of 87 th Avenue	Median	Trees	~ 7
		Shrubs	~ 10
West of 88 th Drive	Median	Trees	1
		Shrubs	~ 20
West of 91 st Avenue	Median	Trees	~ 10

Exhibit 3.18 (Continued)			
Existing Landscaping along Grand Avenue within Study Area			
Location	Area	Type	Amount
Loop 101 half diamond service interchange	Outside	Trees	*
		Shrubs	*

* Indicates areas where landscaping exists in such amount as to not be readily quantifiable.

From visual inspection, existing landscaping surrounding two areas surpasses the landscaping provided in the remainder of the corridor:

- 15th Avenue – McDowell Road / 19th Avenue (City of Phoenix)
- Olive Avenue / 75th Avenue – 88th Drive (City of Peoria)

Refer to **Exhibit 3.19** for locations of existing landscaping along Grand Avenue within the Study Area.

Based on information contained in their CIPs both the City of Glendale and the City of Peoria have landscaping / aesthetic improvements planned for the near future on or near Grand Avenue:

- The City of Glendale’s 2003 – 2012 Capital Improvement Plan includes funding to implement the recommendations made in *The Grand Vision – Grand Avenue Image Improvement Study* including landscaping along the outside and median of Grand Avenue. The City of Glendale also includes landscaping improvements on 67th Avenue from Grand Avenue to Northern Avenue, Maryland Avenue from 51st Avenue to 59th Avenue, 51st Avenue from Grand Avenue to Camelback Road, and along 59th Avenue in their CIP.
- The City of Peoria’s FY 2004 Capital Improvement Program Highlights includes funding for a pedestrian project at Peoria Avenue / 83rd Avenue / Grand Avenue which includes landscaping improvements (also included in MAG Transportation Improvement Program (TIP)).

The RTP allocates \$147 million to the portion of Grand Avenue between 19th Avenue and Loop 101. A portion of this amount is intended for beautification purposes that may or may not result in additional landscaping.



3.1.12 Lighting

Within the Study Area, street lighting is provided along Grand Avenue between the following segments:

Westbound Grand Avenue

- 15th Avenue to west of 43rd Avenue
- 51st Avenue and Bethany Home Road intersection
- West of 55th Avenue to south of Butler Drive
- East of 81st Avenue to north of Peoria Avenue

Eastbound Grand Avenue

- 88th Drive to west of 85th Avenue
- North of Peoria Avenue to Monroe Street
- East of 67th Avenue to 15th Avenue

Based on information contained in their CIPs both the City of Phoenix and the City of Peoria have street lighting improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix's 2003 – 2008 Capital Improvement Program includes funding for street modernization including the installation of street lights that may or may not affect Grand Avenue or the arterials that cross it.
- The City of Peoria's FY 2004 Capital Improvement Program includes funding for street lighting improvements along the realigned 83rd Avenue from Olive Avenue to Peoria Avenue.

3.1.13 Freight Facilities

Rail

As discussed in **Section 3.1.7**, the BNSF Railway has track that parallels Grand Avenue throughout the Study Area. Along this alignment, there are several yards and one intermodal facility where freight is transferred to/from rail and truck. Refer to **Section 3.4.4** for detailed information on the facilities and operations of the railway,

Truck

With the completion of Loop 101 (Agua Fria Freeway) freight traffic along Grand Avenue has decreased. However, the presence of the BNSF intermodal facility as well as several municipal downtowns located either on or in the vicinity of Grand Avenue still requires the movement of freight by truck within the Study Area.

At the BNSF intermodal facility located north of Camelback Road and south of Grand Avenue, large amounts of freight are transferred from truck to train and vice versa. As the freight has destinations all across the Phoenix valley, it is likely a majority of the truck traffic either travels along Grand Avenue or crosses it.

Aside from the BNSF intermodal facility, there are no major trucking distribution centers along Grand Avenue within the Study Area.

3.2 EXISTING AND HISTORICAL TRAFFIC

3.2.1 Data Collection

Portions of Grand Avenue are currently under construction for new traffic interchanges within the Study Area. No new traffic counts have been collected due to this construction; however, additional counts will be conducted later in 2004 after the opening of the new Grand Avenue interchanges at 43rd Avenue/Camelback Road and 51st Avenue/Bethany Home Road.

Since traffic patterns will vary significantly during the construction and after opening of the new interchanges along Grand Avenue, the MAG regional travel demand model will be used for a short-term forecast (2006). This short term forecast will include the programmed interchanges along Grand Avenue being completed. Additional traffic analysis including traffic demand, peak hour turning movements, and level of service will be conducted with the short-term forecast. The short-term 2006 forecast will be used as the base condition to compare with long term traffic forecasts.

The following section presents available traffic count information for the year 2002 and also provides a comparison with 1998 count data obtained from the previous 1999 MIS.

3.2.2 Average Weekday Daily Traffic Volumes

Historical traffic count information was collected from various sources including a previous study completed by ADOT and information contained on MAG's website, which had a common base year for the available traffic counts of year 2002. **Exhibit 3.20** illustrates the 2002 Average Daily Weekday Traffic along the Study Area. A comparison was made between the 1998 traffic volumes from the 1999 MIS and the obtained 2002 traffic volumes. This comparison is shown in **Exhibit 3.21**. Volume differences and the percent differences along Grand Avenue are depicted in **Exhibit 3.22**.

Exhibit 3.22				
Grand Avenue Traffic Volume Comparison Year 1998 and 2002				
Section	1998 Average Weekday Daily Traffic*	2002 Average Weekday Daily Traffic**	Volume Difference from 1998 to 2002	Percent Difference from 1998 to 2002
Loop 101 – 91 st Ave	30,100	24,600	-5,500	-18%
91 st Ave – 83 rd Ave	22,900	23,000	+100	0%
83 rd Ave – 75 th Ave	20,100	21,000	+900	+4%
75 th Ave – 67 th Ave	21,000	23,000	+2,000	+10%
67 th Ave – 59 th Ave	25,000	24,000	-1,000	-4%
59 th Ave – 51 st Ave	24,500	26,000	+1,500	+6%
51 st Ave – 43 rd Ave	29,500	22,300	-7,200	-24%

Exhibit 3.22 (Continued)				
Grand Avenue Traffic Volume Comparison Year 1998 and 2002				
Section	1998 Average Weekday Daily Traffic*	2002 Average Weekday Daily Traffic**	Volume Difference from 1998 to 2002	Percent Difference from 1998 to 2002
43 rd Ave – 35 th Ave	34,900	29,000	-5,900	-17%
35 th Ave – 27 th Ave	36,000	32,900	-3,100	-9%
27 th Ave – 19 th Ave	25,300	21,700	-3,600	-14%

*Source: *Grand Avenue Major Investment Study Final Report*, September 1999, ADOT.

**Source: *MAG “2002 / 2003 Average Weekday Volume Traffic Map (Final Draft)”*, Updated June 23, 2004, MAG.

As can be seen from **Exhibit 3.22**, a majority of the sections of Grand Avenue have decreased in traffic volume between the years 1998 and 2002. This can be attributed to the opening of Loop 101 which provides a continuous freeway facility between I-10 and I-17. The continuous section of Loop 101 provides an alternative route choice in the West Valley area relieving short term traffic impacts along Grand Avenue.

A comparison between 2002 actual average daily traffic (ADT) counts obtained from MAG and the 2002 model ADT produced from the MAG transportation demand model is shown in **Exhibit 3.23**. In conformance with standard practice in traffic forecasting, future year traffic forecasts will be adjusted based upon the results presented in this exhibit.

Exhibit 3.23				
Volume Comparison 2002 Model versus 2002 Actual				
Section	2002 Model ADT	2002 Actual ADT*	Volume Difference between Model and Actual	Percent Difference between Model and Actual
Loop 101 – 91 st Ave	33,300	24,600	8,700	26%
91 st Ave – 83 rd Ave	28,700	23,000	5,700	20%
83 rd Ave – 75 th Ave	22,600	21,000	1,600	7%
75 th Ave – 67 th Ave	29,800	23,000	6,800	23%
67 th Ave – 59 th Ave	30,300	24,000	6,300	21%
59 th Ave – 51 st Ave	30,600	26,000	4,600	15%
51 st Ave – 43 rd Ave	31,400	22,300	9,100	29%
43 rd Ave – 35 th Ave	30,400	29,000	1,400	5%
35 th Ave – 27 th Ave	31,400	32,900	-1,500	-5%
27 th Ave – 19 th Ave	32,000	21,700	10,300	32%

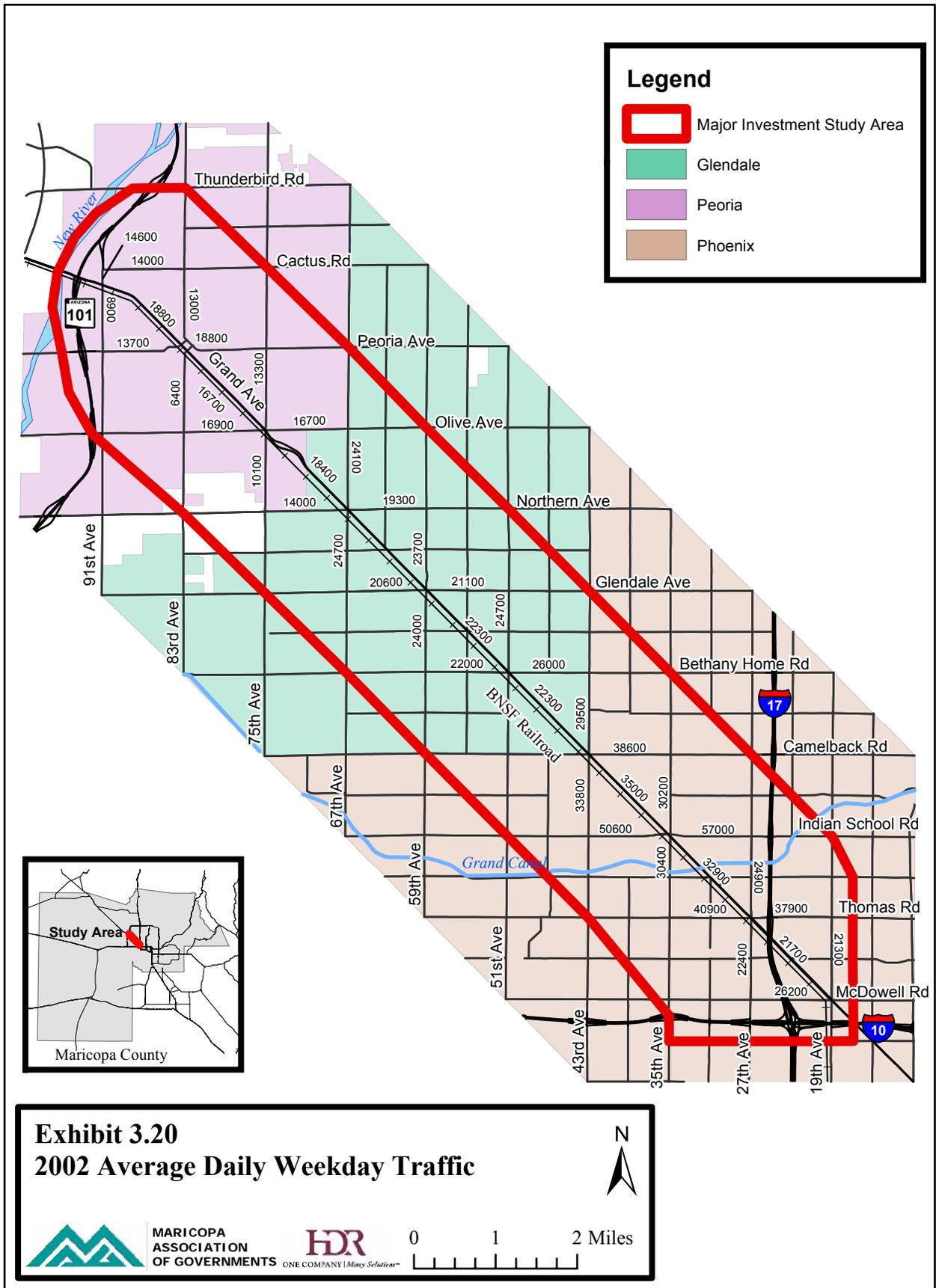
*As shown in *MAG “2002 / 2003 Average Weekday Volume Traffic Map (Final Draft)”*,

3.2.3 Peak Hour Traffic Volumes and Turning Movement Counts

The Project Team is awaiting the opening of three grade-separations that are currently under construction to obtain current peak hour and turning movement counts. This data will be inserted following completion of data collection in the late winter of 2004. This information will be included prior to this document being “Final” and before the submission of the “Draft MIS”.

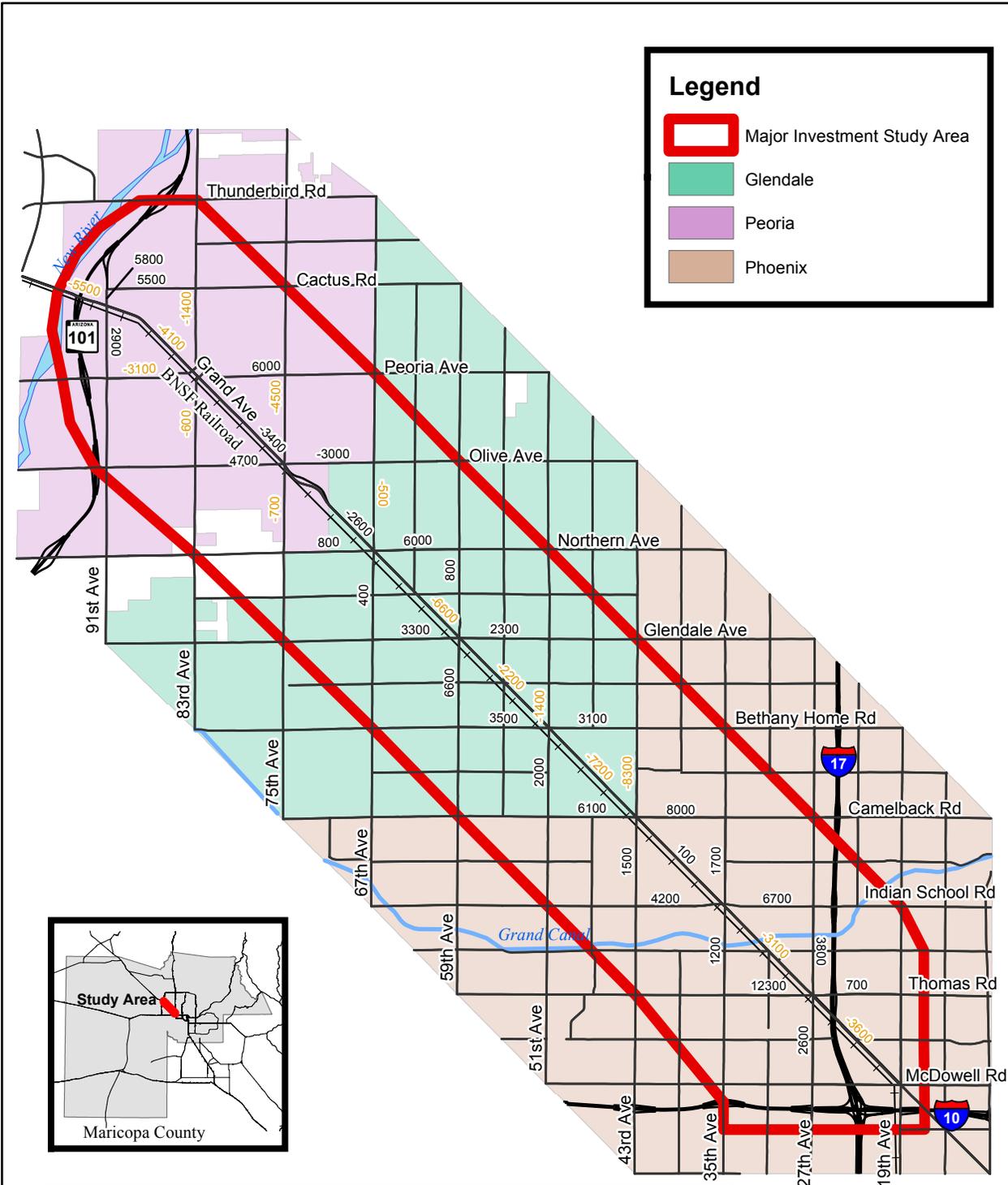
Derived from the MAG transportation demand model, **Exhibit 3.24** presents the peak hour volumes, both AM and PM, for year 2002.

Exhibit 3.24		
Peak Hour Volumes from 2002 Model		
Section	2002 Model Peak Hour Volumes	
	AM	PM
Loop 101 – 91 st Ave	6,820	8,440
91 st Ave – 83 rd Ave	6,340	7,480
83 rd Ave – 75 th Ave	5,200	5,580
75 th Ave – 67 th Ave	6,850	7,510
67 th Ave – 59 th Ave	6,660	7,270
59 th Ave – 51 st Ave	7,090	7,560
51 st Ave – 43 rd Ave	7,330	7,650
43 rd Ave – 35 th Ave	7,000	7,360
35 th Ave – 27 th Ave	7,120	7,590
27 th Ave – 19 th Ave	6,660	7,390



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Legend

- Major Investment Study Area
- Glendale
- Peoria
- Phoenix



Exhibit 3.21
Difference in Daily Traffic Volume
1998 to 2002

N

0 1 2 Miles

3.3 EXISTING TRAFFIC OPERATING CONDITIONS

As discussed in the previous section, the year 2006 short-term forecast developed from the MAG regional travel demand model will be used as the base condition. Due to the current reconstruction and programmed grade-separated interchanges along Grand Avenue, subsequent analysis will be performed based on completion of these roadway improvements. It is anticipated that by the year 2006, grade-separated interchanges will be in operation along Grand Avenue at the following locations within the Study Area:

- 27th Avenue/Thomas Road (open)
- 35th Avenue / Indian School Road (open)
- 43rd Avenue/Camelback Road (2004)
- 51st Avenue/Bethany Home Road (2004)
- 55th Avenue/Maryland Avenue (2004)
- 59th Avenue/Glendale Avenue (2006)
- 67th Avenue/Northern Avenue (2005)
- 75th Avenue/Olive Avenue (2004)
- 91st Avenue Ramps at Loop 101 (open)

The MAG model will be reviewed for 2006 base year conditions. Roadway and intersection turning movement information based on the model data will then be used to develop level of service analysis. Additionally, select link analysis will be performed on Grand Avenue to identify where vehicle trips start and end that travel along specific sections of Grand Avenue. Comparative analysis will also be performed between the forecast years.

A VISSIM microsimulation model will be developed using traffic forecast data from the MAG travel demand model. VISSIM is a tool for microscopic traffic flow simulation that incorporates detailed roadway geometrics and operations such as the grade-separations and traffic signals along Grande Avenue. Visual vehicular animation as well as traffic operation analysis including level of service along the Grand Avenue corridor will be derived from VISSIM as part of the 2006 base year conditions.

3.3.1 Congestion and Level of Service (LOS)

The intersection Level of Service (LOS) for the major intersections along Grand Avenue as generated by the MAG transportation demand model for year 2002 is presented in **Exhibit 3.25A**.

Exhibit 3.25A		
Intersection Level of Service (LOS) 2002 Model		
Intersection	2002 Model Intersection LOS	
	AM	PM
Loop 101 / Grand Ave	B	C
91 st Ave / Grand Ave	B	C
Peoria Ave / Grand Ave	C	D

83 rd Ave / Grand Ave	C	C
75 th Ave / Olive Ave / Grand Ave	D	E/F
67 th Ave / Northern Ave / Grand Ave	N/A	C
59 th Ave / Glendale Ave / Grand Ave	D	E/F
51 st Ave / Bethany Home Rd / Grand Ave	E/F	E/F
43 rd Ave / Camelback Rd / Grand Ave	D	E/F
35 th Ave / Indian School Rd / Grand Ave	D	E/F
27 th Ave / Thomas Rd / Grand Ave	C	C
19 th Ave / McDowell Rd / Grand Ave	C	E/F

[The following Exhibits will be included prior to this document being “Final” and before the submission of the “Draft MIS”:

- *Exhibit 3.25B – 2002 Intersection Level of Service (map).]*

3.3.2 Origins / Destinations (SELINK)

Select Link analysis will be performed along Grand Avenue for 2006 conditions to identify where trips are traveling to and from within sections of Grand Avenue. This information will be included prior to this document being “Final” and before the submission of the “Draft MIS”.

3.3.3 Travel Time and Speed

As part of the VISSIM microsimulation process, travel times and speeds recorded by MAG in its “2002 – 2003 MAG Regional Travel Time and Travel Speed Study” are being used to calibrate the VISSIM models.

3.3.4 Crash Analysis

The three most current years of crash data along Grand Avenue were collected from the ADOT Traffic Records Section. The data covers the time period from November 1, 2000 to October 31, 2003. A total of 1,304 crashes occurred along Grand Avenue within the Study Area over this three-year period. Approximately 57% (745) of all crashes in the Study Area occurred at major intersections along Grand Avenue while the remaining 43% (559) occurred along segments of Grand Avenue.

The crash data was broken down based on the incident occurring at either a six-legged intersection (also include 91st Avenue and 99th Avenue) or along a segment of Grand Avenue. For the purposes of this analysis, crashes occurring within 150 feet of a six-legged intersection are considered to occur at the intersection. Crashes occurring at all minor intersection are considered to occur along the segment.

As part of this crash analysis, nine data fields were analyzed and are discussed in detail below for both intersection and segment data. The nine data fields include:

- First Harmful – The first thing encountered by the initiating vehicle in the crash
- Daylight – Whether it was daytime, dawn/dusk or nighttime
- Weather – What the weather was like at the time of the crash
- Intersection Related – Whether an intersection, driveway or alley was an access point relating to the crash

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- Injury – Whether the crash had fatalities, injuries or property damage only
- Collision Manner – How the initiating vehicle hit the other, if another was present
- Special Location – Did the crash occur at a special location such as a railroad crossing or pedestrian crosswalk
- Road Condition – The condition of the roadway at the time of the crash (i.e. under construction, pot-holes, flooded)
- Surface Condition – The condition of the surface of the roadway at the time of the crash (i.e. dry, wet, sand)

Within the “first harmful” field, 91% (678) of the intersection crashes involved another vehicle, 1% (8) involved a pedestrian, 1.5% (11) involved a train, 1% (8) involved a bicyclist and the remaining 5.5% (40) were other. Along the segments, 83% (463) of the segment crashes involved another vehicle, less than 1% (4) involved a pedestrian, 2% (10) involved a bicyclist and the remaining 14% (82) were other.

Within the “daylight” field, 71% (532) of the intersection crashes occurred during daylight hours, 4% (27) occurred during dawn/dusk, and 25% (185) occurred during darkness. Along the segments, 70% (390) of the crashes occurring during daylight hours, 7% (38) occurred during dawn/dusk, and 23% (129) occurred during darkness.

Within the “weather” field, 84% (627) of the intersection crashes occurred when the weather was clear, while only 3.6% (27) occurred when it was raining; the remaining 12% (91) were other. Along the segments, 89% (498) of the crashes occurring when the weather was clear, while only 3% (16) occurred when it was raining; the remaining 8% (45) were other.

Within the “intersection related” field, 77% (576) of the intersection crashes were related to intersections. Also worth noting, 22% (165) of the intersection crashes reported “no relationship” to an intersection in their filings. The remaining 1% (4) were related to driveways. Along the segments, 47% (262) of the crashes were related to intersections and 6% (33) were related to driveways. Similar to the intersection crashes, 47% (264) of the segment crashes reported “no relationship” to an intersection in their filings.

Within the “injury” field, 68% (510) of the intersection crashes were property damage only (PDO), 31% (230) were crashes in which injuries were sustained and 1% (5) were crashes in which the most severe injury was a fatality. Along the segments, 59% (332) of the crashes were property damage only, 40% (223) were crashes in which injuries were sustained and less than 1% (4) were crashes in which the most severe injury was a fatality. **Exhibits 3.26 and 3.27** present injury data for both intersections and segments along Grand Avenue within the Study Area.

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Exhibit 3.26 Crashes by Severity on Grand Avenue at Major Intersections					
Intersection	Crashes	Injury			Total
		Fatal	Injury	PDO	
15th / Roosevelt / Grand	20	1	4	15	20
19th / McDowell / Grand	29	0	12	17	29
27th / Thomas / Grand	48	0	14	34	48
35th / Indian School / Grand	41	0	10	31	41
43rd / Camelback / Grand	78	3	31	44	78
51st / Bethany Home / Grand	130	1	35	94	130
55th / Maryland / Grand	55	0	16	39	55
59th / Glendale / Grand	121	0	46	75	121
67th / Northern / Grand	58	0	16	42	58
75th / Olive / Grand	75	0	18	57	75
83rd / Peoria / Grand	38	0	6	32	38
91st / Grand	46	0	19	27	46
99th / Grand	6	0	3	3	6
Total	745	5	230	510	745

Exhibit 3.27 Crashes by Severity on Grand Avenue between Major Intersections					
Segment	Crashes	Injury			Total
		Fatal	Injury	PDO	
15th Ave - 19th Ave	26	0	9	17	26
19th Ave - 27th Ave	19	0	8	11	19
27th Ave - 35th Ave	101	1	44	56	101
35th Ave - 43rd Ave	100	2	52	46	100
43rd Ave - 51st Ave	33	0	13	20	33
51st Ave - 55th Ave	20	0	5	15	20
55th Ave - 59th Ave	25	0	9	16	25
59th Ave - 67th Ave	97	0	32	65	97
67th Ave - 75th Ave	31	1	15	15	31
75th Ave - 83rd Ave	36	0	19	17	36
83rd Ave - 91st Ave	54	0	11	43	54
91st Ave - 99th Ave	17	0	6	11	17
Total	559	4	223	332	559

Within the “collision manner” field, 47% (347) of the intersection crashes were rear-end, 17% (128) were sideswipe, 15% (115) were angle and the remaining 21% (155) were other. Along the segments, 35% (196) were rear-end, 15% (85) were sideswipe and 18%

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(101) were angle. In addition along the segments, 4% (23) involved a U-turn movement. The remaining 28% (154) were other.

Within the “special location” field, a vast majority of both intersection (97%, 719) and segment (98%, 550) crashes reported no special location. For intersection crashes, approximately 2.5% (18) involved a railroad crossing and 1% (6) involved a pedestrian crossing. The remaining crashes were other.

Within the “road condition” field, again a vast majority of both intersection (98%, 727) and segment (98%, 547) crashes reported no adverse roadway conditions. For intersection crashes, 2% (18) of crashes occurred along portions of the roadway that was either under construction or had temporary lane closures. For segment crashes, 2% (11) of crashes occurred along these same types of restrictions.

Within the “surface condition” field, 75% (554) of the intersection crashes occurred when the pavement was dry, while only 5% (38) occurred while the pavement was wet. For the intersection crashes 18% (136) of the incidents did not report the surface condition. The remaining 2% (17) were other. Along the segments, 75% (421) of the crashes occurred when the pavement was dry and 11% (64) of the crashes occurred when the pavement was wet. For segment crashes, 11% (60) of the incidents did not report the surface condition. The remaining 3% (14) were other.

The two intersections with the highest number of crashes were:

- 51st Avenue / Bethany Home Road / Grand Avenue with 130 crashes
- 59th Avenue / Glendale Avenue / Grand Avenue with 121 crashes

The three segments with the highest number of crashes were:

- 27th Avenue – 35th Avenue with 101 crashes
- 35th Avenue – 43rd Avenue with 100 crashes
- 59th Avenue – 67th Avenue with 97 crashes

Based on information contained in CIPs the cities of Phoenix, Glendale and Peoria have safety improvements planned for the near future on or near Grand Avenue:

- The City of Phoenix’s 2003 – 2008 Capital Improvement Program includes funding projects at undermined locations to reduce traffic congestion and eliminate safety hazards as needs are determined.
- The City of Glendale’s 2003 – 2012 Capital Improvement Plan includes funding for traffic safety improvements to reduce accidents at high-incident locations.
- The City of Peoria’s FY 2004 Capital Improvement Program includes funding for safety improvements for the Peoria Avenue / 83rd Avenue / Grand Avenue intersections

3.4 EXISTING AND PLANNED MULTI-MODAL FACILITIES AND USAGE

Although the predominant method of travel within the Study Area is by private automobile, Grand Avenue is a multi-modal transportation corridor that includes transit, rail, pedestrian and bicycle facilities and services. There are short- and long-term plans to enhance the multi-modal facilities within the Study Area.

3.4.1 Public Transit Service

Existing Public Bus Service

As **Exhibits 3.28 and 3.29** indicate, the Study Area is served by a strong combination of local, express, circulator, and RAPID bus routes. In January 2004, the Grand Avenue Limited route replaced the Yellow Line as the local route that runs along Grand Avenue. It provides four morning trips from the Peoria Community Center to downtown Phoenix and four evening trips in the opposite direction. The Grand Avenue Limited route intersects 13 long-standing and three new north-south and east-west local bus routes. The long-standing routes include: Routes 17, 19, 24, 27, 35, 41, 43, 50, 59, 60, 67, 106 and the Green Line. The new routes are Route 51, which runs along 51st Avenue, Route 70, which links Luke Air Force Base to downtown Glendale along Glendale Avenue, and the Glendale Urban Shuttle (GUS), which is a circulator around downtown Glendale. Weekday hours of service vary by route, but it is the general goal of Valley Metro to provide service from 4:00 AM to midnight with a peak frequency of 15 minutes and an off-peak frequency of 30 minutes.

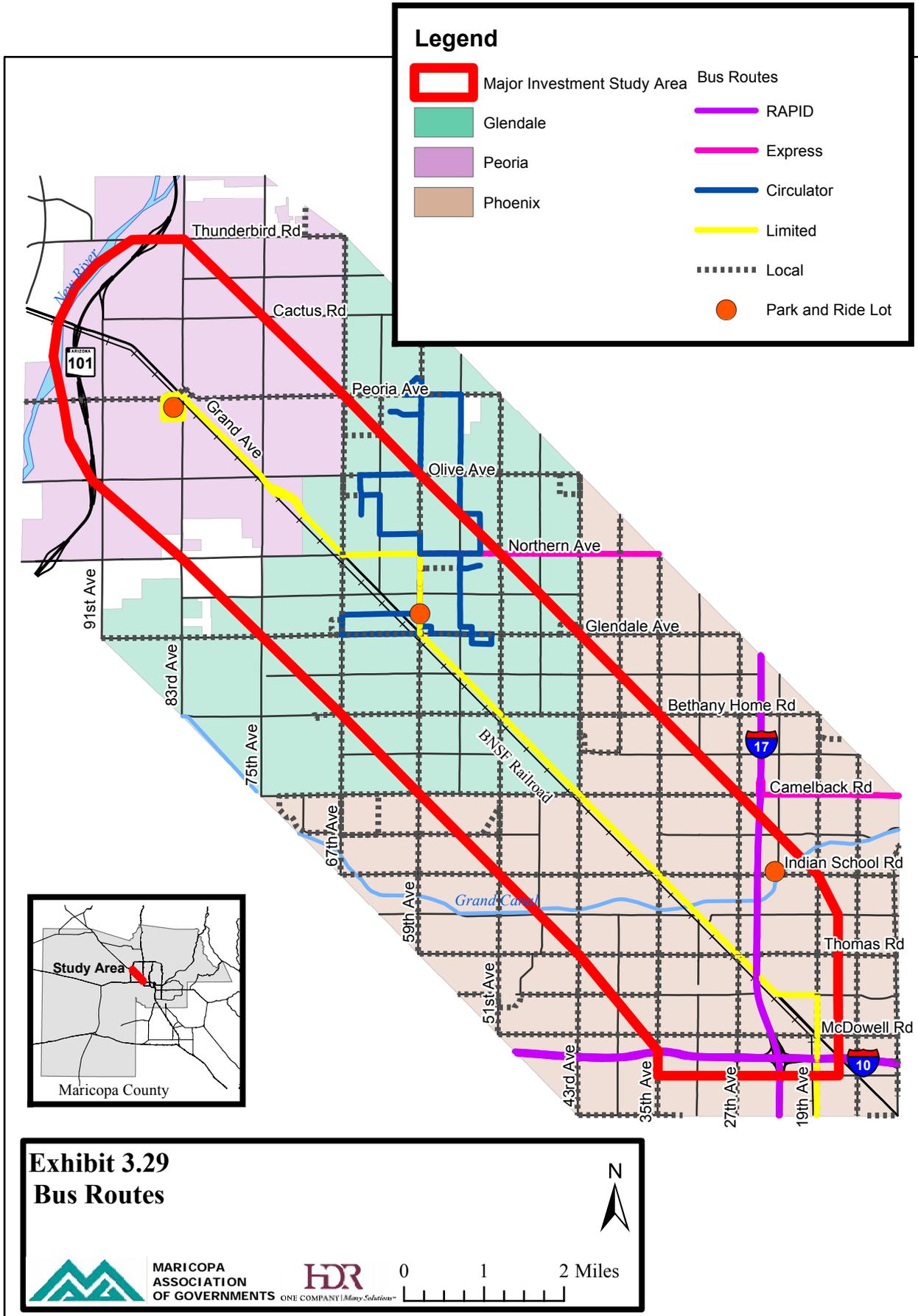
In addition to routes intersecting the Grand Avenue Limited route, the Study Area is also served by bus routes which travel through the Study Area but do not intersect the Grand Avenue Limited Route. These routes include local Routes 80, 90 and 122; express Routes 560, 570, and 581; RAPID Routes I-10 West and I-17; and the GUS III circulator. The weekday hours of service, frequency, and boarding data can be found for these routes and those discussed above in **Exhibit 3.28**.

Several routes operate in multiple jurisdictions in and out of the Study Area. **Exhibit 3.30** breaks down the weekday and Saturday boardings by route and jurisdiction.

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Exhibit 3.28 Existing Valley Metro Bus Routes								
Route	Weekday Hours	Frequency			Weekday Average Boardings		Saturday Average Boardings	
		Peak	Base	Sat.	Daily	Per Mile	Daily	Per Mile
Routes Along Grand Avenue								
Grand Avenue Limited	4 am trips/4 pm trips	-	-	-	138	2.1	-	-
Routes Intersecting Grand Avenue								
17- McDowell	4am to midnight	15	30	30	8,440	3.5	4,056	3.0
19- 19th Avenue	4am to midnight	15	30	30	7,648	2.4	4,277	2.6
24- Glendale/Lincoln	5am to midnight	15	30	35	6,266	3.4	2,957	2.4
27- 27th Avenue		30	30	30	4,136	3.1	2,608	2.0
35-35th Avenue	5am to midnight	20	30	30	6,470	2.8	3,640	2.0
41- Indian School	4am to midnight	15	30	30	9,380	3.2	4,387	2.5
43- 43rd Avenue	4am to 11pm	30	30	30	2,967	2.5	1,574	1.5
50-Camelback	4am to midnight	15	30	30	5,998	3.9	3,060	2.9
51-51st Avenue	4:30am to 9pm	35	35	60	896	1.7	297	1.1
59-59th Avenue	5am to 10:30pm	30	30	30	2,654	2.3	1,330	1.2
60- Bethany Home	4am to 10pm	35	35	35	1,931	2.7	1,345	1.9
67- 67th Avenue	6am to 10pm	30	30	30	2,242	2.3	1,390	1.7
70- Glendale/Luke Link	5am to 10pm	60	60	60	264	2.4	121	0.5
106- Peoria/Shea	3:30am to midnight	20	40	30	3,647	0.8	1,902	1.2
Green- Thomas	4:30am to midnight	10	30	30	10,834	4.7	5,032	4.1
GUS	7am to 6pm	15	15	30	3,789	0.8	361	0.5
Other Routes Serving Study Area								
80- Northern	5am to 10pm	30	30	30	1,141	2.3	697	1.3
90- Dunlap	5am to 10pm	30	30	32	2,642	2.4	1,679	1.6
122- Cactus	5:30am to 10pm	60	60	60	351	0.8	193	0.4
560- Avondale (Exp.)	2 am trips/2 pm trips	-	-	-	119	2.1	-	-
570- Glendale (Exp.)	2 am trips/2 pm trips	-	-	-	59	1.0	-	-
581- North Mtn. (Exp.)	4 am trips/4 pm trips	-	-	-	142	1.6	-	-
I-10 West (RAPID)	11 am trips/10 pm trips	-	-	-	343	1.8	-	-
I-17 (RAPID)	16 am trips/17 pm trips	15	-	-	640	1.5	-	-
GUS III	8am to 5pm	15	-	-	301	0.2	-	-

Source: Valley Metro January 2004 Monthly Ridership Report.



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**Exhibit 3.29
Bus Routes**



MARICOPA ASSOCIATION OF GOVERNMENTS



0 1 2 Miles

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Exhibit 3.30 Bus Route Boardings by Municipality					
Route	Municipality	Weekday Average Boardings		Saturday Average Boardings	
		Daily	Per Mile	Daily	Per Mile
Routes Along Grand Avenue					
Grand Avenue Limited	Glendale	17	0.3	-	-
	Peoria	53	3.9	-	-
	Phoenix	68	1.2	-	-
	Total	138	2.1	-	-
Routes Intersecting Grand Avenue					
17- McDowell	Phoenix	7,962	3.5	3,676	3.0
	Other	478	3.5	380	2.6
	Total	8,440	3.5	4,056	3.0
19- 19th Avenue	Phoenix	7,648	2.4	4,277	2.6
	Total	7,648	2.4	4,277	2.6
24- Glendale/Lincoln	Glendale	1,107	5.0	514	2.8
	Phoenix	5,159	3.0	2,443	2.3
	Total	6,266	3.4	2,957	2.4
27- 27th Avenue	Phoenix	4,136	3.1	2,608	2.0
	Total	4,136	3.1	2,608	2.0
35-35th Avenue	Phoenix	6,470	2.8	3,640	2.0
	Total	6,470	2.8	3,640	2.0
41- Indian School	Phoenix	8,522	3.2	3,778	2.7
	Other	858	3.6	609	1.5
	Total	9,380	3.2	4,387	2.5
43- 43rd Avenue	Phoenix	2,967	2.5	1,574	1.5
	Total	2,967	2.5	1,574	1.5
50-Camelback	Phoenix	5,641	4.0	2,908	3.0
	Other	357	1.7	152	1.7
	Total	5,998	3.9	3,060	2.9
51-51st Avenue	Glendale	321	1.0	98	0.6
	Phoenix	575	2.1	199	1.4
	Total	896	1.7	297	1.1
59-59th Avenue	Glendale	1,661	2.2	932	1.3
	Phoenix	993	2.4	398	1.0
	Total	2,654	2.3	1,330	1.2
60- Bethany Home	Glendale	676	2.8	474	2.0
	Phoenix	1,255	2.7	871	1.9
	Total	1,931	2.7	1,345	1.9

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Exhibit 3.30 (Continued)					
Bus Route Boardings by Municipality					
Route	Municipality	Weekday Average Boardings		Saturday Average Boardings	
		Daily	Per Mile	Daily	Per Mile
67- 67th Avenue	Glendale	1,262	1.9	847	1.5
	Phoenix	980	2.9	543	1.9
	Total	2,242	2.3	1,390	1.7
70- Glendale/Luke Link	Glendale	264	0.6	121	0.5
	Total	264	0.6	121	0.5
106- Peoria/Shea	Glendale	538	2.8	322	1.5
	Peoria	378	2.1	0	0.0
	Phoenix	2,332	1.7	1,431	1.2
	Other	399	1.0	149	0.6
	Total	3,647	1.8	1,902	1.2
Green- Thomas	Phoenix	10,232	4.8	4,647	4.3
	Other	602	2.6	385	1.7
	Total	10,834	4.7	5,032	4.1
GUS	Glendale	3,789	0.8	361	0.5
	Total	3,789	0.8	361	0.5
Other Routes Serving Corridor					
80- Northern	Glendale	263	2.5	158	1.1
	Phoenix	878	2.2	539	1.4
	Total	1,141	2.3	697	1.3
90- Dunlap	Glendale	596	2.9	414	2.1
	Phoenix	2,046	2.2	1,265	1.5
	Total	2,642	2.4	1,679	1.6
122- Cactus	Phoenix	351	0.8	193	0.4
	Total	351	0.8	193	0.4
560- Avondale (Exp.)	Phoenix	67	2.1	-	-
	Other	52	2.1	-	-
	Total	119	2.1	-	-
570- Glendale (Exp.)	Glendale	19	1.5	-	-
	Phoenix	40	0.7	-	-
	Total	59	1.0	-	-
581- North Mtn. (Exp.)	Glendale	33	3.4	-	-
	Phoenix	109	1.1	-	-
	Total	142	1.6	-	-
I-10 West (RAPID)	Phoenix	343	1.8	-	-
	Total	343	1.8	-	-
I-17 (RAPID)	Phoenix	640	1.5	-	-
	Total	640	1.5	-	-
GUS III	Glendale	301	0.2	-	-
	Total	301	0.2	-	-

Source: Valley Metro January 2004 Monthly Ridership Report.

Existing Paratransit Service

Demand response (also known as paratransit) service is characterized by the lack of a predetermined 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 specific 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 3.31 lists paratransit systems operating in the Study Area. 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 persons with disabilities and, in some cases, the general public.

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. Another paratransit system, Sun Cities Area Transit, operates in the unincorporated area to the west of the Study Area.

Exact hours of operation vary by system. Basic weekday operating hours for all passengers are 7:00AM to 5:30PM in the City of Glendale, 6:00AM to 6:00PM in the City of Peoria, and 5:00AM to midnight in the City of Phoenix. ADA complementary paratransit service has longer hours of operation to match fixed route service. The City of Phoenix and City of Glendale provide Saturday and Sunday service also.

The base fare for dial-a-ride service is \$2.00 in the City of Glendale and \$3.00 in the City of Peoria. Both cities have discounted prices for seniors, persons with disabilities and children. They also provide some discounts for large groups and regular passengers. All ADA riders pay a \$2.00 fare. The City of Phoenix has a zone fare structure with a base fare of \$2.40 for the first zone plus \$1.20 per additional zone. They also discount fares for the elderly, persons with disabilities and children. All ADA riders pay the base fare of \$2.40. The Maricopa County Special Transportation Services provides free trips. Some coordination between the services is provided for transfers, but only Phoenix provides a discount on fares for riders transferring to fixed route service.

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Exhibit 3.31 Paratransit Systems Serving the Grand Avenue Corridor						
System	Glendale Dial-a-Ride		Maricopa County Special Transportation Services	Peoria Dial-a-Ride		Phoenix Dial-a-Ride
Eligibility	General Public		Seniors, persons with disabilities, and low income individuals	General Public		Seniors and persons with disabilities
Vehicles	19		55	9		110
Annual Boardings	81,768		106,395	30,399		333,860
Days and Hours of Service	Non-ADA	ADA	All	Non-ADA	ADA	All
	Mon – Fri, 7AM to 5:30PM; Sat – Sun, 7AM to 5PM	Mon – Sun, 5AM to 10PM	Mon – Fri, hours vary	Mon – Fri, 6AM to 6PM	Mon – Fri, 5AM to 8PM	Mon – Fri, 5AM to 12AM; Sat – Sun, 5AM to 10PM
Fare	Base \$2.00	\$2.00	Free	Base \$3.00	\$2.00	Base \$2.40 1 st Zone \$0.60 Each Zone
	Discounted \$1.00			Discounted \$1.00		Discounted \$1.20 1 st Zone \$0.60 Each Zone
	Age 0 – 5 Free			Age 0 – 5 Free		ADA \$2.40 1 st Zone \$1.20 Each Zone
Discounted Transfers	No		No	No		Yes
Coordinated Transfers	Yes		No	Yes		Yes

Sources: Valley Metro Fiscal Year 2003 Annual Transit Performance Report
Regional Bus Fleet Summary: Dial-a-Ride and Vanpools Status Date: June 30, 2003

Existing Vanpool Service

Vanpools are organized ridesharing arrangements in which a relatively small group of commuters who have similar origins collectively agree to commute to work in a single vehicle. Vehicles for this type of service may be owner or leased by one of the commuters in the group, a company, or a third party representative.

The Valley Metro Vanpool Program provides vans to groups of eight to 15 commuters throughout the Phoenix metropolitan area, including the Grand Avenue Study Area. Passengers share the basic operating costs (fuel, preventative maintenance, etc.) of the van by paying an equitable monthly fee.

Park and Ride Lots

There are four park-and-ride lots in the Grand Avenue Study Area. Two of these lots are in the City of Peoria, while the City of Glendale and Phoenix each have one lot within the Study Area. The lots are available to transit riders by the cities or through informal agreements between property owners and Valley Metro that are subject to change on short notice. **Exhibit 3.32** lists the locations of the park-and-ride lots and the bus routes that serve each. The location of the lots with respect to the bus routes can be seen in **Exhibit 3.29**.

Exhibit 3.32 Park-and-Ride Lots			
Location	Routes Designated	Spaces	Typical Occupancy
Peoria Park & Ride East Jefferson Street & 84th Avenue, N. E. corner	Grand Avenue Limited, 106	38	30
Peoria Park & Ride West Washington Street & 84th Avenue, S. W. corner	Grand Avenue Limited, 106	35	30
Glendale City Lot 59th Avenue & Myrtle Avenue, N.E. and S.W. corner	59, 70, 570, GUS, Grand Avenue Limited	10	4
Thunderbird Fairlanes Indian School Road & 24th Avenue	41	10	0

Source: City of Phoenix Park-and-Ride Update and Utilization Report dated January 12, 2004.

Programmed and Planned Transit Improvements

The programmed transit improvements can be broken down into capital and operating investments. The capital investments include park-and-ride lots, maintenance facilities, buses, shelters, pull-outs, etc. The operating investments include lengthening of routes, adding a new routes route, and extending the operating hours of service. Operating improvements can be made to dial-a-ride service, fixed route service and vanpool service.

Exhibit 3.33 summarizes the programmed capital and operating improvements for Fiscal Year (FY) 2004 for the City of Peoria, City of Glendale, and City of Phoenix within the Grand Avenue Study Area. This information is from the Valley Metro/Regional Public Transportation Authority (RPTA) Annual Transit Performance Report for FY 2003/FY 2004.

Exhibit 3.33 Programmed Transit Capital and Operating Improvements: FY 2004	
Municipality	Improvement
Planned Capital Improvements	
Peoria	Replace three revenue vehicles
Glendale	Begin design of Park-and-Ride in Glendale
Phoenix	Bus purchases for replacement of existing fleet
	Maintenance for buses, parts, and components
	Purchase new fareboxes
	Construct various bus bays and bicycle lanes
Planned Operating Improvements	
Peoria	Upgrade transit dispatch system
Glendale	Implement new Grand Avenue Limited service
	Implement new Route 51 - 51st Avenue service
	Expand Glendale Urban Shuttle (GUS) to include a new route
Phoenix	Implement hourly weekday and Saturday service on Route 41-Indian School
	Implement new Grand Avenue Limited service
	Implement new Route 51 - 51st Avenue service
	Add one earlier morning eastbound trip on Route 60-Bethany Home Road

Source: Valley Metro Fiscal Year 2003 Annual Transit Performance Report.

The City of Glendale approved a half-cent sales tax initiative in November 2001 that is charged with funding a comprehensive transportation program. Included in this program is the expansion of local bus service – including service seven days a week, and increased level of specialized transit services – dial-a-ride hours of service, express bus routes, neighborhood collectors, and light rail.

The City of Peoria does not have a dedicated local transit funding source. They are served by the regional fixed route transit service provided by the RPTA. The only transit services operated and funded by the City of Peoria is the dial-a-ride service.

The City of Phoenix passed the Transit 2000 Plan in March 2000, which provided a dedicated funding source of a 0.4% sales tax. The plan calls for increased local bus service, improved dial-a-ride service, the introduction of new service such as light rail transit service, bus rapid transit service, limited stop services and neighborhood circulators. By 2005, regular bus service will operate on all major streets from 5am to midnight on Monday through Saturday and 6am to 10pm on Sundays and holidays.

In addition to the local city taxes, the planned transit improvements in the Grand Avenue Study Area as well as the entire Maricopa County are dependent upon the RTP. The 20-year plan will be presented to the voters of Maricopa County in November 2004 for funding through the extension of a half-cent transportation sales tax. This multi-modal plan includes operational funding for improvements to fixed route service and new light rail service within the Study Area. Although most improvements are not detailed in the report, **Exhibit 3.34** shows the designated routes and funding levels by phase for improvements to routes within the Study Area.

Exhibit 3.34 Regional Transportation Plan		
Route	Phase	Cost (million \$)
Freeway Expressway/BRT		
West Loop 101 Connector (NEW)	I	5
Grand Avenue Limited	II	5.4
Supergrid Route		
Glendale Avenue (24)	I	11.6
Camelback Road	II	6.1
Peoria Avenue/ Shea Boulevard(106)	II	12.6
59th Avenue (59)	II	11.4
McDowell Road/ McKellips Boulevard (17)	II	35.3
Thomas Road (Green)	III	11.7
Indian School Road (41)	III	9.5
Dunlap Avenue/ Olive Avenue (90)	IV	5.5
83rd Avenue/ 75th Avenue (NEW)	IV	4.8
19th Avenue (19)	III	
35th Avenue (35)	III	
Light Rail Transit		
Glendale Link - 19th Avenue/Bethany Home Road to Downtown Glendale	III	180

Source: MAG Regional Transportation Plan, Chapter 10.

The light rail link planned is a 5-mile section that will connect to the minimum operating system scheduled to open in 2007. Construction is planned for the third phase of the RTP, which corresponds to FY 2015 – FY 2020. In addition to the Glendale Link, a new transit center and park-and-ride lot are planned at the termini of the link in downtown Glendale.

The RTP also includes bus purchases, paratransit vehicle purchases, vanpool vehicle purchases, and construction of transit centers, park-and-ride lots, maintenance facilities, and bus stop pullouts. All of these investments will improve transit operations within and around the Grand Avenue Study Area.

3.4.2 Non-Motorized Transportation Facilities

The following types of non-motorized transportation facilities, those used by pedestrians and cyclists, exist or are planned in the Grand Avenue Study Area:

- **Multi-Use Paths:** Paved or unpaved off-road trails shared by pedestrians, cyclists, and in some cases equestrians. Unpaved multi-use paths exist on both banks of the Grand Canal.
- **Bike Lanes:** On-street lanes signed and striped for the exclusive use of bicycles, typically on both sides of the roadway. Bike lanes may exist on arterial, collector and local streets.

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- **Bike Routes:** Roadways without striped bike lanes that are designated as “Bike Routes” by signage only. Bike route signs are typically posted on collector and local streets rather than arterial streets.

Existing Facilities

The existing non-motorized transportation facilities are listed in **Exhibit 3.35**. All three types of facilities are represented within the Grand Avenue Study Area. There are three routes that cross Grand Avenue and 15 routes that enter the study area but do not cross Grand Avenue.

Exhibit 3.35 Existing Bikeways and Trails		
Location	Facility Type	Municipality
Facilities that Cross Grand Avenue		
Grand Canal	Multi-Use Paths	Phoenix
Maryland Avenue	Bike Lanes	Glendale
Other Facilities Entering Corridor		
23rd Avenue, Encanto Boulevard-Hatcher Road	Bike Lanes	Phoenix
31st Avenue, Washington Street-Encanto Boulevard & Indian School-Camelback Road	Bike Lanes	Phoenix
39th Avenue, Roosevelt Street-Osborn Road	Bike Lanes	Phoenix
47th Avenue, Campbell Avenue-Thomas Road	Not-Specified	Phoenix
Encanto Boulevard, 47th-31st Avenue & 21st-3rd Avenue	Bike Lanes	Phoenix
Osborn Road, 47th-35th Avenue	Bike Lanes	Phoenix
Campbell Avenue, 55th-47th Avenue & 35th-27th Avenue	Bike Lanes	Phoenix
Missouri Avenue, 43rd Avenue-I-17	Bike Lanes	Phoenix
Bethany Home Road, 39th Avenue-I-17	Bike Lanes	Phoenix
47th Avenue, Missouri Avenue-Butler Drive	Bike Route	Glendale
55th Avenue, Orangewood-Olive Avenue	Bike Route	Glendale
61st Avenue, Bethany Home Road-Maryland Avenue	Bike Route	Glendale
63rd Avenue, Camelback Road-Glendale Avenue	Bike Route	Glendale
71st Avenue, Glendale-Myrtle Avenue	Bike Route	Glendale
Missouri Avenue, 73rd-59th Avenue & 47th-43rd Avenue	Bike Route	Glendale
Glendale Avenue, 99th-67th Avenue	Bike Route	Glendale
Orangewood Avenue, 55th-45th Avenue	Bike Route	Glendale
71st Avenue, Olive Avenue-Thunderbird Road	Bike Lanes	Peoria
79th Avenue, Peoria Avenue-Thunderbird Road	Bike Lanes	Peoria
85th Avenue, Mountain View Road-Peoria Avenue	Bike Route	Peoria
87th Avenue, Orangewood-Peoria Avenue	Bike Lanes / Bike Route	Peoria
Mountain View Road, 73rd-63rd Avenue & 91st-85th Avenue	Bike Lanes	Peoria

Exhibit 3.35 (Continued) Existing Bikeways and Trails		
Location	Facility Type	Municipality
Varney Lane/Cholla Street, 87th-31st Avenue	Bike Lanes	Peoria
Sweetwater Avenue, 87th-71st Avenue	Bike Lanes	Peoria
Monroe Street, 83rd-85th Avenue	Bike Route	Peoria

Source: “Bikeways in the Phoenix Metropolitan Area” (MAG, 2003).

Programmed and Planned Facilities

There are four projects in the current MAG Transportation Improvement Program, 2004-2007 that improve non-motorized transportation within the Grand Avenue Study Area. The projects are listed in **Exhibit 3.36** and include alleyway improvements, bike lanes, at-grade crossing, and a grade separated crossing.

Similar to the planned transit improvements, the planned non-motorized transportation improvements are tied into the MAG RTP. The money assumed to be available for non-motorized transportation facilities comes from local sources and from CMAQ funding, which is federally allocated for air quality and congestion relief. The funding level in the RTP is not sufficient to construct the entire regional non-motorized plan. A majority of the street projects, though, do include funding for improvements that will accommodate bicycle usage.

The RTP includes three sub-plans that describe the future non-motorized transportation system. They are the MAG Regional Bike Plan, which deals mainly with on-street bicycle facilities, the Regional Off-Street System (ROSS) plan, which utilizes canal banks, railroad easements and other corridors to provide multi-modal trails, and the West Valley Multi-Modal Transportation Corridor Plan, which is a 42-mile trail network that generally follows the New River and lower Agua Fria River corridors. The projects from these three plans that lie within the Grand Avenue Study Area are listed in **Exhibit 3.37**.

Exhibit 3.36 Programmed Bicycle / Pedestrian Improvements 2004 -2007				
Location	Description	Municipality	Year	Cost
Historic Catlin Court Alleyway	Improve four alleyways for multi-modal use	Glendale	2004	\$101,800
63rd Avenue, Olive Avenue to Grand Avenue	Design and construct bicycle lane	Glendale	2006	\$632,600
Grand Avenue at 83rd and Peoria Avenue	Design and construct at-grade pedestrian crossing	Peoria	2004	\$757,000
Grand Canal at I-17	Construct bicycle grade separation structure	Phoenix	2004	\$3,500,000

Source: MAG Transportation Improvement Program (FY 2004 – FY 2007).

Exhibit 3.37 Planned Bikeways and Trails		
Location	Facility Type	Municipality
MAG Regional Bike Plan		
Grand Avenue, SR 74 to Van Buren Street/7th Avenue	Bike Lanes	Peoria Glendale Phoenix
51st Avenue, Bell to Riggs Road	Bike Lanes	Glendale
67th Avenue, Happy Valley Road-Glendale Avenue	Bike Lanes	Glendale
Glendale Avenue, Litchfield Road-7th Street	Bike Lanes	Glendale
23rd Avenue, Bell Road-Van Buren Street	Bike Lanes	Phoenix
31st Avenue, Bell-Van Buren Road	Bike Lanes	Phoenix
MAG Regional Off-Street System Plan (ROSS): Potential Corridors		
High Voltage Power Lines, between Northern and Olive Avenue, 115th-Grand Avenue	Multi-Use Path	Peoria
Railroad along Grand Avenue	Multi-Use Path	Phoenix
Grand Canal	Multi-Use Path	Phoenix
West Valley Multi-Modal Transportation Corridor Plan		
Primary Trail crosses Grand Avenue at New River	Multi-Use Path	Peoria
Secondary Trail crosses Grand Avenue to the east of the Primary Trail at New River	Multi-Use Path	Peoria
Transit Connection Nodes located at intersection of Grand Avenue and Primary Trail and Secondary Trail	Connection	Peoria
Neighborhood/Transit/Connector Trail, West Transit Connection Node along Grand Avenue to Sun City	Multi-Use Path	Peoria

Source: MAG Regional Transportation Plan, Chapter 13.

Refer to **Exhibit 3.17** for information on existing and planned bicycle facilities.

3.4.3 Pedestrian Facilities and Restrictions

As noted above in **Section 3.1.8**, sidewalks do exist along portions of the Grand Avenue corridor. While a continuous sidewalk does not exist along the entire corridor, the side of Grand Avenue opposite the BNSF track does provide for some pedestrian movement. In general, approximately 50% of the corridor in the City of Phoenix and the City of Glendale has sidewalk. In the City of Peoria, approximately 15% of the corridor has sidewalk.

Signalized intersections do allow for pedestrian movements within the Study Area and pedestrians were observed using them during the field visits. In addition to signalized intersections, several other pedestrian crossings of Grand Avenue were documented.

3.4.4 Rail Facilities and Services

The BNSF Railroad parallels the entire length of Grand Avenue within the Study Area. For approximately 70% of the corridor the BNSF is located to the south of Grand Avenue, for the remaining 30% the railroad is located north of Grand Avenue. Between Bell Road and the end of track south of downtown Phoenix, there are 118 potential rail served customers. Cargo traveling along this route includes groceries, asphalt, cement, lumber, building supplies and automobiles.

Within the Study Area, there are six BNSF facilities:

- Mobest Yard, located south of Grand Avenue at the intersection of McDowell Road and 19th Avenue, functions as the BNSF's major classification yard in the City of Phoenix. At this location, trains are broken up, reassembled and shipped to their final destinations.
- The BNSF Intermodal Facility is located south of Grand Avenue at the end of Tom Murray Avenue (north of Camelback Road). At this location, freight is transferred between trains and trucks.
- The Santa Fe Center, a rail-served industrial park, is located south of Grand Avenue between Indian School Road and Camelback Road.
- Glendale Yard North and Glendale Yard South exist south of Grand Avenue centered around Maryland Avenue. In the future, these two yards may be combined, potentially reducing the number of trains headed to Mobest Yard.
- The Glendale Depot, located south of Grand Avenue at Glenn Drive (north of Glendale Avenue), functions as BNSF corporate office space.
- The BNSF Automotive Distribution Center, located at Grand Avenue and Thompson Ranch Road (outside Study Area) in the City of El Mirage functions as the BNSF's major distribution center for automobiles heading to the Phoenix metropolitan area.

Commuter rail currently does not exist along Grand Avenue. The BNSF has indicated that the Grand Avenue corridor, as it exists with only one track, could accommodate limited (AM/PM peak) commuter rail in addition to freight rail, so long as the schedules were carefully coordinated. They have also indicated that the potential exists that the Grand Avenue corridor could be double-tracked within existing right-of-way, thereby permitting both freight and commuter rail service within the Study Area throughout the day.

3.5 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

The MAG ITS Strategic Plan Update (April 2001) is an update of the original ITS Strategic Plan completed in 1995. The Update includes a history of the ITS architecture that currently exists in the region as well as recommendations for improvements and additions to this architecture over the next 20 years.

With respect to existing infrastructure, the Update recognizes the following agencies within the Study Area as being regionally connected, either on the regional fiber optic network or on leased communication links:

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- Glendale Police Department
- Glendale Traffic Management Center (TMC)
- Peoria Police Department
- Peoria TMC
- Phoenix Fire
- Phoenix Police Department
- Phoenix TMC
- Phoenix Transit

Based on information contained in the Update, the following roadways currently have or are recommended to have in the near future fiber optic connectivity to the regional system:

- I-17 from Peoria Avenue to I-10 terminus
- 35th Avenue from Washington Street to Dear Valley Road
- 59th Avenue from Camelback Road to Bell Road
- I-10 from Loop 101 to Chandler Boulevard
- Glendale Avenue from Loop 101 to Grand Avenue
- Olive Avenue from 79th Avenue to 59th Avenue

The following list of projects was identified in the Update based on the Draft Transportation Improvement Program ITS Projects (FY 2001 – 2005):

- Glendale Computerized Signal System – Construct Phase I of computerized signal system on 59th Avenue from Camelback Road to Beardsley Road, include hardware and software interface with Peoria and Phoenix signals.
- Glendale Computerized Signal System – Construct Phase II of computerized signal system on Bell Road from 51st Avenue to 83rd Avenue.
- Glendale Computerized Signal System – Construct Phase III of computerized signal system on Glendale Avenue from 43rd Avenue to 99th Avenue, integrate with Peoria and Phoenix.
- Glendale Traffic Management Center – Design, construct and operate Glendale Traffic Management Center.
- Peoria Citywide Traffic signal Interconnect System – Design and construct citywide traffic signal interconnect system.
- Peoria Citywide Interconnect – Interconnect citywide traffic signal system.

The Update makes reference to the 24 Systematically Managed Arterial (SMART) Corridors identified in the AZTech Metropolitan Model Deployment Initiative (MMDI), of which Grand Avenue is included. SMART Corridors are key arterial links that span the urban area and pass through multiple jurisdictions. They include the implementation of closed-circuit television (CCTV) cameras, variable message signs (VMS) and detection as well as the coordination of traffic signals across multiple jurisdictional boundaries. Within the Study Area, the following arterials have been identified as SMART Corridors:

- Grand Avenue from Van Buren Street to Bell Road
- 59th Avenue from I-10 to Loop 101 (Agua Fria Freeway)

- Indian School Road from Loop 101 (Agua Fria Freeway) to Loop 101 (Pima Freeway)
- Camelback Road from Loop 101 (Agua Fria Freeway) to Hayden Road
- Glendale Avenue from Loop 101 (Agua Fria Freeway) to Scottsdale Road

Based on information contained in its CIP the City of Glendale has ITS improvements planned for the near future on or near Grand Avenue:

- The City of Glendale's 2003 – 2012 Capital Improvement Plan includes funding for the installation of hardware and software for a computerized signal system throughout Glendale.

3.6 RIGHT-OF-WAY / PROPERTY BOUNDARIES

Property boundaries within the Study Area were identified using Maricopa County property assessor maps and supplemented with ADOT as-built and construction plans.

For those areas along Grand Avenue and the cross-streets where proposed geometric improvements will be analyzed, parcel lines will be mapped and owners identified. Properties owned by ADOT and the State of Arizona will also be mapped. Detailed parcel information will be documented once the MIS moves into the Alternatives phase and proposed improvements, and their associated land acquisition impacts, are identified.

3.7 DRAINAGE FACILITIES

Two drainage facilities exist within the Study Area. The Grand Canal, discussed in **Section 3.1.10**, while not designated to carry storm flows, does convey stormwater. The Grand Canal, which travels east-west through the Study Area, is located between Osborn Road and Indian School Road. In addition to the Grand Canal, detention basins are located north of Grand Avenue between Missouri Avenue and Bethany Home Road. Further investigation should identify which systems feed these basins.

Refer to **Exhibit 3.1** for the location of the Grand Canal through the Study Area.

3.8 FUTURE CONDITIONS

The traffic forecasts for the Grand Avenue MIS Phase II will be prepared by the MAG utilizing EMME2 regional computerized traffic forecasting model. Future conditions will be analyzed for the year 2030. The MAG travel demand model network will be reviewed and refined for each of the horizon years based on community long-range plans, input from the Agency Steering Group (ASG), and the Regional Transportation Plan (RTP). The socioeconomic data will also be reviewed and refined as necessary within the Study Area for incorporation into the MAG model.

Based on information generated from the MAG transportation demand model, both future ADT as well as intersection LOS will be analyzed and presented.

3.8.1 Future Volumes

The MAG transportation demand model was run for the year 2030 assuming “base” conditions, which include all improvements identified in the Regional Transportation Plan (RTP), but no improvements along Grand Avenue. While the Project Team understands funding for improvements to Grand Avenue was included in the RTP, part of the objective of this study is to identify what improvements are needed, and thus a “base” network will be reviewed.

As shown in **Exhibit 3.38** there is tremendous growth in the ADT along Grand Avenue between 2002 and 2030 (base). The change in volumes range from a maximum of 126% to a minimum of 28%.

Exhibit 3.38				
Volume Comparison 2002 Model versus 2030 Model				
Section	2002 Model ADT	2030 Model ADT	Volume Difference between 2002 and 2030	Percent Difference between 2002 and 2030
Loop 101 – 91 st Ave	33,300	54,500	+21,200	+64%
91 st Ave – 83 rd Ave	28,700	42,800	+14,100	+49%
83 rd Ave – 75 th Ave	22,600	51,100	+28,500	+126%
75 th Ave – 67 th Ave	29,800	57,500	+27,700	+93%
67 th Ave – 59 th Ave	30,300	57,400	+27,100	+89%
59 th Ave – 51 st Ave	30,600	54,900	+24,300	+79%
51 st Ave – 43 rd Ave	31,400	59,600	+28,200	+90%
43 rd Ave – 35 th Ave	30,400	59,500	+29,100	+96%
35 th Ave – 27 th Ave	31,400	57,600	+26,200	+83%
27 th Ave – 19 th Ave	32,000	40,900	+8,900	+28%

[The following Exhibit will be included prior to this document being “Final” and before the submission of the “Draft MIS”:]

- *Exhibit 3.39 – 2030 Traffic Volumes – Base Conditions (map)*

3.8.2 Future Level of Service (LOS)

The future level of service (LOS) at the major intersections along Grand Avenue were investigated for year 2030. **Exhibit 3.40** presents a comparison between the AM and PM intersection LOS for years 2002 and 2030.

Exhibit 3.40				
Intersection Level of Service (LOS) Comparison 2002 Model versus 2030 Model				
Intersection	2002 Model Intersection LOS		2030 Model Intersection LOS	
	AM	PM	AM	PM
Loop 101 / Grand Ave	B	C	C	D
91 st Ave / Grand Ave	B	C	D	E/F

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Peoria Ave / Grand Ave	C	D	C	E/F
83 rd Ave / Grand Ave	C	C	C	D
75 th Ave / <i>Olive Ave</i> / Grand Ave*	D	E/F	E/F	E/F
67 th Ave / Northern Ave / Grand Ave*	N/A	C	E/F	E/F
59 th Ave / Glendale Ave / <i>Grand Ave</i> *	D	E/F	E/F	E/F
51 st Ave / Bethany Home Rd / Grand Ave*	E/F	E/F	E/F	E/F
43 rd Ave / Camelback Rd / <i>Grand Ave</i> *	D	E/F	E/F	E/F
35 th Ave / <i>Indian School Rd</i> / Grand Ave*	D	E/F	E/F	E/F
27 th Ave / Thomas Rd / <i>Grand Ave</i> **	C	C	E/F	E/F
19 th Ave / McDowell Rd / Grand Ave	C	E/F	E/F	E/F

*Roadway in *italics* modeled as grade-separated in year 2030.

**Roadway in *italics* modeled as grade-separated in years 2002 and 2030.

[The following Exhibit will be included prior to this document being “Final” and before the submission of the “Draft MIS”:

- *Exhibit 3.41 – 2030 Intersection LOS – Base Conditions (map)*