



# Table of Contents

- 1.0 OVERVIEW ..... 1**
  - 1.1 PURPOSE ..... 1
  - 1.2 BACKGROUND – WHAT ARE DHOV ACCESS RAMPS ..... 1
  - 1.3 ADVANTAGES OF DHOV ACCESS RAMPS ..... 1
  - 1.4 FINDINGS..... 4
- 2.0 BACKGROUND OF THIS TECHNICAL MEMORANDUM..... 5**
  - 2.1 MAG HOV FACILITIES POLICY GUIDELINES AND PLAN (2002) ..... 5
  - 2.2 SOUTHEAST CORRIDOR MAJOR INVESTMENT STUDY (MIS) (2012)..... 5
  - 2.3 ASSESSMENT OF ALTERNATIVE IMPROVEMENT STRATEGIES (2012) ..... 6
- 3.0 CURRENT HOV SYSTEM..... 7**
  - 3.1 EXISTING HOV SYSTEM FACILITIES..... 7
  - 3.2 PLANNED DHOV ACCESS RAMPS ..... 7
  - 3.3 POTENTIAL FUTURE HOV FACILITIES ..... 7
- 4.0 POTENTIAL LOCATIONS FOR DHOV ACCESS RAMPS..... 9**
  - 4.1 N. 79TH AVENUE..... 11
  - 4.2 W. CARVER ROAD ..... 12
  - 4.3 W. GALVESTON STREET..... 14
  - 4.4 S. CENTRAL AVENUE ..... 17
  - 4.5 W. WASHINGTON – W. ADAMS AND W. JEFFERSON STREETS ..... 19
  - 4.6 W. MOUNTAIN VIEW ROAD..... 22
  - 4.7 W. GROVERS AVENUE..... 24
  - 4.8 W. CAMPBELL AVENUE ..... 28
  - 4.9 W. MARYLAND AVENUE..... 30
  - 4.10 N. 52<sup>ND</sup> STREET ..... 32
  - 4.11 E. MOUNTAIN VIEW ROAD ..... 34
- 5.0 DHOV ACCESS RAMP DEVELOPMENT POLICY STATEMENT..... 36**
  - 5.1 GENERAL STATEMENT OF INTENT ..... **ERROR! BOOKMARK NOT DEFINED.**
  - 5.2 POLICY OBJECTIVES..... 36
  - 5.3 SCOPE OF THE POLICY..... 37
  - 5.4 IMPLEMENTATION GUIDANCE AND PARAMETERS..... 37
    - 5.4.1. *Transportation System Performance*..... 37
    - 5.4.2. *Transportation/DHOV Access Ramp Planning*..... 38
    - 5.4.3. *Community, Business, and Land Use Guidance* ..... 38
    - 5.4.4. *Financial Considerations*..... 38

## List of Figures

- Figure 1 Direct HOV Connector Ramps at Loop 101/Pima Freeway and SR-51/Piestewa Freeway ..... 2
- Figure 2 Direct HOV Access Ramps to/from N. 3<sup>rd</sup> Street on Interstate 10/Papago Freeway ..... 2
- Figure 3 Existing High-Occupancy Vehicle (HOV) Facilities in the CPHX Study Area..... 8
- Figure 4 Potential Locations for Direct High-Occupancy Vehicle (DHOV) Access Ramps on HOV Facilities in the CPHX Study Area ..... 10

## **1.0 Overview**

High-occupancy vehicle (HOV) lanes have been constructed on most of the Valley freeways. Since these lanes are constructed as the inner-most lanes, operators of qualifying vehicles desiring to use the HOV lanes typically must enter the general purpose (GP) lanes via an available on-ramp and weave over to the HOV lanes. It is possible to eliminate this weaving by constructing direct HOV (DHOV) interchanges with ramps that connect directly with HOV lanes. DHOV access ramps allow buses, carpools, vanpools, and motorcycles to directly access the HOV lanes in the center of the freeway.

### **1.1 Purpose**

This Technical Memorandum addresses the potential for adding DHOV access ramps at select locations on the Valley freeway system. The assessment is a planning level, preliminary conceptual evaluation of the potential for constructing DHOV access ramps at select locations to enhance traffic flow efficiency, mobility, accessibility, and safety. This empirical evaluation of DHOV potential for the CPHX freeway system was conducted to add support to a policy framework for identifying appropriate locations for DHOV access ramps and the decisionmaking necessary to select and implement projects that will benefit the region. More detailed engineering evaluations would be required prior to implementation at any of the assessed locations.

### **1.2 Background – What are DHOV Access Ramps**

Typically, DHOV access ramps represent a traffic interchange connecting the local street system to the HOV lanes in the center of a freeway. The access ramps come down from a freeway overpass, or up from a freeway underpass, and vehicle operators merge from the on-ramp into the HOV lane from inside the freeway median and exit from the HOV lane to an off-ramp. Thus, DHOV access ramps work much like other left-side on- and off-freeway ramps (often associate with high-speed connector ramps), except these ramps are restricted to HOV-eligible vehicles. Eligible vehicles access the ramps from an adjacent park-and-ride (P&R) facility or surface street.

There are two types of DHOV access ramps. Direct connector ramps provide a seamless linkage between HOV lanes on one freeway to HOV lanes on another freeway. Figure 1 is an aerial photograph showing recently completed direct connector ramps for the HOV system at the interchange of Loop 101/Pima Freeway and SR-51/Piestewa Freeway in North Phoenix. The second type of DHOV access ramps affords dedicated access to freeway HOV lanes from an overpassing, or underpassing, local street. Figure 2 is an aerial photograph showing the DHOV access ramps at N. 3<sup>rd</sup> Street in the center of Interstate 10/Papago Freeway in downtown Phoenix.

### **1.3 Advantages of DHOV Access Ramps**

DHOV access ramps have the potential to improve safety, reduce congestion, save time, and increase travel time reliability for both HOVs and regular traffic in the GP lanes of the freeway. HOV operators can have a difficult time merging left through multiple GP lanes to gain access to the HOV lane, especially during congested peak travel periods. The weaving must be done with caution at freeway speeds and creates safety and performance issues that can significantly reduce the effective capacity of a freeway. The result is greater congestion, as travel speeds generally are negatively impacted by vehicles weaving across the GP lanes to enter HOV lanes and subsequent to exiting the HOV lanes.

When buses, particularly the articulated (extra-long) buses engage in this weaving process to enter and exit the HOV lanes, the potential for traffic flow interference and congestion increases substantially. Bus movements into and out of the HOV lanes can result in a long ripple effect or shockwave through the traffic flows, as these vehicles cannot be maneuvered like automobiles. Generally, vehicle operators braking to accommodate bus movements create significant traffic queues (aka “jams”) and collisions or near collisions could occur. By enabling buses, carpools, vanpools, and motorcycles to connect directly with HOV lanes, the need to for weaving through general traffic flows is eliminated, yielding more efficient and safer travel conditions for all vehicles.

FIGURE 1  
DIRECT HOV CONNECTOR RAMPS AT LOOP 101/PIMA FREEWAY AND SR-51/PIESTEWA FREEWAY



Image Source: bing Maps

FIGURE 2  
DIRECT HOV ACCESS RAMPS TO/FROM N. 3<sup>RD</sup> STREET ON INTERSTATE 10/PAPAGO FREEWAY



Image Source: bing Maps

The Washington State Department of Transportation (WSDOT) has been monitoring DHOV access ramp operations in the Seattle metropolitan area since the region’s first such facility opened in 2004. In September 2008, WSDOT reported transit service and HOVs were gaining up to eight minutes in travel time savings during peak traffic periods with the available DHOV access ramps. The results from WSDOT studies are summarized in the following table.

DHOV Location	Transit Daily Volume	Total Daily DHOV volume	Peak-Period Time Savings*
Interstate 5/44th Ave W – Lynnwood	212	4,570	4-8 minutes
Interstate 405/NE 6th St – Bellevue	334	4,020	1-2 minutes
Interstate 90/142nd Pl SE – Eastgate	293	3,630	5-6 minutes
Interstate 405/NE 128th St – Totem Lake	303	9,130	2-6 minutes
Interstate 5/Broadway Ave SE – Everett	126	2,630	3-7 minutes

\*For Transit Vehicles.

Source: Washington State Department of Transportation, *Grey Notebook Edition 31*, September 30, 2008, p. 48.

WSDOT collaborates with the Puget Sound Regional Council, the area’s Metropolitan Planning Organization (MPO) and Sound Transit, the regional transit provider, to identify potential DHOV access ramp locations on the Seattle metropolitan freeway system. Ten DHOVs are now open to traffic; the photograph at right shows the DHOV access ramps constructed on Interstate 90 at 142nd Place SE in Bellevue, Washington. Three more DHOV access ramp interchange facilities are in the design phase, and another seven are planned for construction, as funding becomes available. Additional information regarding the development of Seattle’s plans for enhancing transit service and P&Rs through construction of DHOV access ramps may be reviewed at <http://www.wsdot.wa.gov/HOV/directaccessramps.htm>.

**Direct High-Occupancy Vehicle Access Ramps in Bellevue, Washington**



Source: Washington State Department of Transportation (WSDOT).

DHOV access ramps essentially are a traffic interchange with a surface street, often, but not always, linked with an existing or planned P&R, even a transit center. Joint development of the DHOV access ramps with transit and P&R facilities maximizes HOV and transit use. New traffic interchanges often are favored, for a number of reasons, such as: land may be available for the transit/P&R facility; commuter traffic is removed from a congested traffic interchange at a major roadway; and construction impacts at an existing interchange are avoided. Notwithstanding the generally recognized operational benefits of DHOV access ramps for freeway and HOV lane users, there are potential impacts beyond the freeway system that require attention during planning and construction.

New DHOV access ramps must have a connection with the local surface street system. This access in many cases does not exist, which requires the acquisition of right-of-way (ROW), possible displacement of business or residential land uses, impacts on access to businesses or neighborhoods, and quality of life changes associated with a change in traffic patterns. A critical concern is the latter effect – changes in traffic patterns. Although WSDOT experience indicates DHOV access ramps typically generate relatively lower traffic volumes than the typical freeway on/off ramps at major intersecting roadways (volumes generally do not exceed 10,000 vehicles per day), queues could develop and back traffic into the local street system. This particular aspect of new travel demand and impacts on local traffic operations created in the vicinity of the DHOV access ramps needs detailed, location-specific studies to identify potential mitigation measures.

## 1.4 Findings

The activities of an independent engineering evaluation and a *charette* attended by regional officials and stakeholders identified 73 potential locations along the Valley's freeway system for DHOV access ramps. These two separate activities produced agreement on eight locations. Three other locations were identified through additional actions expressly focused on creating additional freeway capacity by improving traffic flow with the installation of DHOV access ramps.

The eleven potential locations for DHOV access ramps were the object of preliminary conceptual engineering evaluation to establish general geometric design requirements and identify potential project impacts. All locations examined are half-mile roads with potential access to the region's arterial mile-road grid system. This examination has produced the following conclusions:

- It is potentially feasible to develop DHOV access ramps at each of the locations examined.
- There would be few ROW constraints associated with installing DHOV access ramps in the medians of existing freeways; ROW is generally adequate to accommodate the bridge and ramps with relatively minor modifications to the general purpose (GP) lanes.
- The principal issues relating to implementation of DHOV access ramps are ROW to access the ramps from the local street system and potential impacts to land uses in the vicinity of access routes. In general, development of the DHOV access ramps will require new ROW from the local street system to the freeway median, but displacements of existing land uses would be minimal.
- The two locations on I-17/Black Canyon Freeway that would facilitate HOV and transit travel to/from downtown Phoenix – S. Central Avenue and W. Adams/W. Jefferson streets – would present the greatest difficulty for implementation, given the existing conditions created by early development of this freeway facility. However, as expansion plans for the freeway are formulated, the bulk of the issues could be addressed. Development of DHOV access ramps at W. Adams/W. Jefferson streets is considered problematic, and consideration may need to be given to installing DHOV access ramps at W. Van Buren Street to/from the north only. This action, however, will need to be coordinated with any improvements to the I-17/I-10 system interchange directly north of W. Van Buren Street.
- Plans to extend the METRO Light Rail Transit (LRT) system north to Metrocenter on the west side of I-17 will provide an avenue for joint development of the LRT and DHOV access ramps and change the nature of impacts that may be associated with the ramps alone.
- In some cases, traffic movements to/from the DHOV access ramps would use collector streets rather than arterial streets. Traffic impacts associated with queuing and turning movements will need to be evaluated at each location to minimize negative impacts on businesses and residential neighborhoods in the vicinity of the ramps.
- Two locations are in areas yet to be developed – W. Campbell Avenue (Phoenix), W. Maryland Avenue (Glendale), and N. 52<sup>nd</sup> Street (Phoenix) – and, therefore, present the most immediate opportunity to minimize impacts and development costs. In fact, the Arizona Department of Transportation (ADOT) is developing plans for the DHOV access ramps at the W. Maryland Avenue location.

## 2.0 Background of this Technical Memorandum

This section provides a brief historical background regarding thinking about DHOV access ramps in the MAG region and how they would augment the existing HOV system constructed on Valley freeways.

### 2.1 MAG HOV Facilities Policy Guidelines and Plan (2002)

MAG, in a cooperative effort with the ADOT and the Regional Public Transit Authority (RPTA), completed the *High Occupancy Lanes and Value Lanes Study* in December 2002. This study was undertaken to provide necessary information to policy makers on the MAG Regional Council and the State Transportation Board (STB) to update the *High Occupancy Lanes and Value Lanes Study* (1994). A principal focus of the update was evaluation of the potential feasibility of converting HOV lanes to high-occupancy toll (HOT) lanes. The study presented the following observation:

*Although HOV lanes enjoy considerable public usage, they have not resulted in wholesale changes in the way people commute. Today, most sections of the HOV system have considerable excess capacity during the peak hours, with the exception of I-10 between 79th Avenue and 3rd Avenue, which is at capacity. Moreover, the MAG Travel Demand Model predicts considerably more demand by 2020.*

The *High Occupancy Lanes and Value Lanes Study* examined existing travel conditions in the MAG Region and defined Guiding Principles for planning HOV and HOT lanes. Options were evaluated based on a wide range of factors, and the study ultimately accomplished comprehensive evaluation of the multiplicity of engineering, financial, and social support aspects of HOV and HOT lane concepts. As a potential means to increasing utilization of the HOV system being developed in the Valley through MAG, DHOV access ramps also were considered and evaluated. The study presents the following conclusion regarding the implementation of DHOV access ramps:

*The simplest method of implementing HOV direct access ramp locations is to accommodate them within the freeway median and realign the general-purpose lanes around the direct access ramps. The cost to construct HOV direct access ramps can be significant due to the right-of-way impacts to the existing land use within urbanized areas, plus major reconstruction of the existing freeway system.*

The review undertaken during the *High Occupancy Lanes and Value Lanes Study* examined potential implementation at several locations specifically associated with access to Downtown Phoenix and facilitating Express Bus operations at major transit centers. The results of the review can be summarized as follows:

- DHOV access ramps on I-17/Black Canyon Freeway at W. Maryland Avenue and SR-51/Piestewa Freeway at E. Maryland Avenue were discounted, as forecasted ramp volumes were very low.
- Ramp volumes associated with DHOV access ramps at W. Washington/W. Adams and W. Jefferson streets on I-17/Black Canyon Freeway were adequate; however, the availability of ROW was constrained and estimated construction costs (\$50 million) was considered excessive. Nevertheless, the costs of this access scheme were concluded to be outweighed by forecasted use and the ability to accommodate HOV movements into and out of the downtown area, given the alternative of constructing HOV direct connector ramps at “The Stack” interchange.
- DHOV access ramps at the W. Washington/W. Adams and W. Jefferson locations were recommended for inclusion in the freeway HOV system with the specific understanding that they would accommodate HOV access to the downtown area and be “...a much more cost-effective alternative to direct HOV connectors between Black Canyon and Papago at the ‘Stack’.”

### 2.2 Southeast Corridor Major Investment Study (MIS) (2012)

A second study, commissioned by MAG, addressed the specific transportation needs of the portion of the CPHX study area bounded by “The Stack” (I-10/Papago Freeway System Interchange with I-17/Black Canyon Freeway) in the northwest and the “Pecos Stack” (I-10/Maricopa Freeway System Interchange with Loop 202/Santan Freeway) in the southeast. This study, referred to as the *Southeast Corridor Major Investment Study* (MIS), identifies multimodal transportation investment alternatives that incorporate freeway-based managed lanes, DHOV access ramps, transit options, and arterial capacity enhancements in the designated study area. It recommended DHOV access ramps at the following locations:

- W. Washington Street (defined by the one-way pair of W. Adams and W. Jefferson streets) on I-17/Black Canyon Freeway;
- S. Central Avenue on I-17/Black Canyon Freeway;
- SR-143/Hohokam Expressway traffic interchange with I-10/Maricopa Freeway;
- Carver Road on I-10/Maricopa Freeway; and
- Galveston Street on I-10/Maricopa Freeway.

**2.3 Assessment of Alternative Improvement Strategies (2012)**

In July of 2012, subsequent to completion of the Southeast Corridor MIS, the question of the feasibility of constructing DHOV access ramps was addressed again for the entire CPHX study area. A high-level technical assessment of improvement strategies was conducted to determine the potential applicability of alternatives to enhance facility capacity and traffic flow. Four potential strategies were evaluated, including:

- Conversion of existing interchanges to diverging diamond interchanges (DDIs);
- New direct access ramps to HOV lanes at strategic locations;
- New arterial/freeway overcrossings/undercrossings at strategic locations; and
- Two-lane (choice lane) exit ramps.

The general approach involved application of initial screening criteria, taking into consideration: adjacent and nearby land uses and major generators, traffic patterns, proximity to transit centers, proximity to commercial and shopping centers, and concentrations of residential development. This was followed with an analysis utilizing more focused criteria to determine whether improvements would be feasible. These criteria accounted for traffic operations, constructability, ROW availability, and environmental concerns. Thirty-five separate locations were identified as having sufficient qualities and characteristics to justify additional evaluation to establish the potential for developing DHOV access ramps.

This planning-level assessment was undertaken to highlight locations where improvements to freeway capacity in the CPHX study area potentially could be implemented. It was assumed during this screening process that further, more detailed evaluation would occur prior to adoption of any recommendations for improvements. The information provided in the Technical Memorandum represents one more level of analysis for select locations to further define and understand the feasibility of construction DHOV access ramps in the CPHX study area.

**2.4 CPHX Charette (2012)**

A *charette* was conducted as part of the CPHX study, with a large number of stakeholders (e.g., federal, state, regional, and local officials) attending.<sup>2</sup> The *charette* provided stakeholders with an opportunity to identify desirable improvements in the CPHX study area relating to: pedestrian and bicycle mobility matters, arterial roadways, freeway efficiency/capacity additions, and public transit services and facilities. An assortment of potential improvement projects on freeways throughout the CPHX study area resulted from this exercise. One of the items identified during this process was new DHOV access ramps. Forty-five separate locations were identified by participants as having the potential for implementing DHOV access ramps.

The results of the technical assessment described above were combined with those from the *charette* and organized by freeway corridor (see Attachment A). Eight DHOV improvement opportunities were identified that were common to the technical assessment and the *charette*. These eight potential DHOV locations were scheduled for additional planning and engineering evaluation to provide a better understanding of the feasibility of constructing DHOV access ramps and the potential impacts and benefits of incorporating such facilities into the freeway system serving the CPHX study area.

<sup>1</sup> Technical Memorandum, Central Phoenix Transportation Framework Study – *Assessment of Alternative Improvement Strategies*, prepared by CH2M HILL, dated July 11, 2012, Revised August 6, 2012.

<sup>2</sup> *Charette* refers to a common practice associated with planning projects involving collaborative examination of opportunities and constraints by professionals and stakeholders during an intensive session, often lasting all day with the objective being definition of myriad potential improvements to be bundled into improvement scenarios for evaluation. This practice sometimes is referred to as a “workshop.”

### 3.0 Current HOV System

This section provides a summary of the current or existing HOV system constructed as part of the metropolitan freeway system. A brief listing of proposed expansion projects indicates where the future HOV system is anticipated to be developed.

#### 3.1 Existing HOV System Facilities

HOV lanes are present on all freeways within the CPHX study area with the two exceptions (Figure 3). There are no HOV lanes on the segment of I-17/Black Canyon Freeway from the “The Split” (I-17/Black Canyon Freeway System Interchange with I-10/Papago-Maricopa Freeways) to just north of W. McDowell Road; a northbound HOV lane exists from just north of W. McDowell Road to just north of W. Indian School Road. There are no HOV lanes on SR-143/Hohokam Expressway, which is not a commuter route. In the MAG region, five direct connectors have been constructed at five system interchanges:

- I-10/Papago Freeway to/from Loop 202/Red Mountain Freeway at the “Mini-Stack,” the junction of I-10 with Loop 202 and SR-51/Piestewa Freeway;
- I-10/Papago Freeway to/from US-60/Superstition Freeway;
- SR-51 to/from Loop 101/Pima Freeway (in the east direction only);
- I-10/Papago Freeway to/from Loop 202/Santan Freeway (to the east), the “Pecos Stack;” and
- Loop 101/Price Freeway to/from Loop 202/Santan Freeway (to the east).

The regional freeway system also has three existing DHOV access ramp facilities along the I-10/Papago Freeway:

- N. Third Street, providing a connection to and from Interstate 10 east of the Deck Park Tunnel (refer to Figure 2);
- N. 3<sup>rd</sup> Avenue linked to N. 5<sup>th</sup> Avenue, providing a connection to and from Interstate 10 west of the Deck Park Tunnel; and
- N. 79<sup>th</sup> Avenue, providing a connection to and from Interstate 10 in the east direction only and access for the 79<sup>th</sup> Avenue P&R north of Interstate 10.

#### 3.2 Planned DHOV Access Ramps

DHOV access ramps at W. Maryland Avenue in Glendale are identified as an illustrative project in the MAG Regional Transportation Plan 2010 Update (RTP). This means MAG anticipates construction in a phase beyond the current planning period of the RTP (FY 2011-2031). Nevertheless, as noted earlier, ADOT is moving forward with design and construction of the ramps at the existing W. Maryland Avenue overpass of Loop 101/Agua Fria Freeway.

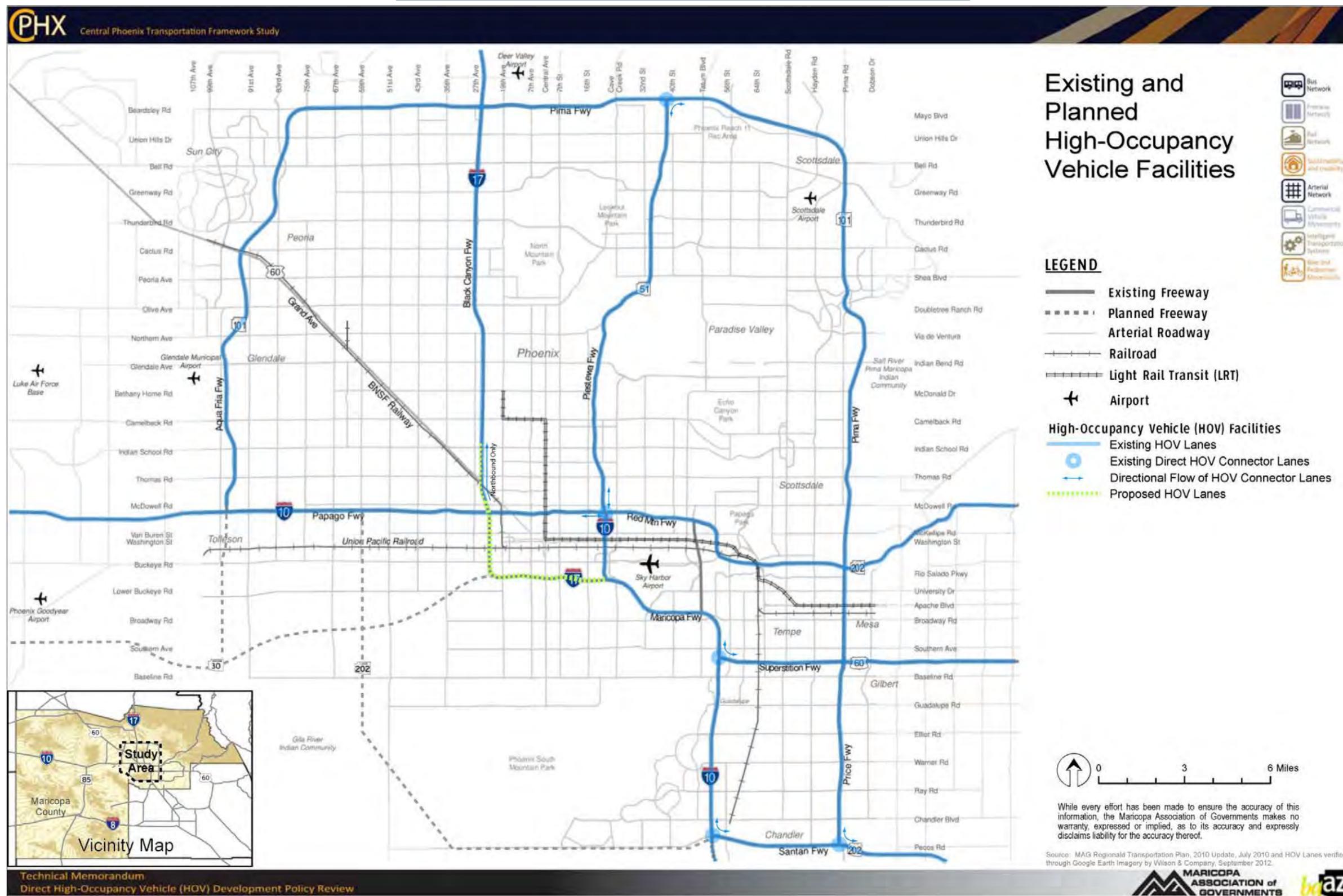
#### 3.3 Potential Future HOV Facilities

The MAG RTP identifies future improvements to the HOV system, which are shown in Figure 3. Many of the improvements highlighted in the RTP already are completed and shown as existing in Figure 3. Specific improvements presented in the RTP and yet to be completed are:

- One HOV lane in each direction between “The Split,” Milepost (MP) 0.0, and I-17/I-10 at “The Stack” (I-17/Black Canyon Freeway System Interchange with I-10/Papago Freeway) (MP 6.5) – Phase IV (FY 2012-2025);
- One HOV lane in each direction between “The Stack” (MP 6.5) and the “North Stack” (I-17/Black Canyon Freeway System Interchange with Loop 101/Agua Fria-Pima Freeways) (MP 20.9) – Phase IV (FY 2012 2025);

*[Note: Only the southbound HOV lane between “The Stack” and just north of Indian School remains to be constructed. The specific approach for completing this project and the preceding project between “The Split” and “The Stack” will be determined following additional studies by ADOT and MAG.]*

FIGURE 3  
EXISTING HIGH-OCCUPANCY VEHICLE (HOV) FACILITIES IN THE CPHX STUDY AREA



- Direct HOV ramp connectors at The Stack interchange is identified as an illustrative project – Phase beyond the current planning period of the RTP (FY 2011-2031);<sup>3</sup>
- Loop 202/South Mountain Freeway will be constructed with one HOV lane in each direction – Phase II and III (FY 2011-2020); and
- Direct HOV connector ramps at the I-10 and I-17 system interchanges with Loop 101/Agua Fria Freeway – Phase beyond the current planning period of the RTP (FY 2011-2031).

#### 4.0 Potential Locations for DHOV Access Ramps

Figure 4 shows all locations identified during the CH2M HILL assessment, the *charette*, and the Southeast Corridor MIS. A complete listing of each of these locations with a preliminary evaluation addressing right-of-way compatibility, land use compatibility, and proximity to park-and-ride facility and transit service is provided in Attachment A. Eight locations identified in the CH2M HILL assessment coincided with sites identified during the *charette* attended by planning professionals and study area stakeholders. Including W. Maryland Avenue (as specified in the MAG RTP and currently under an ADOT design-build contract) and W. Carver Road and W. Washington Street (as identified in the Southeast Corridor MIS), there are eleven locations where DHOV access ramps have been identified as desirable or potentially feasible:

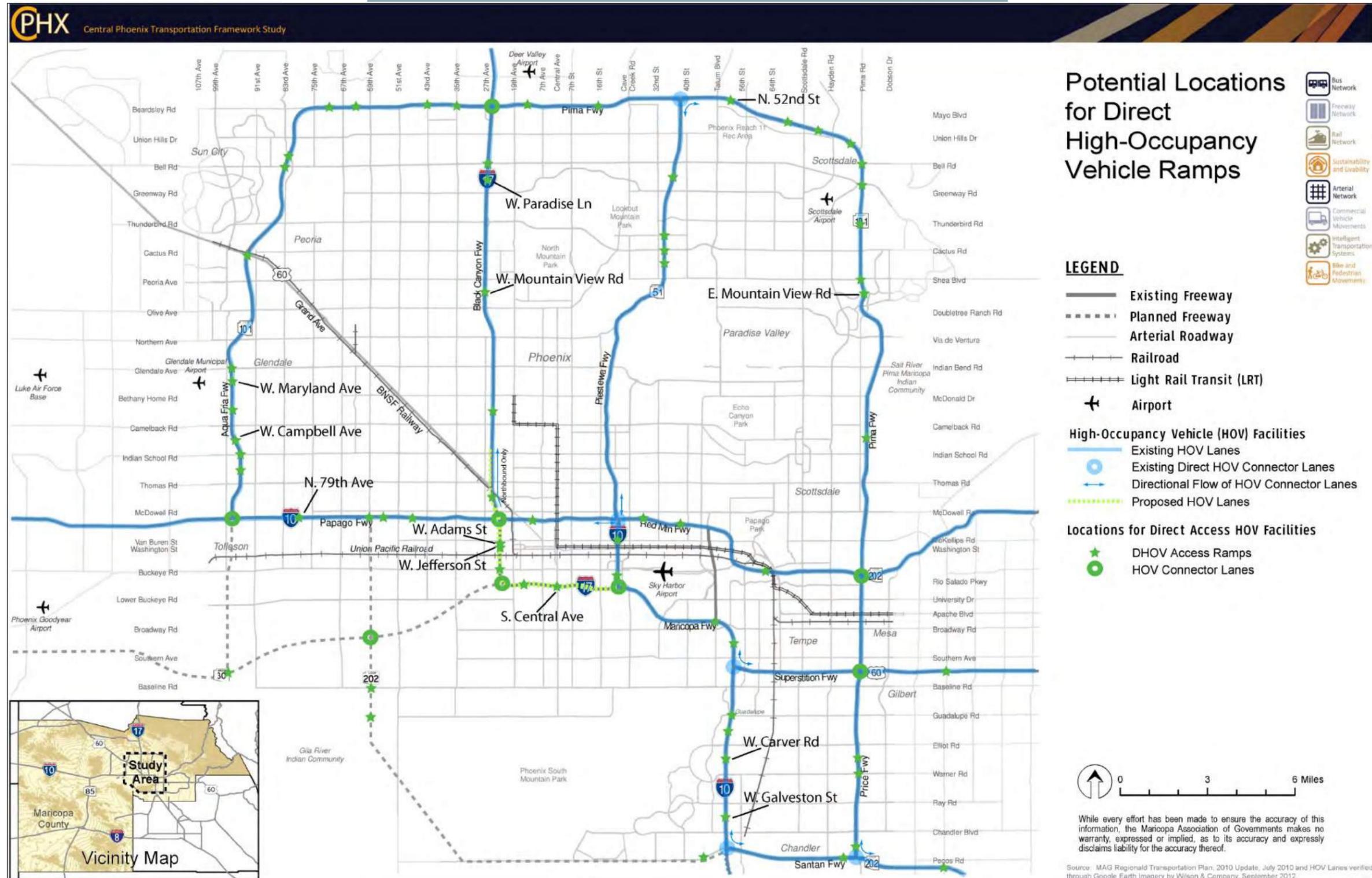
- N. 79th Ave (between N. 83rd Ave and N. 75th Ave) on I-10/Papago Fwy;
- W. Carver Rd (between W. Elliot and W. Warner roads) on I-10/Maricopa Fwy;
- W. Galveston St (between W/E Ray Rd and W/E Chandler Blvd) on I-10/Maricopa Fwy;
- S. Central Ave (between N. 7th St and N. 7th Ave) on I-17/Maricopa Fwy;
- W. Washington (defined by W. Adams and W. Jefferson streets) on I-17/Black Canyon Fwy;
- W. Mountain View/W. Cheryl Drive (between W. Dunlap Ave and W. Peoria Ave) on I-17/Black Canyon Fwy;
- W. Grovers Avenue (replacing W. Bell Rd) on I-17/Black Canyon Fwy;
- W. Campbell Ave (between Indian School Rd and Camelback Rd) on Loop 101/Agua Fria Fwy;
- W. Maryland Ave (between Bethany Home Rd and Glendale Ave) on Loop 101/Agua Fria Fwy;
- N. 52nd St (between N. Tatum Blvd and N. 56th St) on Loop 101/Pima Fwy; and
- E. Mountain View Rd (between N. Pima Rd/N. 90th St and E. Shea Blvd) on Loop 101/Pima Fwy.

These eleven locations were the object of further preliminary conceptual engineering evaluation to: establish general geometric design requirements; determine operational issues; and identify potential project impacts. It should be noted that all except one location – Bell Road – are half-mile roads, and Bell Road was removed from consideration in favor of W. Grovers Avenue, a half-mile road.

The following subsections provide a description and preliminary planning/engineering analysis of each potential DHOV access ramp location. Information presented for each location begins on a new page to provide separation and distinction among the different sites.

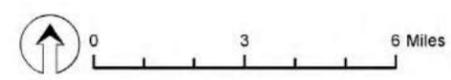
<sup>3</sup> The concept of “illustrative projects” is adopted under Federal regulations to identify projects that potentially could be included in an RTP, if additional resources beyond the reasonably available financial resources identified in the RTP were available. Recognition of illustrative projects can be helpful in guiding transportation and land use planning efforts at both the regional and local level.

FIGURE 4  
POTENTIAL LOCATIONS FOR DIRECT HIGH-OCCUPANCY VEHICLE (DHOV) ACCESS RAMPS ON HOV FACILITIES IN THE



### Potential Locations for Direct High-Occupancy Vehicle Ramps

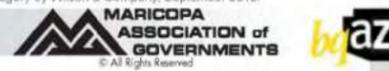
- LEGEND**
- Existing Freeway
  - Planned Freeway
  - Arterial Roadway
  - Railroad
  - Light Rail Transit (LRT)
  - Airport
- High-Occupancy Vehicle (HOV) Facilities**
- Existing HOV Lanes
  - Existing Direct HOV Connector Lanes
  - Directional Flow of HOV Connector Lanes
  - Proposed HOV Lanes
- Locations for Direct Access HOV Facilities**
- DHOV Access Ramps
  - HOV Connector Lanes



While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.

Source: MAG Regional Transportation Plan, 2010 Update, July 2010 and HOV Lanes verified through Google Earth Imagery by Wilson & Company, September 2012.

Technical Memorandum  
Direct High-Occupancy Vehicle (HOV) Development Policy Review



4.1 N. 79th Avenue



**Description**

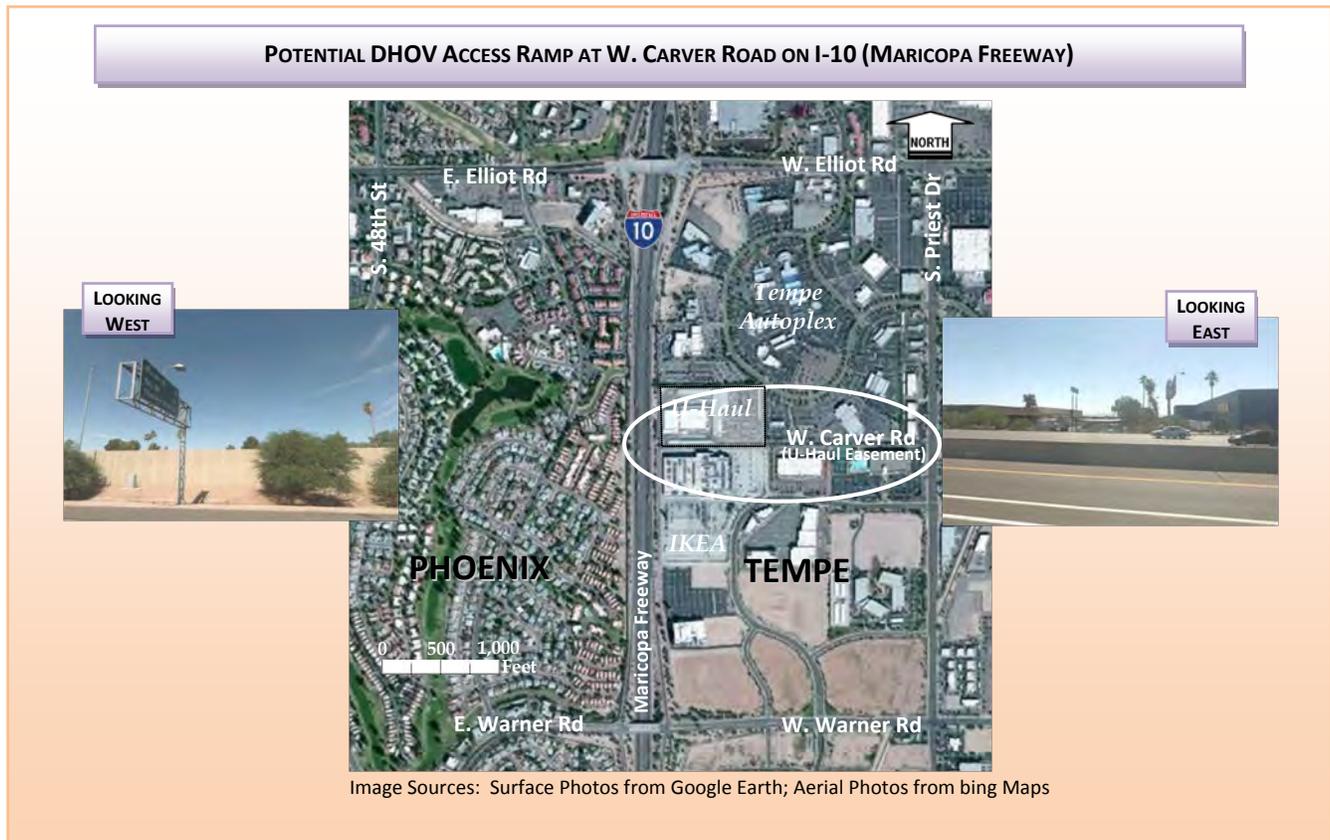
N. 79<sup>th</sup> Avenue is a north-south half-mile road in west Phoenix with intersections at W. McDowell and W. Thomas roads. Prominent attractions in the area include: Ashley Furniture HomeStore Pavilion, located at the southwest corner of N. 79<sup>th</sup> Avenue and W. Encanto Boulevard; and Desert Sky Mall, occupying the one-half square-mile situated directly east of N. 79<sup>th</sup> Avenue and south of W. Thomas Road. Valley Metro’s 79<sup>th</sup> Avenue Park-and-Ride (P&R) is located at the southeast corner of N. 79<sup>th</sup> Avenue and W. McDowell Road. This P&R facility has 607 covered parking spaces and is served by Route 17, Route 17A, Express Route 560, and RAPID I-10 West.

An overpass of I-10/Papago Freeway is present at N. 79<sup>th</sup> Avenue, which provides access to the DHOV access ramps. These ramps facilitate travel to/from the east and are available to buses, carpools, and vanpools. It should be noted that motorcycles, alternate-fuel vehicles, and hybrid vehicles also may use HOV lanes in the Phoenix metropolitan area and, therefore, could use these ramps to access the HOV lanes. The overpass is constructed to permit continuation of N. 79<sup>th</sup> Avenue to the south of I-10 in the future. Development in the area to the south is characterized by warehouses, light manufacturing, and a heliport. There are large parcels available for further expansion of this commercial/industrial area to the south as well as residential and supporting commercial to the north.

**Preliminary Analysis of this Location**

The ROW west of N. 79<sup>th</sup> Avenue would be sufficient to allow construction of DHOV access ramps for travel to/from the west. Depending on preliminary designs for these ramps, some modifications to the GP lanes of I-10 and on/off ramps at N. 83<sup>rd</sup> Avenue may be required. A large sign support structure straddling I-10 approximately 600 feet west of N. 79<sup>th</sup> Avenue would need to be restructured or relocated. This improvement would permit HOV movements in both directions. This location is considered a reasonably feasible site for DHOV access ramps in both directions. A conceptual plan for implementing this improvement at N. 79<sup>th</sup> Avenue is provided in Attachment B.

## 4.2 W. Carver Road



### Description

W. Carver Road, an east-west half-mile road in southwest Tempe, does not exist west of S. Hardy Drive, and there is no equivalent roadway or alignment in the Ahwatukee community of Phoenix west of I-10/Maricopa Freeway. The W. Carver Road alignment directly east of I-10/Maricopa Freeway is an easement providing access from S. Priest Drive, an Arterial street, to the U-Haul Company, a 13-acre County Island adjacent I-10/Maricopa Freeway, as well as access to the Priest Drive Business Center on S. Priest Drive. Prominent attractions in the area include, on the east side of I-10/Maricopa Freeway: Tempe Autoplex; IKEA, located in a commerce/business park; and an assortment of large and small retail and commercial establishments. Fully developed residential neighborhoods of Phoenix’s Ahwatukee Foothills Village area are located directly west of I-10, separated by a noise reduction wall. Valley Metro’s Route 65 loops into the southeast corner of the commerce/business park from S. Hardy Drive to the east, and Routes 56 and 108 operate along S. Priest Drive north of W. Elliott Road.

### Preliminary Analysis of this Location

The existing ROW north and south of the W. Carver Road alignment would be sufficient to allow construction of DHOV access ramps in the center of I-10/Maricopa Freeway. The GP lanes of the freeway and on/off ramps at E/W Elliot Road and E/W Warner Road would need to be modified. Two large cantilevered motorist information sign support structures are located close to south edge of the Carver Road alignment. These sign support structures and others likely would need to be relocated to accommodate overcrossing I-10 with DHOV access ramps. This improvement would permit HOV movements in both directions.

W. Carver Road would need to be constructed as a public street between S. Priest Drive and I-10/Maricopa Freeway to provide a connection with the DHOV freeway overpass and ramps. City of Chandler design specifications for a Local Street call for a cross-section of 58 feet (including Public Utility Easement). This represents the minimal ROW

requirements for constructing a connection between the freeway and S. Priest Drive. Given the role the new street would have in the transportation system, it is likely that the 68-foot cross-section of a Collector Street would be more appropriate. By comparison, the City of Phoenix cross-section for an Industrial Local Street, which would reflect use of the street by U-Haul trucks, is 60 feet.

Acquisitions described below would extend the existing roadway now used by U-Haul to access its site; however, these minimal acquisitions would not satisfy the design guidelines of the City of Chandler:

- a 34 x 992-foot parcel and two buildings located along the southern edge of the U-Haul Company site;
- a 34 x 1,330-foot (one acre) parcel within the Autoplex Subdivision used for access to the U-Haul Company site – this parcel is owned by AMERCO Real Estate Company; and
- a 34 x 246-foot parcel along the southern edge of the Priest Drive Business Center, which provides access to the Center and entry to the AMERCO parcel for access to the U-Haul Company site.

In addition, access would need to be maintained to the Priest Drive Business Center. Also, the current roadway alignment equivalent to W. Carver Road within the U-Haul Company site is used for on-site circulation; therefore, access modifications would be required to accommodate the company’s operations at this site. Exhibit 5.2A shows the potential acquisition requirement to provide public street access to the Carver Road DHOV at the I-10/Maricopa Freeway. Actual acquisition of the travel corridor for construction of Carver Road between Priest Drive and the freeway could be shifted south of the location shown; final corridor alignment would depend on roadway cross-section requirements and negotiations with property owners and businesses. This location is considered a reasonably feasible site for DHOV access ramps in both directions. A conceptual plan for implementing this improvement at W. Carver Road is provided in Attachment B.

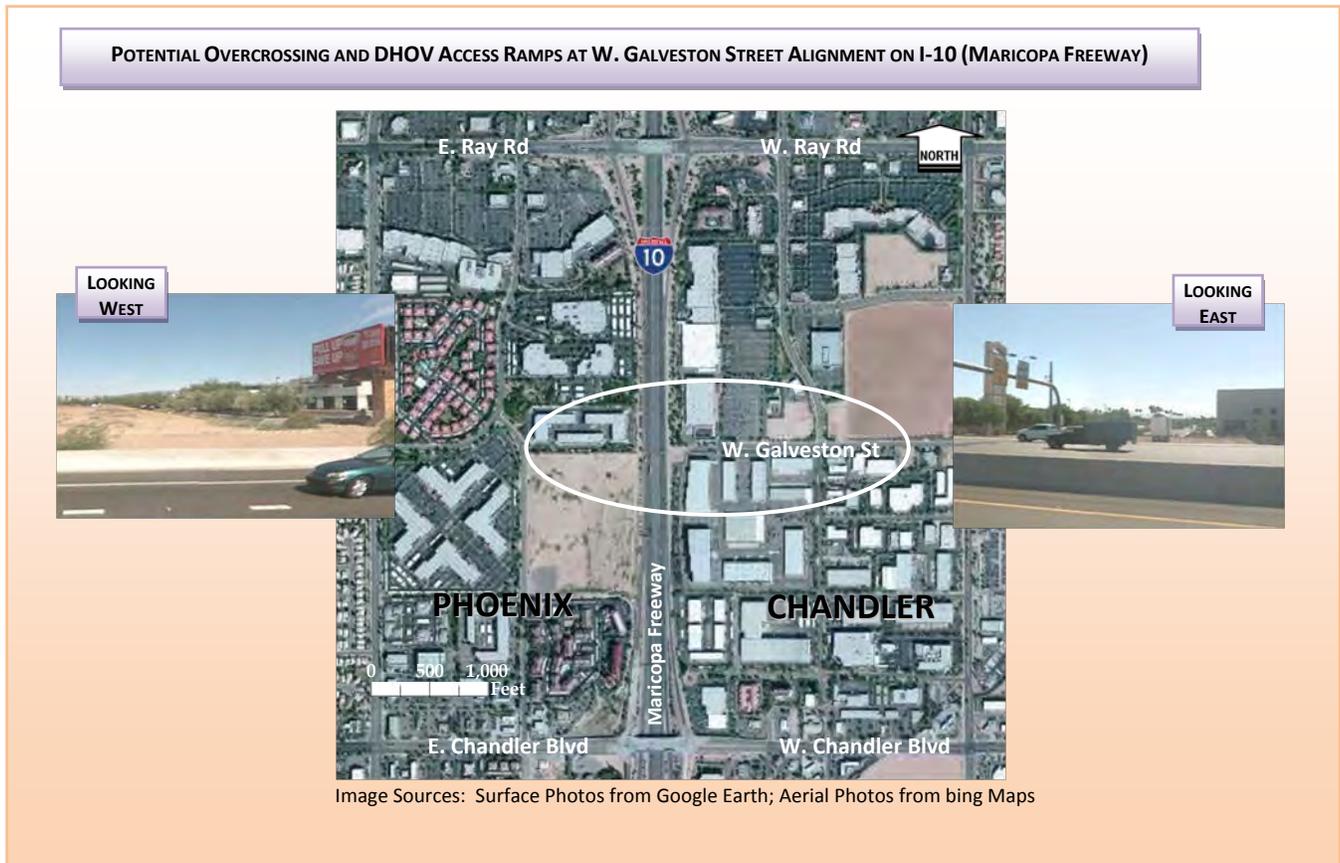
**EXHIBIT 5.2A – POTENTIAL 68-FOOT ROW ACQUISITION REQUIREMENT FOR W. CARVER ROAD ACCESS TO I-10 (MARICOPA FREEWAY)**



Source: Maricopa County Assessor’s Office :: Parcel Visualization at <http://maps.mccassessor.maricopa.gov/maps/default.aspx>

0 300 600 Feet

### 4.3 W. Galveston Street



#### Description

W. Galveston Street is an east-west half-mile road in west Chandler with an intersection at N. 56<sup>th</sup> Street, a major arterial. Galveston Street does not exist west of I-10/Maricopa Freeway in south Phoenix. There is a large office building intruding on the street’s alignment to the west of the freeway, and the building’s parking lot fully occupies potential ROW. Prominent attractions in the area include: warehousing and office development directly east and west of I-10 south of the Galveston Street alignment. A major regional commercial node exists one-half mile in all directions from the I-10/Ray Road traffic interchange. There are no public transit services or facilities proximate to this location.

#### Preliminary Analysis of this Location

The existing ROW north and south of the Galveston Street alignment would be sufficient to allow construction of DHOV access ramps in the center of I-10/Maricopa freeway. Modifications to GP lanes of I-10 and on/off ramps at E/W Ray Road and E/W Chandler Boulevard would be required. Three large sign support structures straddling I-10 are present: one in line with the Galveston Street alignment; one approximately 800 feet to the north; and one approximately 800 feet to the south. These sign support structures and others likely would need to be relocated to accommodate overcrossing I-10 with DHOV access ramps. This improvement would permit HOV movements in both directions.

W. Galveston Street terminates in a cul-de-sac 430 feet east of I-10/Maricopa Freeway ROW. The street has been constructed within a 70-foot ROW. From the cul-de-sac to the freeway, there is a dedicated 40-foot ROW currently occupied by a driveway to commercial properties south of the W. Galveston Street alignment. The dedicated 40-foot ROW would not be sufficient for a two-lane ramp to the DHOV overpass at the freeway. Therefore, an additional

30 feet of ROW would need to be acquired from HD Development of Maryland, Inc., owner of the parcel occupied by Chandler Pavilions. This acquisition would result in the following impacts:

- Loss of 10 parking spaces at the Chandler Pavilions;
- Loss of the access driveway for commercial properties south of the W. Galveston Street alignment;
- Relocation of:
  - Electric power line and utility pole that facilitates the crossing of I-10/Maricopa Freeway of a power line buried east of the freeway;
  - Sign advertising shops
  - Drainage
  - Roadway Directional Sign over the freeway.

**Looking East at W. Galveston Street from I-10/Maricopa Freeway at Sign for Shops, Electric Power Pole, Drainage Feature, and Roadway Directional Sign that would need to be Relocated for DHOV Bridge and Ramps**



Source: Google earth, 2013.

Exhibit 4.3A on the following page shows the locations of required ROW and features that would need to be relocated.

There is the potential for a P&R facility and transit center on the west side of the freeway, if the DHOV facility is continued west of I-10 to provide access from S. 50<sup>th</sup> Street. Additional ROW would need to be acquired from the mixed-use/office complex to the north of the Galveston Street alignment. To avoid significant impacts to the existing commercial office building, ROW could be acquired from the undeveloped parcel fronting the W. Galveston Street alignment on the south that is owned by the Kyrene School District. Potential ROW acquisitions are shown in Exhibit 4.3B. The exhibit also shows the location of required relocations, which include:

- Loss of 38 parking spaces on the south side of the mixed-use/office complex;
- Relocation of a billboard; and
- Relocation of an electric power line and utility pole that facilitates the crossing of I-10/Maricopa Freeway of a power line buried west of the freeway.

This location, both east and west of I-10/Maricopa Freeway, is considered a reasonably feasible site for DHOV access ramps in both directions. A conceptual plan for implementing this improvement east of W. Galveston Street is provided in Attachment B.

EXHIBIT 4.3A – RIGHT-OF-WAY ACQUISITION REQUIRED AT W. GALVESTON STREET EAST OF I-10/MARICOPA FREEWAY (CHANDLER, AZ)



Source: Maricopa County Assessor's Office :: Parcel Visualization at <http://maps.mcasessor.maricopa.gov/maps/default.aspx>

EXHIBIT 4.3B – RIGHT-OF-WAY ACQUISITION REQUIRED AT GALVESTON STREET WEST OF I-10/MARICOPA FREEWAY (PHOENIX, AZ)



Source: Maricopa County Assessor's Office :: Parcel Visualization at <http://maps.mcasessor.maricopa.gov/maps/default.aspx>

#### 4.4 S. Central Avenue

POTENTIAL DHOV ACCESS RAMPS AT S. CENTRAL AVENUE ON I-17/MARICOPA FREEWAY



Image Source: bing Maps

#### **Description**

S. Central Avenue is a north-south arterial roadway that runs through the center of Downtown Phoenix to south Phoenix and extends north through Uptown Phoenix. It has an intersection with E/W Buckeye Road, an arterial roadway to the north of I-17/Black Canyon Freeway, but no major intersections with another arterial roadway to the south prior to E/W Broadway Road. S. 7<sup>th</sup> Street, one-half mile to the east, is a major arterial with a traffic interchange with the freeway. S. 7<sup>th</sup> Avenue also has a traffic interchange with I-17; it is an arterial roadway.

S. Central Avenue north of I-17 is lined with commercial, light industry, and warehousing establishments with older residential neighborhoods adjacent to the east and west. The north frontage road provides access to commercial, retail, and academic land uses. To the south of I-17, S. Central Avenue provides access to a concentration of light industry and warehousing establishments; a vacant 28-acre parcel is located in the southwest quadrant of S. Central Avenue and W. Watkins Street. Route 0 operates along S. Central Avenue and through Central Station located at W. Van Buren Street in the northwest corner of the intersection. There are no other public transit services or facilities proximate to this location.

#### **Preliminary Analysis of this Location**

The existing ROW east and west of S. Central Avenue is not sufficient to allow construction of DHOV access ramps in the center of I-17, assuming plans to widen the freeway to eight lanes and add HOV lanes are implemented. Modifications to GP lanes of I-17 and on/off ramps at S. 7<sup>th</sup> Street and S. 7<sup>th</sup> Avenue would be required. The frontage roads east and west of S. Central Avenue to S. 7<sup>th</sup> Street and S. 7<sup>th</sup> Avenue, respectively, would be shifted outward and reconstructed. Frontage road access at S. Central Avenue would be eliminated, as a new intersection would be developed for access to/from the DHOV access ramps.

Two large sign support structures straddling I-17 (one approximately 1,480 feet to the west; and one approximately 420 feet to the east) and two cantilevered sign support structures (approximately 600 feet east and west of S. Central Avenue) would be removed and relocated as appropriate to the new freeway design.

Constructing DHOV access ramps to the east could directly impact an abandoned Southern Pacific Railroad ROW (i.e., tracks have been removed) over which I-17 passes at S. 3<sup>rd</sup> Street. Ramps rising up from S. Central Avenue

would need to be elevated to provide the clearance required over railroad ROW (Note: As the ROW has been abandoned, this may not be an issue).

With the widening project proposed for I-17/Maricopa Freeway, the frontage road system would be terminated at S. Central Avenue and redesigned, as noted above. However, many businesses rely on direct access to the existing frontage roads. Terminating the frontage roads at S. Central Avenue would require retaining needed access to these properties and businesses. This location is considered a reasonably feasible site for DHOV access ramps in both directions. A conceptual plan for implementing the improvements described for S. Central Avenue and I-17/Black Canyon Freeway is provided in Attachment B. The plan identifies potentially impacted parcels. Direct, adverse effects potentially would affect three parcels:

- The Friendly House and Academia Del Pueblo K-8 School – A building at the south end of this parcel would need to be removed or modified to accommodate the westbound frontage road, or the frontage road would need to be shifted south to avoid the building; and
- Tire Pros Commercial Center, Two Parcels (Copperstate Tire Company) –
  - A building at the south end of the south parcel would need to be removed or modified to accommodate the westbound frontage road, or the frontage road would need to be shifted south to avoid the building
  - A large supply of used commercial vehicle tires stored around the south building would need to be relocated
  - The Tire Pros sign would need to be relocated
  - A second building on the north parcel would need to be removed;
  - A billboard in the southeast corner of the south parcel would need to be acquired or relocated;
- A parcel on the northeast corner of the Westbound Frontage Road and S. Central Avenue has no permanent structures, and is being used to store used tires.

### 4.5 W. Washington – W. Adams and W. Jefferson Streets

POTENTIAL WASHINGTON STREET DHOV ACCESS RAMPS AT W. ADAMS & W. JEFFERSON STREETS ON I-17/BLACK CANYON FREEWAY

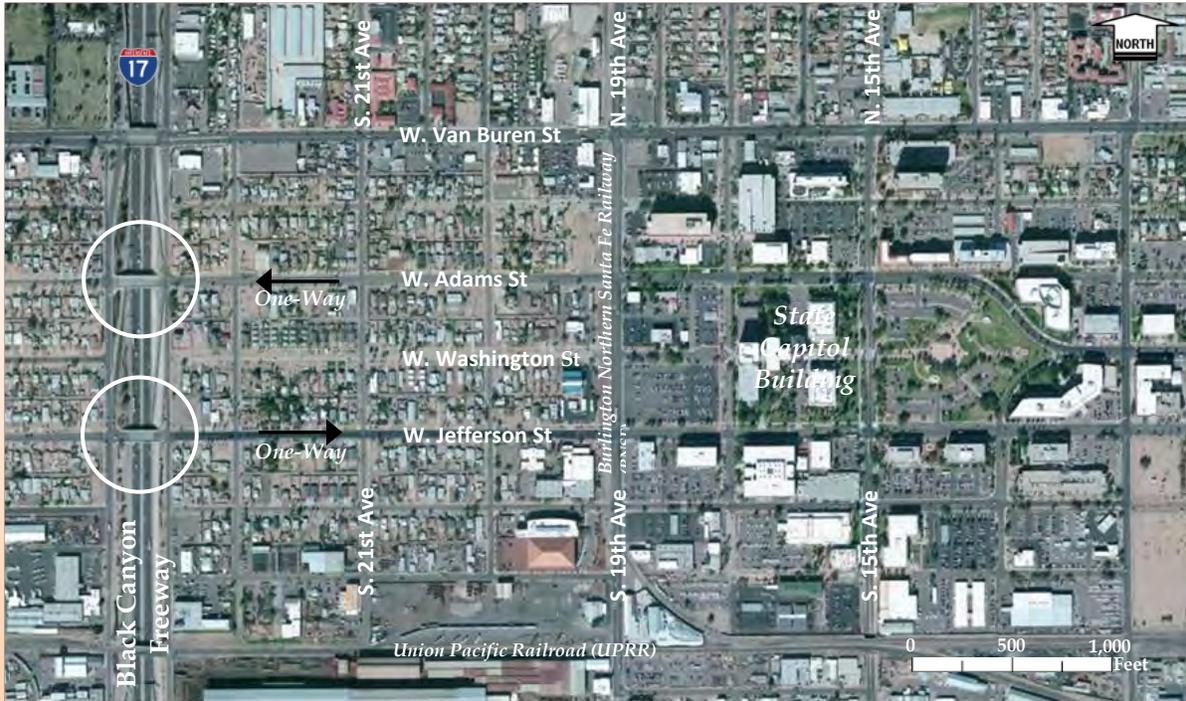
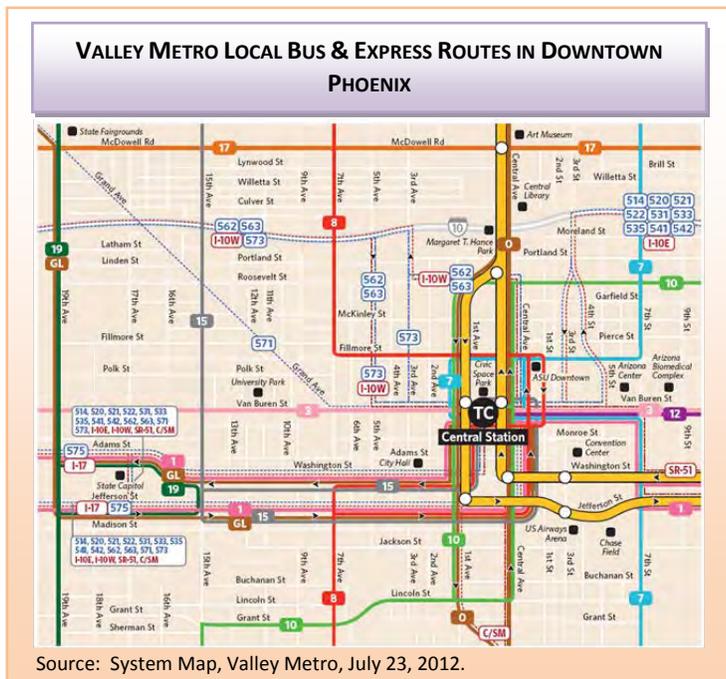


Image Source: bing Maps

#### Description

W. Adams and W. Jefferson streets constitute a one-way pair created to provide direct access at I-17/Black Canyon Freeway for the State Capitol and government offices east of N/S 19<sup>th</sup> Avenue and Downtown Phoenix. N/S 19<sup>th</sup> Avenue is a 5-lane north-south Major Arterial. W. Adams Street, the westward extension of W. Washington Street at N/S 15<sup>th</sup> Avenue, is a 4-lane, one-way westbound Arterial from N. 19<sup>th</sup> Avenue to I-17, dropping to a 3-lane, one-way Collector west of I-17 to N. 27<sup>th</sup> Avenue. W. Jefferson Street is a 2-lane, one-way eastbound Collector from S. 27<sup>th</sup> Avenue west of I-17, becoming a 3-lane, one-way eastbound Arterial to S. 19<sup>th</sup> Avenue, where it widens to four lanes.

Older, single-family residential developments front both streets west of N/S 19<sup>th</sup> Avenue. The two streets are used extensively by Valley Metro buses, particularly in the peak hours. The Valley Metro system map at right shows three local routes (#1,



Source: System Map, Valley Metro, July 23, 2012.

#15, and #19), 14 Express Bus routes, five RAPID bus routes, and the Grand Avenue Limited (GL) currently operate on the two streets. All routes entering on W. Jefferson Street, except for Route 19, which turns back at N. 19<sup>th</sup> Avenue, loop through Central Station Transit Center located on the north side of W. Van Buren Street between N. Central Avenue and N. 1<sup>st</sup> Avenue. The same routes exit the downtown area via W. Washington/W. Adams streets.

**Preliminary Analysis of this Location**

As noted earlier, DHOV access ramps were recommended at this location in the *Policy Guidelines and Plan* adopted in 2002. The location presents a number of operational and design issues.

**Roadway Spacing and Right-of-Way**

- W. Washington/W. Adams and W. Jefferson streets are a one-way pair;
- The distance between W. Van Buren Street and W. Adams Street is 750 feet;
- The distance between W. Adams Street and W. Jefferson Street is 800 feet;
- The distance between W. Adams Street and the UPRR main line is 1,090 feet;

Land availability is identified as an issue at this location. Mapping available through the Maricopa County GIS Portal reveals the existing ROW through this segment of I-17:

- 300 feet north of W. Van Buren Street;
- approximately 360 feet between W. Van Buren Street and W. Adams Street; and
- approximately 375 feet south of W. Adams Street.

**W. Washington/W. Adams - W. Jefferson One-Way Pair**

Respecting the matter of the W. Washington/W. Adams - W. Jefferson one-way pair, if access to these two streets is to be accommodated in both directions to facilitate direct access for motorists on I-17/Black Canyon Freeway HOV lanes, then ramps must be constructed north and south of both streets (today access at I-17 only is from/to the north). The existing southbound off-ramp to W. Jefferson Street is approximately 900 feet in length from the freeway to the intersection and the ramp passes under the W. Adams Street crossover at I-17. The extended arrows in Exhibit 4.5A reflect this distance as a minimum for all four ramps. It is assumed that clearances under the I-17 crossovers of W. Adams and W. Jefferson streets, as well as W. Van Buren Street, can be achieved, if the ramps are constructed to the same design standard. However, I-17 was the first freeway constructed in Arizona in the 1960s and Interstate design standards have changed since that time. For example, the DHOV access ramps at N. 3<sup>rd</sup> Street on I-10/Papago Freeway are 1,100 feet in length, reflecting a later design standard and, clearly, the ramp slopes are more compatible with bus operations. An additional 1,100 feet is provided as deceleration/acceleration lanes to permit the connection with the main HOV lanes. If this latter standard is applied, it is unlikely that sufficient clearances would be achieved at W. Van Buren, W. Adams, and W. Jefferson streets to accommodate freeway traffic.

Exhibit 4.5A shows the basic arrangement of the four ramps proposed to expedite downtown access for users of HOV lanes serving motorists with origins/destinations in Ahwatukee, Tempe, Mesa, Gilbert, Chandler, and the southeast Valley. Between W. Adams and W. Jefferson streets, two DHOV access ramps would be side-by-side: one southbound ascending to W. Jefferson and the other descending southbound from W. Adams. Two side-by-side DHOV access ramps, such as constructed at N. 3<sup>rd</sup> Street, are 70 feet wide when the emergency buffers separating the ramps from the HOV lanes are taken into account. Therefore, the two ramps would push the main HOV lanes and three freeway GP lanes to the west, which would impact the southbound off-ramp to W. Jefferson Street. When accounting for the deceleration/acceleration lane of the southbound DHOV access ramp from W. Adams Street, it is possible that the bridge structure of the UPRR could be impacted.

Depending on the adopted design treatment for these four ramps, there appears to be sufficient ROW north and south of both W. Adams and W. Jefferson streets to construct DHOV access ramps in the center of I-17. However, the narrower ROW north of W. Van Buren Street would pose a challenge, even if the number of I-17 GP lanes is not increased. A proposed increase in the number I-17 GP lanes along with need to retain the 3-lane frontage roads and the northbound on-ramp from W. Adams Street for non-HOV traffic creates even greater design challenges. South of W. Van Buren Street, where the available ROW is greater and there are 2-lane frontage roads, design solutions could be less problematic.

Construction cost indices established by the U.S. Bureau of Reclamation indicates an increase in the cost to construct of approximately 43 percent between 2002 and 2011, while the Consumer Price Index reflects an increase of 25 percent. Thus, it can be concluded that the \$50 million price tag for constructing these DHOV access ramps is now in the range of \$62.5 million to \$71.5 million.

Development of DHOV access ramps at this location would be problematic through not impossible, due to the close proximity of the Adams and Jefferson streets overpasses of I-17/Black Canyon Highway and high cost. Should the desirability of DHOV access ramps in this location be affirmed in the future, it is recommended that the DHOV access ramps be moved to W. Van Buren Street. DHOV movements to/from the north only would be accommodated at W. Van Buren Street. Recommended diversions of the frontage roads at this location, as presented in preliminary designs for I-17/Black Canyon Freeway improvements, would increase the distance between the three intersections.

The I-17 Corridor Improvement Study (CIS) and preliminary information for the Environmental Impact Statement (EIS) show the freeway being expanded into the block east of the Northbound Frontage Road with DHOV access ramps exiting and entering HOV lanes to/from the north only from W. Jefferson and W. Adams streets. Subsequent evaluations of this location, such as accomplished at the MAG-sponsored I-10/I-17 Spine Corridor Workshop, and refinement of design plans for I-17 likely may alter the scheme proposed in the CIS/EIS. Therefore, a conceptual plan for this location was not prepared. It must be noted that W. Jefferson and W. Adams are heavily utilized by Express buses; the former for AM inbound service and the latter for PM outbound service. The availability of DHOV access ramps at W. Van Buren could alter routing of the Express service serving downtown Phoenix.



4.6 W. Mountain View Road/W. Cheryl Drive



**Description**

The preliminary concept for this improvement envisions a connection of W. Mountain View Road east of I-17/Black Canyon Freeway to W. Cheryl Drive west of I-17/Black Canyon Freeway via the W. Ironwood Drive alignment. The proposal for this location also envisions the DHOV access ramps would be constructed parallel with the METRO LRT line, which is being extended up N. 19th Avenue. Current plans are for the LRT line to turn west at W. Dunlap Avenue, turn north at N. 25th Avenue, then cross over to Metrocenter at W. Mountain View Road. The LRT service would operate in the median between the DHOV access ramps that would provide access to I-17 from N. 25th Avenue and the interior parking lot circulation roadway inside Metro Parkway. A conceptual plan of this proposal is provide in Attachment B.

The combined DHOV/LRT facility would begin at the W. Mountain View and N 25th Avenue intersection then swing north to the W. Ironwood Drive alignment, where it would be fully elevated. The DHOV/LRT facility would cross I-17 on a bridging structure that would continue fully elevated to the west side of Metro Parkway East. West of Metro Parkway East, the DHOV/LRT facility would curve to the south, dropping down to the surface of the Metrocenter parking lot, where there would be an LRT station and P&R lot.

W. Cheryl Drive accesses Metro Parkway East approximately 268 feet west of the southbound I-17/Black Canyon Freeway Frontage Road. This entry roadway provides access to the more than 100 retail establishments at Metrocenter. W. Cheryl Drive continues west of Metrocenter but does not exist east of I-17. W. Cheryl Drive corresponds roughly to W. Ironwood Drive east of I-17.

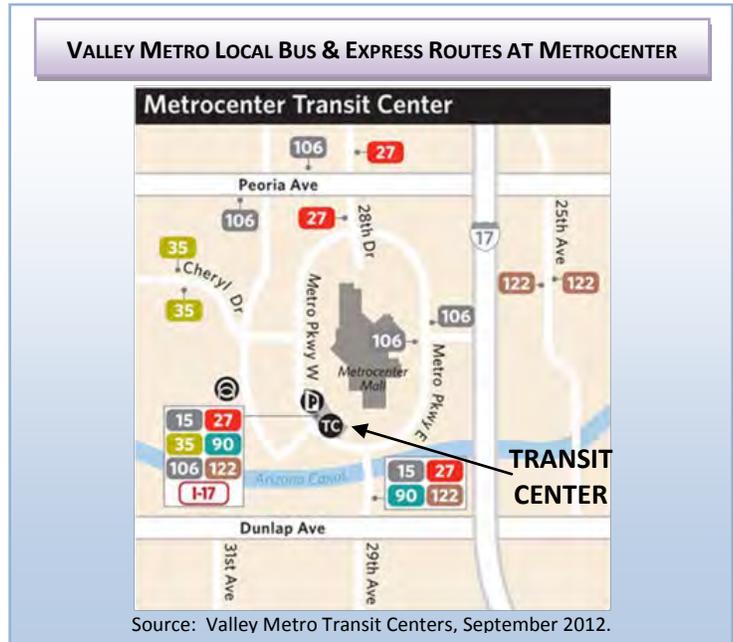
Commercial properties dominate the west side of the southbound Frontage Road of I-17 with access provided via W. Cheryl Drive and Metro Park East. Commercial properties also dominate the east side of the freeway. Access to these properties is provided by the northbound I-17 Frontage Road, W. Mountain View Road, N. 26<sup>th</sup> Drive, and N. 25<sup>th</sup> Drive. Several hotels and restaurants are located along the east side of the freeway. Rose Mofford Sports

Complex and Park fronts the east side of N. 25<sup>th</sup> Avenue from the Arizona Canal Diversion Channel to W. Peoria Avenue.

The Metrocenter Transit Center and P&R facility is located in the southwest corner of the Metrocenter mall complex on S. Metro Parkway West. The Transit Center serves local routes #15, #27, #35, #90, #106, and #122 plus Express Route 581 and two I-17 RAPID routes (see accompanying graphic illustration at right).

**Preliminary Analysis of this Location**

The existing ROW north and south of the W. Cheryl Drive/W. Ironwood Drive alignment is sufficient to allow construction of DHOV access ramps in the center of I-17/Black Canyon Freeway. Modifications to freeway GP lanes and on/off ramps at W. Peoria and W. Dunlap avenues would be required. I-17 is at the same grade as the W. Cheryl Drive/W. Ironwood Drive alignment; therefore, an elevated overcrossing or depressed undercrossing would need to be considered. Potential impacts include:



- (1) realignment of the mall entry/exit at W. Cheryl Drive to/from the southbound Frontage Road (Note: assuming the overcrossing remains elevated over the entrance, this action may not be required, eliminating direct impacts to the businesses directly north and south of W. Cheryl Drive);
- (2) direct impacts to circulation of the east parking area of Metrocenter mall and loss of up to 100 retail parking spaces;
- (3) acquisition of commercial property on the east side of the Northbound I-17 Frontage Road;
- (4) modification of access to the office complexes via N. 26<sup>th</sup> and N. 25<sup>th</sup> drives;
- (5) increased noise exposure for restaurant, retail, and commercial activity in the vicinity of the crossing (particularly is buses regularly utilize the new access in addition to the LRT);
- (6) loss of 60 to 70 retail and office parking spaces east of I-17, depending on the selected construction method for achieving required elevation over I-17 (e.g., retained embankment or columns); and
- (7) potential impacts to the I-17 overcrossing of the Arizona Canal and the Arizona Canal Diversion Channel.

DHOV access ramps at this location would facilitate direct ingress/egress at the Metrocenter Mall, improve access to the Metrocenter Transit Center and P&R facility, and provide more direct access to Cave Creek Sports Complex and Park via W. Mountain View Road. Signs providing motorist information and lighting standards along I-17 would need to be relocated. This location is considered a reasonably feasible site for DHOV access ramps in both directions. As noted above, the conceptual plan for implementing this improvement as an elevated overcrossing of W. Mountain View/W. Cheryl Drive at I-17/Black Canyon Freeway is provided in Attachment B.

4.7 W. Grovers Avenue



**Description**

The original site for this DHOV facility was W. Bell Road, an east-west Major Arterial serving the mobility needs of north Phoenix from N. 51<sup>st</sup> Avenue to Scottsdale Road. W. Bell Road was selected as a potential DHOV location through the CH2M Hill evaluation and by *charette* participants. The traffic interchange of W. Bell Road with I-17/Black Canyon Freeway, developed with limited access, represents a major commercial node in Phoenix. The interchange, originally conceived as a full Clover Leaf, ultimately was developed as a Diamond. Retail and commercial development dominates every quadrant of the interchange, although direct access to residential subdivision via W. Village Drive is located in the northeast quadrant. The Deer Valley P&R facility is located in the southwest quadrant of the interchange with direct access from Bell Road and the southbound I-17 Frontage Road. This transit facility is served by local routes #27 and #170 and the I-17 RAPID service.

Nevertheless, this location would present a challenge similar to S. Central Avenue: an intersection for the DHOV access ramps would create three in-line intersections, interfering with traffic flow and creating significant conflicts with existing left-turn lanes used to access I-17. In addition, W. Bell Road is depressed under I-17, which means the DHOV intersection would be depressed creating issues of visibility and drainage plus reconstruction of the I-17 bridge work over W. Bell Road. Constructing direct access ramps (DARs) to I-17 from the Bell Road P&R, a possible alternative application, also would be problematic. Installing the DARs would require substantial reconfiguration of the P&R facility with the potential loss of parking spaces to accommodate circulation of buses and vehicles. In addition, realignment of the southbound I-17 on-ramp likely would be necessary. For these reasons, the W. Bell Road location was set aside.

During the course of the *charette*, participants also expressed preference for a DHOV facility at W. Paradise Lane, which is one-half mile south of W. Bell Road. This is reflected in the table presented in Attachment A. The W. Paradise Lane location is characterized by mixed single- and multi-family residential housing to the southeast with commercial and institutional land uses to the north and west. W. Paradise Lane east of I-17/Black Canyon Freeway is a discontinuous, two-lane, Minor Collector with free access. It has an intersection with the Black Canyon Frontage Road at the west end and connects with N. 23<sup>rd</sup> Avenue at the east end. West of I-17, the alignment of W. Paradise

Lane is a drainage swale, taking drainage from the east side of the freeway in a swale paralleling the north side of W. Paradise Lane and transporting it to Conocido Park, a retention area.

Access to a W. Paradise Lane DHOV facility from the east could only be achieved through the Ponderosa Homes North Subdivision. Expanding W. Paradise Lane to accommodate access traffic to DHOV access ramps, including elevating the roadway to achieve a point over the median of the freeway, would have significant impacts on the residential subdivision and require significant modification of the drainage swale. In addition, extending the DHOV facility west of I-17 is problematic, as the W. Paradise Lane alignment is a key drainage element for the area. Given the encumbering features at this location, this evaluation turned to a third location, as it is clear that a DHOV facility at the north end of I-17/Black Canyon Freeway would be desirable and beneficial.

In October, 2012, MAG sponsored the *I-10/I-17 Spine Corridor Workshop* with the intent of having the region’s decisionmakers and stakeholders carefully examine three options for improving these two primary travel corridors in the region. Three potential long-term solutions were examined and discussed at length during this all-day workshop.

- **Alternative 1 – Cost-Constrained Idea:** This concept did not include any new lanes on I-17/Black Canyon Freeway north of “The Stack” system interchange with I-10/Papago Freeway. Between “The Stack” and “The Split,” one GP lane and two HOV lanes were to be added to I-17. Improvements to Interstate 10 between “The Split” and “Pecos Stack” varied, depending on the segment, expectations of travel demand, and opportunities to create more efficient traffic flows (e.g., reconfigure lane structure). But, generally improvements consisted of an additional GP lane.
- **Alternative 2 – Express Lanes Idea:** This concept focused on increasing capacity of “The Spine Corridor” through: conversion of existing HOV lanes to HOT lanes; providing additional HOT lanes on I-10; adding new HOT lanes on I-17 from “The Split” to the “North Stack;” generally adding one GP lane through the length of the corridor; and constructing Collector/Distributor (C/D) lanes along a limited section of Interstate 10 to allow more efficient entry and exit maneuvers. This concept also provided Workshop participants an opportunity to explore other funding options by introducing the potential for generating revenue through congestion-pricing applied to the HOT lanes with respect to SOVs.
- **Corridor Studies Proposal – I-10 Corridor Improvement Study (CIS) and I-17 Corridor Improvement Study (CIS):** Generally, the proposed improvement to I-17/Black Canyon Freeway from “The Split” to the “North Stack” involved significant widening of the freeway to include two new GP lanes with a new HOV lane south of Van Buren Street. Improvements proposed for I-10/Maricopa Freeway involved substantially widening the freeway to include a varying combination of new GP, HOV, and C/D lanes.

The Express Lanes Idea included DHOV access ramps at several locations, including W. Grovers Avenue, one-half mile north of Bell Road. W. Grovers Avenue is a true half-mile road, extending west of I-17 to N. 59<sup>th</sup> Avenue as a Collector facility. To the east, W. Morningside Drive, offset from W. Grovers Avenue by 600 feet, also is a Collector, extending east to N. 19<sup>th</sup> Avenue where W. Grovers Avenue continues east to N. 7<sup>th</sup> Avenue. This location presents a reasonable opportunity to create a DHOV facility serving both the north and south travel on I-17 and open North Phoenix areas to its use via two collector streets. This potential DHOV location is dominated by office and commercial land uses buffering residential development east and west of the freeway. The southwest corner of the W. Grovers Avenue/I-17 Southbound Frontage Road is a Cox Communications property dedicated to vehicle storage and maintenance. The lack of development at this Cox property makes it a good candidate for a P&R facility and possibly a North Phoenix Transit Center. Currently, Valley Metro Route 27 operates on N. 27<sup>th</sup> Avenue and Routes 170 and 186 operate on W. Bell Road and W. Union Hills Drive, respectively.

**Preliminary Analysis of this Location**

Freeway ROW recorded for this location by the Maricopa County Assessor is 288 feet; therefore, ROW north and south of W. Grovers Avenue and W. Morningside Drive would be sufficient to allow construction of DHOV access ramps in both directions in the center of I-17/Black Canyon Freeway. However, modifications to freeway GP lanes and on/off ramps at W. Bell Road and W. Union Hills Driver would be required. There are two primary issues associated with construction DHOV access ramps at this location.

The first relates to the required distance for elevating access ramps to the DHOV overpass and ramps in the median of I-17. N. 27<sup>th</sup> Avenue is only 450 feet west of the western edge of the I-17 Southbound Frontage Road and W.

Grovers Avenue is at the same grade as the freeway. Access ramps to the DHOV overpass in the I-17 median would need to reach the necessary clearance height prior to the frontage road. An initial assessment indicates the distance to N. 27th Avenue is less than required to achieve the required clearance above the frontage road and I-17 GP lanes. Therefore, the Workshop analysis included a concept that incorporated the Cox property, using a curving ramp design to achieve the necessary vertical height (Exhibit 4.7A). This concept also opens up the site for development as a P&R and, possibly, a Transit Center. The ramp design maintains access to the commercial building located at the northwest corner of the I-17 Southbound Frontage Road and W. Grovers Avenue.

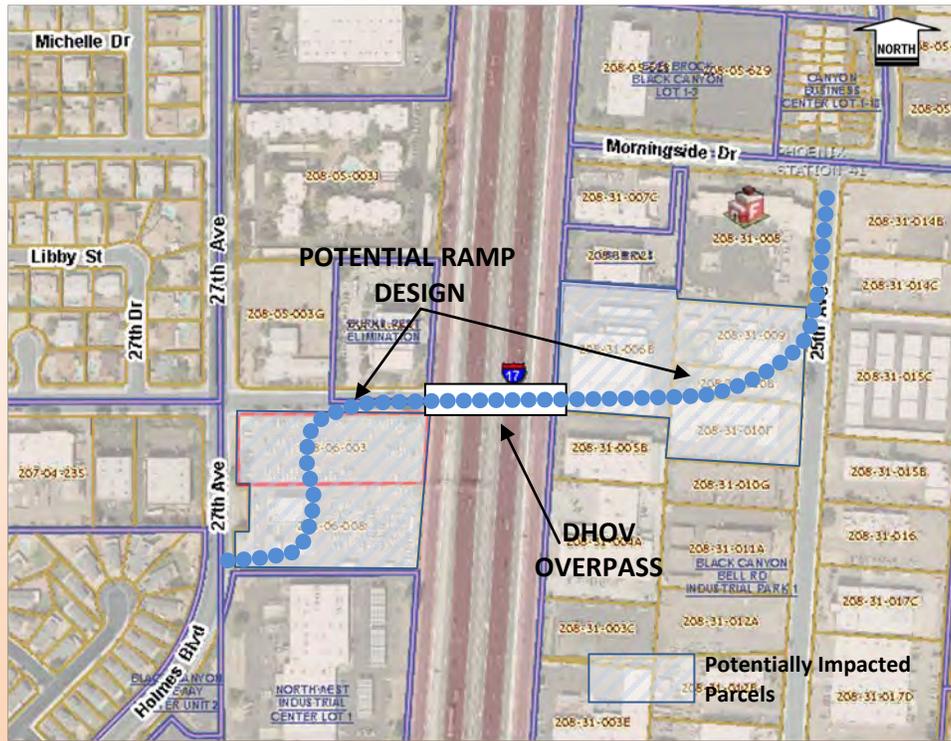
**EXHIBIT 4.7A – POTENTIAL DHOV ACCESS RAMPS DESIGN AT W. GROVERS AVENUE**



Source: Appendix A – Workshop Handouts, Technical Memorandum: Interstate 10 and Interstate 17 “Spine” Corridor Summary

Note that the access ramps shown in Exhibit 4.7A extend to the east, connecting the DHOV overpass with W. Morningside Drive. The second issue at this location is gaining access to W. Morningside Drive. Should this option be pursued, gaining access to N. 25th Avenue would result in displacing up to three commercial buildings (Exhibit 4.7B). In addition, there is a billboard located close to the preliminary alignment of the overcrossing and ramps shown in Exhibit 4.7A. This billboard may need to be relocated. Access could be maintained to other commercial buildings in the area, although for those buildings on N. 25th Avenue, access would be to/from the south only.

**EXHIBIT 4.7B – IMPACTED PARCELS AT W. GROVERS AVENUE DHOV ACCESS RAMPS SITE ON I-17/BLACK CANYON FREEWAY**



Source: Maricopa County Assessor's Office :: Parcel Visualization at <http://maps.mcasessor.maricopa.gov/maps/default.aspx>

0 500 1,000 Feet

This location is considered a reasonably feasible site for DHOV access ramps in both directions. However, construction of a DHOV facility at this location potentially would require displacement of at least four businesses. A conceptual plan for implementing this improvement at W. Grovers Avenue and W. Morningside Drive is provided in Attachment B.

### 4.8 W. Campbell Avenue

The alignment of W. Campbell Road, while planned to connect with Indian School Road on the west side of Loop 101, is not set on the east side of Loop 101. Except for the few hundred feet leading to and in front of the fire station, ROW acquisition would be required east and west of Loop 101 for W. Campbell Road. As noted above, the Phoenix General Plan shows W. Campbell Road west of Loop 101 turning south to W. Indian School Road. The curve to the south already is established and is visible in the accompanying aerial photograph. Still, there is the potential for realigning W. Campbell Road to the south to accommodate the DHOV access ramps and mitigate impacts on the existing residential subdivision, fire station, and N. 97<sup>th</sup> Avenue. Signs providing motorist information and lighting standards along Loop 101 also would need to be relocated.

This location is considered a reasonably feasible site for DHOV access ramps in both directions. In addition, there is land available for developing P&R facilities on both sides of Loop 101. A conceptual plan for implementing this improvement at W. Campbell Avenue is provided in Attachment B.

**POTENTIAL DHOV ACCESS RAMPS LOCATION AT W. CAMPBELL AVENUE ON LOOP 101/AGUA FRIA FREEWAY**



Image Source: bing Maps

**Description**

W. Campbell Avenue is an east-west, half-mile roadway alignment in west Phoenix that is discontinuous between N. 99<sup>th</sup> and N. 91<sup>st</sup> avenues, both Arterial roadways. W. Campbell Avenue is partially developed east of N. 99<sup>th</sup> Avenue, providing access to Phoenix Fire Station No. 54. The Phoenix General Plan and Street Classification Map shows W. Campbell Avenue, west of Loop 101/Agua Fria Freeway, turning south as a Collector (N. 97<sup>th</sup> Avenue) connecting with W. Indian School Road, a Major Arterial roadway (Exhibit 4.8A).

Agricultural land dominates land use at this location today; however, planned land use for the area is commercial. Therefore, a DHOV facility at this location would be compatible with expected future uses. However, a short segment of Terracita, a residential subdivision, has approximately 800 feet of frontage on the north side of W. Campbell Avenue. The Loop 101/W. Camelback Road traffic interchange area and N. 99<sup>th</sup> Avenue/W. Camelback

Road intersection to the west is a commercial node. The area between N. 99<sup>th</sup> and 91<sup>st</sup> avenues is slated for commercial or commerce/business park type developments in the Phoenix General Plan. Valley Metro Route 41 operates along N. 99<sup>th</sup> Avenue.

**EXHIBIT 4.8A - PLANNED ALIGNMENT OF W. CAMPBELL AVENUE WEST OF LOOP 101/AGUA FRIA FREEWAY**



Source: Street Classification Map, City of Phoenix, Arizona, January 20, 2010.

**Preliminary Analysis of this Location**

The ROW north and south of W. Campbell Avenue is sufficient to allow construction of DHOV access ramps in both directions in the center of Loop 101/Agua Fria Freeway. Modifications to freeway GP lanes and on/off ramps at W. Indian School and W. Camelback roads would be required. Loop 101 is depressed approximately 10 feet relative to the W. Campbell Avenue alignment. Therefore, potential impacts on Terracita residences associated with elevating W. Campbell Avenue to overpass the freeway would be reduced, although not eliminated. However, elevating W. Campbell Avenue west of Loop 101 potentially would directly impact access to/from the fire station and alter the alignment of the proposed N. 97<sup>th</sup> Avenue connector.

The alignment of W. Campbell Road, while planned to connect with Indian School Road on the west side of Loop 101, is not set on the east side of Loop 101. Except for the few hundred feet leading to and in front of the fire station, ROW acquisition would be required east and west of Loop 101 for W. Campbell Road. As noted above, the Phoenix General Plan shows W. Campbell Road west of Loop 101 turning south to W. Indian School Road. The curve to the south already is established and is visible in the accompanying aerial photograph. Still, there is the potential for realigning W. Campbell Road to the south to accommodate the DHOV access ramps and mitigate impacts on the existing residential subdivision, fire station, and N. 97<sup>th</sup> Avenue. Signs providing motorist information and lighting standards along Loop 101 also would need to be relocated.

This location is considered a reasonably feasible site for DHOV access ramps in both directions. In addition, there is land available for developing P&R facilities on both sides of Loop 101. However, the ultimate solution of this site may required realignment of W. Campbell Avenue. A conceptual plan for implementing this improvement at W. Campbell Avenue is provided in Attachment B.

## 4.9 W. Maryland Avenue

POTENTIAL DHOV ACCESS RAMPS AT W. MARYLAND AVENUE ON LOOP 101/AGUA FRIA FREEWAY



Image Source: bing Maps

### Description

W. Maryland Avenue is a four-lane, east-west half-mile Collector in west Glendale that serves the central area of Glendale’s Westgate City Center, Jobing.Com Arena, and University of Phoenix Stadium. The roadway has an existing overpass at Loop 101/Agua Fria Freeway and intersections with N. 99<sup>th</sup> and 91<sup>st</sup> avenues, both north-south Major Arterials. Agricultural activity dominates land use west of Loop 101, but the Glendale General Plan Map identifies the future land use for all land west of Loop 101 between W. Bethany Home and W. Glendale roads as Business Park. The Glendale P&R facility is located at the northeast corner of N. 99<sup>th</sup> Avenue and W. Glendale Road, which is identified for Planned Commercial. The P&R facility has 388 shaded parking spaces with a build-out capacity of 600 spaces. Valley Metro Route 70 and Express Routes 573 and 388 operate through this P&R facility.

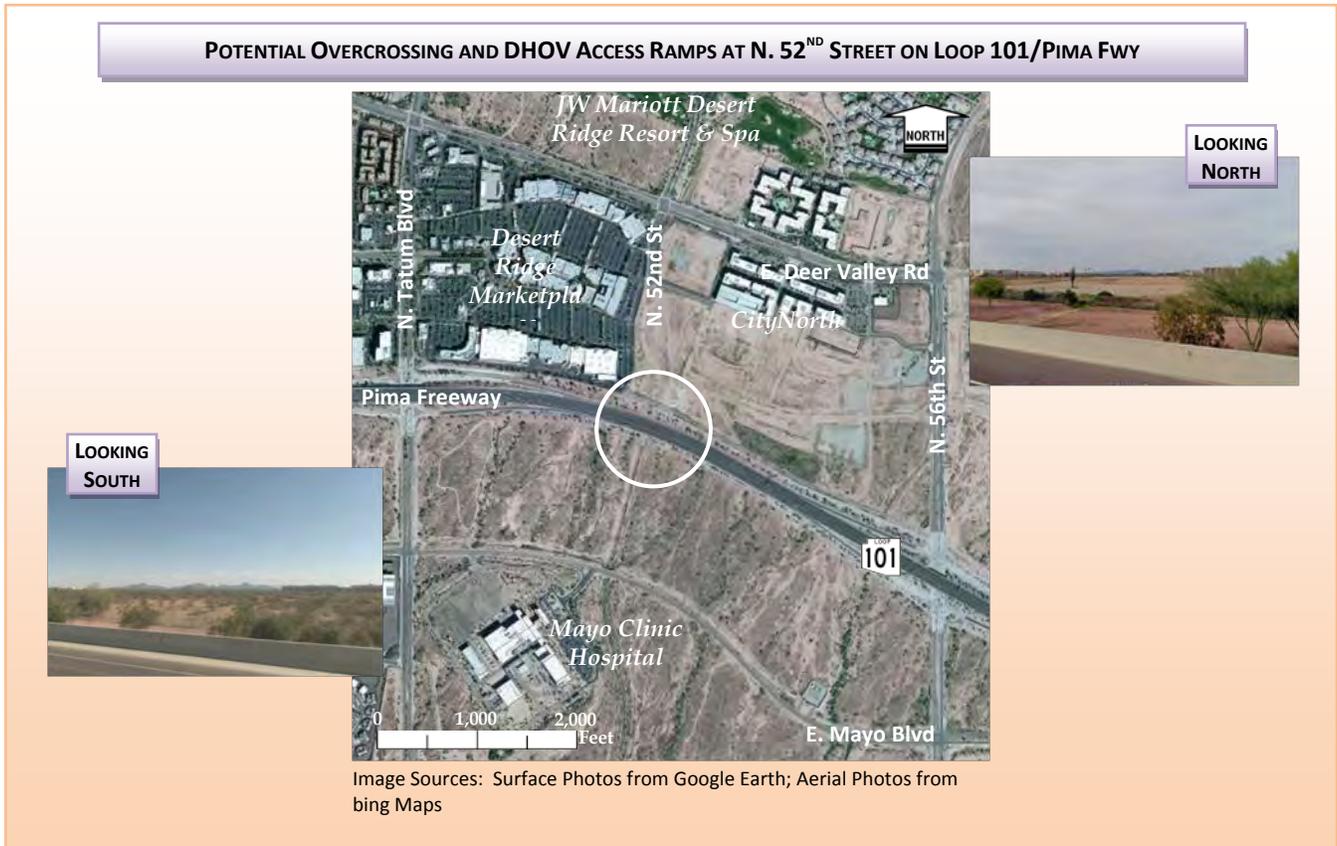
### Preliminary Analysis of this Location

The ROW north and south of W. Maryland Avenue is sufficient to allow construction of DHOV access ramps in both directions the center of Loop 101/Agua Fria Freeway, although there are important constraints that must be considered as conceptual design activity proceeds. Significant modifications to the GP lanes of the freeway and on/off ramps at W. Glendale and W. Bethany Home roads would be required, due to constrictions at the W. Maryland Avenue overpass. Median ROW at the overpass is insufficient for DHOV access ramps, although it does extend approximately 1,500 feet north and south of W. Maryland Avenue. In addition, a major, 60-foot wide drainage channel is present 25 feet east of the northbound GP lanes. Also, signs, providing motorist information, and lighting standards along Loop 101 would need to be relocated.

This location is considered a reasonably feasible site for DHOV access ramps in both directions. In addition, there is land available for developing a P&R facility on the west side of Loop 101. A conceptual plan for implementing this improvement at W. Campbell Avenue is provided in Attachment B.

This improvement has been programmed for implementation in the MAG RTP. ADOT has issued a notice for a Design-Build project to develop DHOV access ramps and combined with a request for bids. The work also consists of: constructing retaining walls; drainage improvements; signing; pavement marking; lighting; freeway management system (FMS) improvements; barriers; Asphalt Concrete Friction Course (ACFC); and signals. A similar request for bids would be expected to be associated with other DHOV access ramp construction at other locations on the CPHX freeway system. The Department's programmed contract amount for the Maryland Avenue project is \$14,100,000. A copy of the *Public Notice – Request for Design-Build Proposals, Agua Fria Freeway (SR 101L) SR 101L at Maryland Avenue HOV Ramps*, is presented in Attachment C.

### 4.10 N. 52<sup>nd</sup> Street



#### Description

N. 52<sup>nd</sup> Street is north-south, half-mile roadway alignment in north Phoenix scheduled to be a Collector with intersections at E. Deer Valley Road and E. Mayo Boulevard, both Arterial roadways. Desert Ridge Marketplace, a regional commercial/shopping center, and City North, a large-scale, mixed-use development, are located directly north of Loop 101/Pima Freeway. The N. 52<sup>nd</sup> Street alignment ultimately will serve these two developments; a segment of approximately 800 feet already exists south of E. Deer Valley Road. Open desert dominates the area south of Loop 101 today, but commercial, health-related, and mixed-use developments are anticipated in the future. The Phoenix General Plan designates the area as a “Primary Core.” Although there are no public transit services or facilities proximate to this location at this time, it should be anticipated that this Primary Core will be served by major transit facilities and services in the future.

#### Preliminary Analysis of this Location

The ROW east and west of the N. 52<sup>nd</sup> Avenue alignment is sufficient to allow construction of DHOV access ramps in both directions in the center of Loop 101/Pima Freeway. Modifications to GP lanes of the freeway and on/off ramps at N. Tatum Boulevard and N. 56<sup>th</sup> Street would be required. The freeway is slightly elevated over the surrounding landscape, particularly to the south, where the landscape grade is six to eight feet lower and slopes away from the freeway.

N. 52<sup>nd</sup> Street is planned to be developed as a Collector roadway between E. Deer Valley Road, north of Loop 101, and E. Mayo Boulevard, south of Loop 101. ROW would need to be acquired from private parties to the north and the Arizona State Land Department (ASLD) to the south, if it is not already conveyed to private parties for future development. Construction of N. 52<sup>nd</sup> Street at Loop 101, as an overpass or underpass with DHOV access ramps, would have a significant influence on future development planning for vacant parcels north and south of the freeway.



In addition, north-to-south drainage in this area of Phoenix is a critical concern, and several drainage facilities would be impacted with reconstruction of the freeway to accommodate the DHOV access ramps. Signs providing motorist information and lighting standards along Loop 101 also would need to be relocated.

This location is considered a reasonably feasible site for DHOV access ramps in both directions. In addition, there is land available for developing a P&R facility north and south of Loop 101. A conceptual plan for implementing this improvement at N. 52<sup>nd</sup> Street is provided in Attachment B.

4.11 E. Mountain View Road

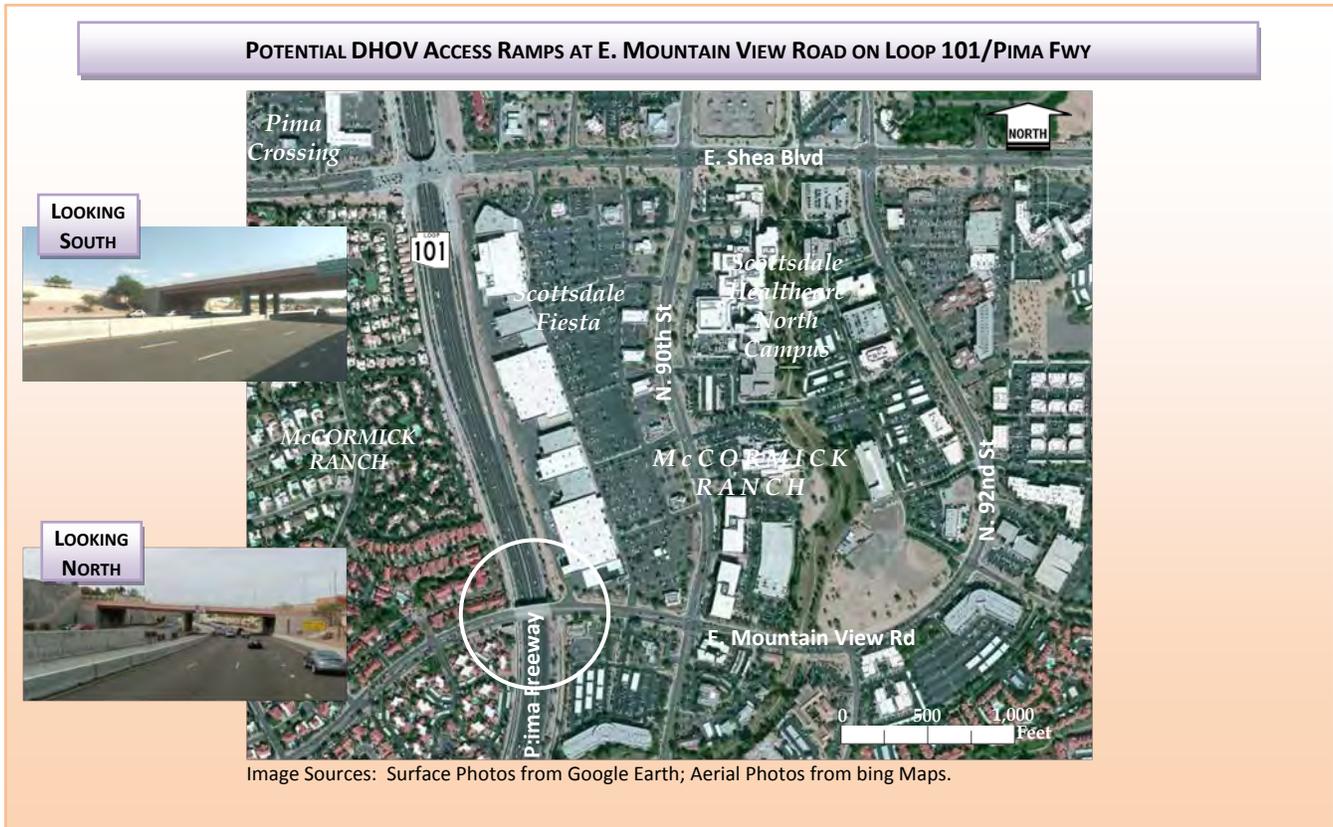


Image Sources: Surface Photos from Google Earth; Aerial Photos from Bing Maps.

**Description**

E. Mountain View Road is a four-lane, east-west half-mile Minor Arterial in central Scottsdale. The facility connects the retail, commercial, medical-related, and office core of McCormick Ranch Center east of Loop 101/Pima Freeway with the residential neighborhoods of this groundbreaking Master Planned Community west of the freeway. The roadway crosses over Loop 101 from the west, intersecting N. 90<sup>th</sup> Street and continuing around to become N. 92<sup>nd</sup> Street with an intersection at E. Shea Boulevard. The regional power center, Scottsdale Fiesta, and the Scottsdale Healthcare North Campus are located in the northeast quadrant. Valley Metro Routes 81 and 106 operate through the E. Mountain View Road/N. 90<sup>th</sup> Street intersection.

**Preliminary Analysis of this Location**

The ROW north and south of E. Mountain View Road is sufficient to allow construction of DHOV access ramps in both directions in the center of Loop 101 with certain caveats. First, like the other locations, modifications to GP lanes of the freeway and on/off ramps at E. Shea Boulevard would be required. Second, the freeway is depressed at E. Mountain View Road and remains depressed to the north past E. Shea Boulevard. The freeway rises approximately 1,200 feet to the south to cross over a major drainage tributary to Indian Bend Wash. Third, although ROW is available, the depressed cross-section has resulted in construction of substantial retaining walls on both sides of the freeway. Portions of these walls may need to be moved/reconstructed. Finally, there is a 14-foot wide, open drainage culvert approximately 44 feet from the east edge of the freeway shoulder that carries stormwater from Scottsdale Fiesta and, possibly, E. Shea Boulevard.

Large support structures for directional sign straddle the northbound lanes of Loop 101 600 feet to the north and 1,000 feet to the south. Other signs, providing motorist information, and lighting standards along Loop 101 would need to be relocated.



This location is considered a reasonably feasible site for DHOV access ramps in both directions. In addition, there is land available for developing a P&R facility north and south of Loop 101. A conceptual plan for implementing this improvement at E. Mountain View Road is provided in Attachment B.

## 5.0 DHOV Access Ramp Development Policy Statement

As noted earlier, DHOV access ramps eliminate the need for vehicle operators to weave across several lanes of congested, mixed-flow traffic in GP travel lanes to gain access to the HOV lanes and vice versa – to weave through congested traffic to gain access to a freeway off-ramp. Where feasible, the provision of DHOV access ramps – connector and dedicated direct access – increases the efficiency and safety of traffic flow on the freeway. DHOV access ramps afford HOV operators the opportunity to maximize their travel time benefits by avoiding freeway main lanes.

The simplest method of implementing DHOV access ramp locations is to locate them within the freeway median and realign the GP lanes around the DHOV access ramps, as was done at N. 3<sup>rd</sup> Street (refer to Figure 2). That being said, the cost to construct DHOV access ramps can be significant, due to:

- Major reconstruction actions on an existing freeway system; and
- Potential impacts to existing land uses within urbanized areas associated with additional right-of-way (ROW), if required.

For the above reasons, it generally is most reasonable to construct DHOV access ramps in the immediate vicinity of major destination/attraction areas (e.g., downtown areas, regional malls, and entertainment and sports venues) in support of peak-use traffic patterns. Another desirable location is in relation to park-and-ride (P&R) facilities, where there would be frequent movements between the freeway and arterial system by public transit vehicles and carpoolers.

Given these simple guidelines, it is safe to say there are as many policy statements regarding this subject as there are organizations to make them. Policy statements serve to clarify intent, describe how a policy is administered, and define the particular features of a policy. Policies serve to lay a framework for achievement of goals and objectives. Furthermore, implemented policies can ensure, to the greatest extent possible, minimizing the risk of conflict and removing the opportunity for narrowly focused decisionmaking. As such, the following guidance has been formulated to give definition and direction to locating and developing DHOV access ramps within the MAG region.

### 5.1 Policy Objectives

A policy statement should outline what it is trying to achieve, i.e., what outcomes or results are the focus of the policy. The following statements provide this framework for developing DHOV access ramps and associated P&R facilities and transit centers. The objectives of the DHOV access ramps Policy Initiative are to:

- Maximize the people-carrying capacity of the regional freeway system by providing incentives to commuters to use buses, vanpools, and carpools through direct and convenient access to the HOV network.
- Provide transportation network capacity for current usage, future travel growth, and accommodation of potential future changes in system management techniques, such as managed lanes or Tolloed Express Lanes (TEL).
- Coordinate the planning and development of regional transportation system modes and facilities with potential DHOV implementation through consideration of –
  - Existing and planned public transportation improvements; and
  - The interaction, effects, and utilization of DHOV access ramps with current and planned P&R facilities with the DHOV.
- Provide strategic guidance on the number and location of DHOVs to optimize system performance in the peak periods, achieve travel time savings, and assure safe operation of the HOV facilities.
- Induce greater HOV lanes volumes through the incentive of ease of access –
  - Improve operational performance of the system of HOV lanes and GP freeway lanes through the placement of with DHOV access ramps where congestion can be reduced; and
  - Reduce conflict points and weaving areas required for ingress and egress of the HOV lanes associated with crossover/interaction with the GP freeway lanes.

- Ensure new DHOV access ramps not only improve performance of the freeway/HOV system, but also minimize traffic impacts on the community through consideration of current and planned local land uses, including impacts on residential neighborhoods and commercial establishments.
- Establish a rational cost-to-benefit relationship that justifies implementation of DHOV access ramps.

## **5.2 Scope of the Policy**

One of the most important purposes of a policy statement is establishment and description of the parties/entities to which the policy applies and who has responsibility to monitor adherence to the policy.

- Successful implementation of a regional program of placing DHOV access ramps at strategic locations to enhance operation and performance of the freeway system will require coordinated planning and, therefore, this policy applies to all parties/entities engaged in development of the regional transportation system.
- MAG, as the regional transportation planning entity with programming and funding authority, shall guide implementation of the policy with direct collaborative and cooperative assistance from transportation agencies, such as ADOT, Valley Metro/RPTA, and other Maricopa County regional public transportation providers.
- The public involvement program of MAG shall assure the inclusion of business and community leaders and other stakeholders in the discussion of the scope of the program to install DHOV access ramp location and operation.

## **5.3 Implementation Guidance and Parameters**

The policy statement should include planning and implementation parameters that will guide the responsible parties/entities to the intended objectives regarding the provision of DHOV access ramps.

### **5.3.1. Transportation System Performance**

The following policy guidance addresses the need to coordinate and integrate potential DHOV access ramps into the regional freeway and arterial street systems.

- a. Efficient use shall be made of existing infrastructure/interchanges, wherever reasonable and feasible.
- b. DHOV access ramps shall be constructed that are safe, energy efficient, facilitate the movement of people and goods, appropriate to address projected needs, and minimize impacts to communities.
- c. DHOV access ramps shall be planned and built, in number and location, to meet established performance standards to ensure the regional freeway/HOV system provides reliable travel times and dependability for transit users, vanpoolers, and carpoolers.
- d. Motorists utilizing the HOV system lane shall be able to maintain an specified average speed or greater for a specified percent of the time during the morning and afternoon peak periods.
- e. Connectivity among and between transportation facilities (e.g., P&R facilities) and modes (e.g., public transportation) should be maintained and, where possible, cross-jurisdiction services and connectivity shall be improved.
- f. DHOV access ramps shall be planned and constructed in a manner that does not preclude implementation of other operational protocols of the HOV lane system, e.g., TEL and managed lanes.
- g. The performance of DHOV access ramps shall be monitored by MAG through a formal data collection and evaluation process designed to support future considerations/deliberation regarding the placement and construction of future DHOV access ramps; data should be collected that takes into consideration:
  - i. Number and types of vehicles utilizing the DHOV access ramps and associated facilities (e.g., P&R facilities);
  - ii. Number of commuters;
  - iii. Average number of commuters per vehicle;
  - iv. Ease of access and /or delay experienced by commuters using the DHOV access ramps;
  - v. Affect on HOV lane performance in the vicinity of the DHOV access ramps;
  - vi. Traffic impact in the host community; and
  - vii. Business and quality of life impacts experienced in the local community.

**5.3.2. Transportation/DHOV Access Ramp Planning**

Planning and implementation of DHOV access ramps shall be accomplished using a collaborative and cooperative process, including MAG, ADOT, Maricopa County, regional public transportation agencies, and other stakeholders. Planning shall include determination of:

- a. An estimated optimal number of DHOV access ramps;
- b. System-level locations of DHOV access ramps with respect to the regional HOV system;
- c. Site location within the community where DHOV access ramps are proposed to be installed;
- d. Access to the HOV system relative to the freeway and local arterial street network;
- e. Potential P&R and transit center locations that would provide a community advantage and promote use and maximize the performance of the DHOV access ramps and HOV system; and
- f. Community and business considerations, such as traffic impacts and quality of life issues and business access.

**5.3.3. Community, Business, and Land Use Guidance**

Appropriate methods and mechanisms shall be defined and established to assure minimal impacts to community, business, and development interests in the vicinity of proposed DHOV access ramp locations.

- a. DHOV access ramps shall be planned with appropriate consideration afforded current and future land use of the community with the objective of minimizing the length of queues and number of vehicle trips
- b. Potential community traffic impacts shall be assessed to assure proposed DHOV access ramps will support and promote community and business well-being.
- c. DHOV access ramps and associated transportation facilities (e.g., P&R and transit center), as may be determined appropriate and desirable, shall support the development of viable choices and plans for current and future public transit and other alternative transportation mode opportunities.
- d. Strategic analysis shall be undertaken to identify the optimal number and locations of DHOV access ramps and the relationship of these locations to the future potential for implementing a congestion pricing program and/or managed lanes concepts to support regional air quality objectives.

**5.3.4. Financial Considerations**

Financial considerations encompass both the costs and benefits of constructing DHOV access ramps as well as the potential effects on community social and economic development and sustainability.

- a. Cost-benefit metrics, based on best practices analysis of the national experience (e.g., forecast cost per potential user, value of the reduction in crashes, cost of developing greater system capacity in an alternative manner), shall be developed by MAG to provide guidance for the potential development of DHOV access ramps and to aid in determining the financial viability of proposals
- b. The location and siting of DHOV access ramps shall not adversely impact adjacent neighborhoods or businesses but provide opportunities for neighborhood improvements and economic development.

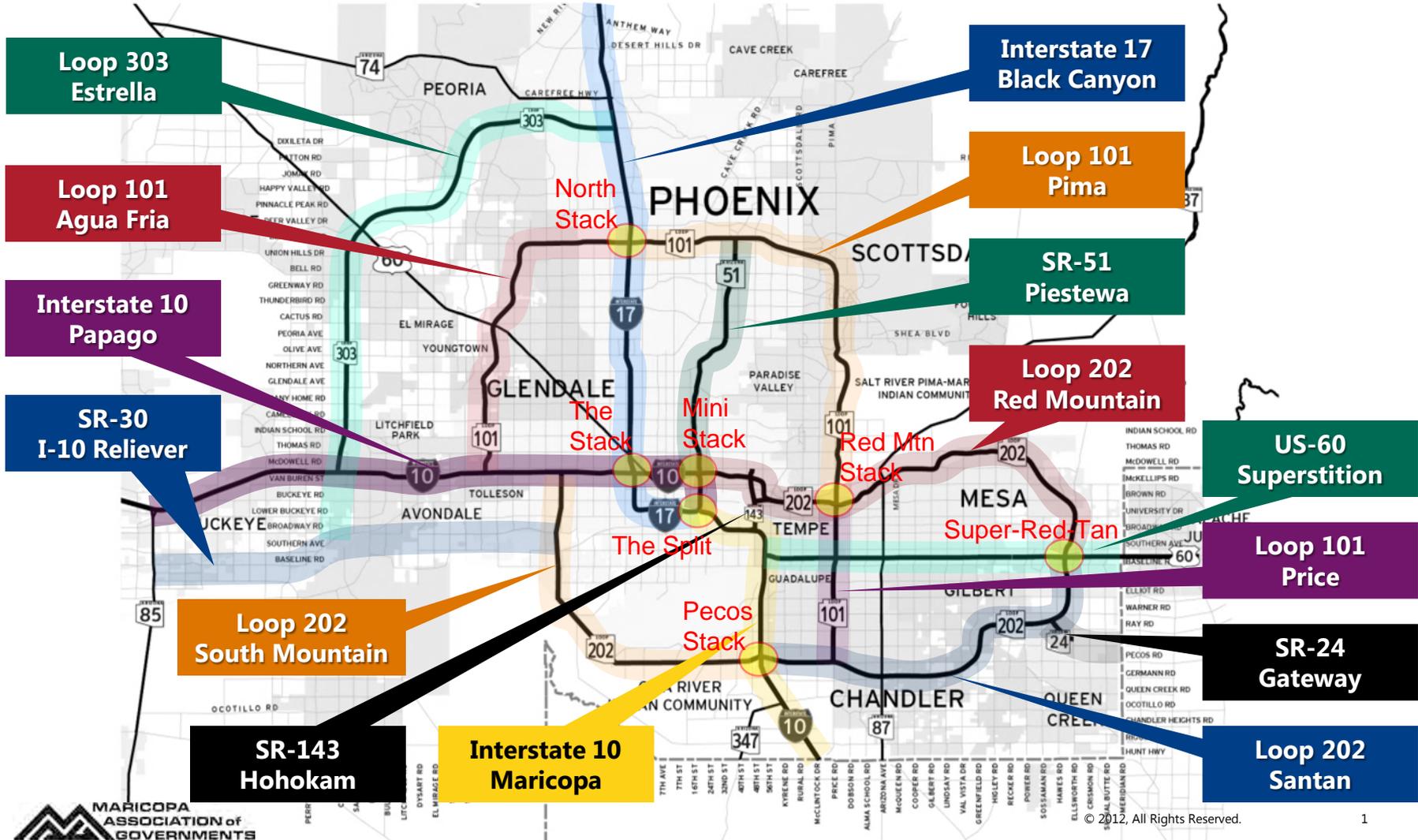


# ATTACHMENTS



# Attachment A

## Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps



**Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps**

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
I-10 (Papago Fwy) West to East	Loop101 (Aqua Fria Freeway) to N. 59 <sup>th</sup> Ave	134.0	138.7	I-10/Loop 101 System Interchange	134.0		✓			
				N. 79th Ave (between N. 83rd Ave and N. 75th Ave)	136.2	✓	✓	> Sufficient ROW on I-10 > Sufficient ROW north of I-10 > ROW acquisition required for N. 79th Ave south of I-10 > Ramps to/from the East already exist	> No significant conflicts > High-density Residential north of I-10	> Direct service: Rt 17 & 17A > One mile from Desert Sky Mall Transit Center: Rts 17, 17A, 29, 41, 685, I-10W, Mary
	N. 59 <sup>th</sup> Ave to "The Stack" at I-17 (Black Canyon Freeway)	138.7	142.7	N. 59th Ave	138.7		✓			
	"The Stack" to "Mini Stack" at Loop 202 (Red Mountain Freeway)/SR-51 (Piestewa Freeway)	142.7	147.3	"The Stack"	142.7		✓			
				N. 12th St (between N. 7th St and N. 16th St)	146.5	✓		> Sufficient ROW on I-10 (same as N. 3rd St) > Sufficient ROW on N. 12th St > Potential conflict to the west with on/off ramps at N. 3rd St	> Commercial, Institutional (close to Banner Good Samaritan Medial Center), Medium-Density Residential north of I-10 > Residential south of I-10	> Rt 12 begins/terminates at Central Station
	"Mini Stack" to "The Split" at I-17 (Maricopa Freeway)	147.3	149.5	"Mini Stack"	147.3		✓			
				E. Roosevelt St (between Loop 202 and E. Van Buren St)	147.5	✓		> Sufficient ROW on I-10 > Sufficient ROW on E. Roosevelt St > Potential conflicts with SR-202 and SR-51 superstructures to the west	Improve access to Maricopa Medical Center and Saint Luke's Hospital	> Rt 10 operates along E. Roosevelt St through Central Station
				E. Sky Harbor Blvd (between E. Jefferson St and E. Buckeye Rd)	148.9	✓		> Sufficient ROW on I-10 > Sufficient ROW on E. Sky Harbor Blvd > New HOV superstructure above I-10 would conflict with Sky Harbor Runway Inner-Approach Zone and Runway Protection Zone	> Commercial and Light Industrial land uses	> Not applicable
	I-10 (Maricopa Fwy) West to East	"The Split" at I-17 (Maricopa Freeway)/I-10 (Papago Freeway) to SR-143 (Hohokam Expressway)	149.3	153.1	"The Split"	149.3		✓		
		SR-143 (Hohokam Expressway) to US-60 (Superstition Freeway)	153.1	155.1	SR-143 (Hohokam Expressway)	153.1		✓		
W. Alameda Dr (between W. Broadway Rd and W. Southern Ave)					154.3	✓		> Inadequate ROW on I-10 > Sufficient ROW on W. Alameda Dr > Potential conflicts with DHOV Connector Ramps to/from US-60	> Commercial to the south > Commercial, recreation, and resort to the north	> Rts 48, 52, & 61 converge at E. Southern Ave and S. 48th St > Rt 56 & 61 converge at S. Priest Dr and Southern Ave
US-60 (Superstition Freeway) to "Pecos Stack" at Loop 202 (Santan Freeway)		155.1	161.5	W/E Guadalupe Rd (between W. Baseline Rd and W/E Elliot Rd)	156.9	✓		> Sufficient ROW on I-10 > Sufficient ROW on Guadalupe Rd > No conflicts for on/off ramps	> High-density Residential to the west > Low-Density Residential (Town of Guadalupe) to the east	> Rt 56 operates along S. Avenida del Yaqui (Priest Dr)
	Between Guadalupe Rd and Elliot Rd			157.4		✓	> Sufficient ROW I-10 > Potential connection with W. Mineral Rd (east of I-10); 20-foot ROW between I-10 and Harl Ave; ROW acquisition required > ROW acquisition required to connect with S. 51st St in Industrial Park west of I-10	> Industrial Park and High- & Low-Density Residential west of I-10 > Light Industry & High-Density Residential east of I-10	> Rt 56 operates along S. Avenida del Yaqui (Priest Dr)	

Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
I-10 (Maricopa Fwy) West to East (Continued)	US-60 (Superstition Freeway) to "Pecos Stack" at Loop 202 (Santan Freeway) (Continued)			Between Elliot Rd and Warner Rd	158.4		✓	> Sufficient ROW on I-10 > Potential access to the east via W. Carver Rd alignment; ROW acquisition required > Connection to S. 51st St to the west would require ROW acquisition and displacements		
				W. Galveston St (between W/E Ray Rd and W/E Chandler Blvd)	160.0	✓	✓	> Sufficient ROW on I-10 > ROW acquisition required east and west of I-10	> Commercial and Light Industrial east and west of I-10 > Medium-Density Residential 1/2 mile east and west of I-10	> No transit services proximate to this site
				"Pecos Stack"	161.5		✓			
I-17 (Maricopa Fwy) South to North	"The Split" at I-10 (Maricopa/Papago Freeway Connection) to Durango Curve	0.0	4.2	S. Central Ave (between N. 7th St and N. 7th Ave)	2.7	✓	✓	> Sufficient ROW on I-17 > Sufficient ROW on S. Central Ave > Impacts to I-17 overcrossing of S. 3rd St RR ROW (abandoned, tracks removed)	> Commercial and Light Industrial south of I-17 > Same north of I-17 with a mix of aged Medium-Density single-family housing	> Rt 0 operates on S. Central Ave through Central Station
				S. 15th Ave (between N. 7th Ave and N. 19th Ave)	3.7	✓		> Sufficient ROW on I-17 > Sufficient ROW on S. 15th Ave > Impacts to I-17 overcrossing of S. 11th Ave/RR ROW > Impacts to S. 19th Ave on/off ramps and I-17 overcrossing of S. 19th Ave	> Commercial and Light Industrial south of I-17 > Aged Medium-Density single-family housing north of I-17	> Rt 10 operates on S. 15th Ave north of W. Pima St; pass through Cental Station
	Durango Curve to I-10 (Papago Freeway)	4.2	6.5	Proposed Future I-17/SR-30 System Interchange at Durango Curve	4.2		✓			
				W. Buckeye Rd	5.0		✓	> Sufficient ROW on I-17 > Sufficient ROW on W. Buckeye Rd > North DHOV ramps would exclude south DHOV ramps at W. Grant St	> Mix of Commercial and Light Industrial with aged Medium-Density single-family housing	> Rt 13 operates along W. Buckeye Rd > Rt 19 operates along S. 19th Ave > Rt 27 operates along S. 27th Ave
				W. Grant St (south of the Union Pacific Railroad)	5.3		✓	> Sufficient ROW on I-17 > Sufficient ROW on W. Grant St east of I-17 > ROW acquisition and commercial displacements required west of I-17 > North DHOV ramps would exclude south DHOV ramps at W. Grant St	> Mix of Commercial and Light Industrial with aged Medium-Density single-family housing	> Rt 19 operates along S. 19th Ave

Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
I-17 (Maricopa Fwy) South to North (Continued)	Durango Curve to I-10 (Papago Freeway) (Continued)			W. Van Buren St (between W. Adams St and I-10)	6.0	✓		<ul style="list-style-type: none"> <li>&gt; ROW on K-17 constrained by on/off ramps to the south</li> <li>&gt; DHOV ramps to the north would impact I-10 Connector ramps associated with The Stack Interchange</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Aged Medium-Density Residential south of W. Van Buren St both east and west of I-17</li> <li>&gt; Greenwood Memory Lawn and Beth El cemetaries north of W. Van Buren St west of I-17</li> <li>&gt; Commercial, Light Industrial with some aged Medium-Density Residential north of Van Buren St east of I-17</li> <li>&gt; State Capital Complex 3/4 mile to the east</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Rt 3 operates along W. Van Buren St through Central Station</li> <li>&gt; Rt 19 operates along S. 19th Ave</li> <li>&gt; Rt 27 operates along S. 27th Ave</li> </ul>
I-17 (Black Canyon Fwy) South to North	"The Stack" at I-10 (Papago Freeway) to W. Dunlap Ave	6.5	14.1	W. Encanto Blvd (between McDowell and Thomas roads)	7.5		✓	<ul style="list-style-type: none"> <li>&gt; Insufficient ROW on I-17; ROW acquisition would be required approx. 1,700 north and south of W. Encanto Blvd with significant displacements</li> <li>&gt; North DHOV ramps would conflict with railroad and Grand Ave overcrossing of I-17</li> <li>&gt; W. Encanto Blvd elevation is same as I-17 requiring elevated structure, acquisition of ROW, significant commercial displacements, access impacts, and environmental impacts</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Light Industrial and Industrial activities east and west of I-17</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Rt 27 operates along N. 27th Ave</li> </ul>
				W. Missouri Ave (between Camelback Rd and Bethany Home Rd)	10.5		✓	<ul style="list-style-type: none"> <li>&gt; Insufficient ROW on I-17; ROW acquisition would be required approx. 1,700 north and south of W. Missouri Ave with significant displacements</li> <li>&gt; W. Missouri Ave elevation is same as I-17 requiring elevated structure, acquisition of ROW, significant commercial displacements, access impacts, and environmental impacts</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Medium-Density Residential north of W. Missouri Ave</li> <li>&gt; High-Density Residential and School south of W. Missouri Ave</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Rt 27 operates along N. 27th Ave</li> <li>&gt; Montebello/19th Ave Transit Center: Rts 15, 19, 60, I-17 RAPID, &amp; METRO Light Rail</li> <li>&gt; 19th/Camelback Park-and-Ride (P&amp;R)</li> <li>&gt; Rt 50 operates along W. Camelback Rd</li> <li>&gt; Rt 60 operates along W. Bethany Home Rd</li> </ul>
	W. Dunlap Ave to Loop 101 (Pima Fwy/Aqua Fria Fwy)	14.1	20.7	W. Cheryl Dr (between W. Dunlap Ave and W. Peoria Ave)	14.6	✓	✓	<ul style="list-style-type: none"> <li>&gt; Insufficient ROW on I-17; ROW acquisition would be required approx. 1,700 north and south of W. Cheryl Dr with significant displacements</li> <li>&gt; South DHOV ramps would conflict with I-17 overcrossing of Arizona Canal</li> <li>&gt; W. Cheryl Dr elevation is same as I-17 requiring elevated structure, acquisition of ROW, significant commercial displacements, access impacts, and environmental impacts</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Metrocenter Mall and Metrocenter Transit Center west of I-17</li> <li>&gt; Commercial, Office, and Cave Creek Park east of I-17</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Metrocenter Transit Center: Rts 15, 27, 35, 90, 106, 122, &amp; I-17</li> <li>&gt; Metrocenter P&amp;R</li> </ul>

Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
I-17 (Black Canyon Fwy) South to North (Continued)	W. Dunlap Ave to Loop 101 (Pima Fwy/Aqua Fria Fwy) (Continued)			W. Thunderbird Rd	17.1	✓		> Insufficient ROW on I-17; DHOV ramps would require spreading the on/off ramps and frontage roads north and south of W. Thunderbird Rd with significant displacements > Sufficient ROW on W. Thunderbird Rd	> Metro North Corporate Park > Mix of Commercial, Office, High-Density and Medium-Density Residential	> Rt 138 operates along W. Thunderbird Rd > Rt 27 operates along N. 31st Ave
				W. Paradise Ln (between Greenway Rd and Bell Rd)	19.1		✓	> Insufficient ROW on I-17 for DHOV ramps > Sufficient ROW east of I-17; City of Phoenix owns alignment to N. 28th and N. 29th avenues > W. Paradise Ln elevation is same as I-17 requiring elevated structure, acquisition of ROW, significant commercial displacements, access impacts, and environmental impacts	> Commercial and Office in NW, NE, & SW quadrants > Medium- and High-Density Residential in SE quadrant	> Deer Valley P&R Lot in SW quadrant of W. Bell Rd/I-17 Traffic Interchange (TI) > Rt 27 operates along N. 29th Ave
				W. Bell Rd	19.1	✓	✓	> Insufficient ROW on I-17; DHOV ramps would require spreading the on/off ramps and frontage roads north and south of W. Bell Rd with significant displacements > Sufficient ROW on W. Bell Rd	> Commercial/Office node > Adjacent Medium- to High-Density Residential	> Deer Valley P&R Lot in SW quadrant of W. Bell Rd/I-17 TI > Rt 27 operates along N. 29th Ave > Rt 170 operates along W. Bell Rd
				SR-51 (Piestewa Fwy)/Loop 101 (Pima Fwy) System Interchange	20.7		✓			
US-60 (Superstition Fwy) West to East	I-10 (Maricopa Freeway) to Loop 101 (Price Freeway)	143.3	147.7	None recommended						
SR-51 (Piestewa Fwy) South to North	Loop 202 (Red Mountain Freeway) to E. Glendale Ave	0.0	6.2	None recommended						
	E. Glendale Ave to E. Shea Blvd	6.2	10.1	None recommended						
	E. Shea Blvd to Loop 101 (Pima Freeway)	10.1	16.7	E. Cholla St (between E. Shea Blvd and E. Cactus Rd)	10.6		✓	> Sufficient ROW on SR-51 > Sufficient ROW on E. Cholla St > DHOV ramps at E. Cholla St would require spreading the on/off ramps at E. Shea Blvd and E. Cactus Rd	> Low- and High-Density Residential	> Rt 16 operates along 32nd St > Dreamy Draw P&R located SW quadrant of E. Shea Blvd and SR-51 TI
				E. Cactus Rd	11.0		✓			
E. Sweetwater Ave (between E. Cactus Rd and E. Thunderbird Rd)	11.6	✓		> Sufficient ROW on SR-51 > Sufficient ROW on E. Sweetwater Ave > DHOV ramps at E. Sweetwater Ave would require spreading the on/off ramps at E. Cactus Rd and E. Thunderbird Rd > Major drainage culvert under SR-51 at this location feeds Indian Bend Wash to the east	> Medium-Density Residential	> Rt 16 operates along 32nd St > Rt 138 operates along E. Thunderbird Rd beginning/terminating at Paradise Valley Transit Center				

Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
SR-51 (Piestewa Fwy) South to North (Continued)	E. Shea Blvd to Loop 101 (Pima Freeway) (Continued)			E. Paradise Ln (between Greenway Rd and Bell Rd)	13.6		✓	> Sufficient ROW on SR-51 > Sufficient ROW on E. Paradise Ln > DHOV ramps at E. Paradise Ln would require spreading the on/off ramps at E. Greenway Rd and E. Bell Rd	> Low- through High-Density Residential > Pedestrian/Bicycle Bridge across SR-51 at this location would need to be removed	> Rt 16 operates along 32nd St > SR51/Bell P&R at SW quadrant of SR51/E. Bell Rd TI
SR-143 (Hohokam Fwy)	I-10 (Maricopa Freeway) to E. McDowell Rd	0.0	4.0	None recommended						
Loop 101 (Aqua Fria Fwy) South to North to East	I-10 (Papago Freeway) to W. Peoria Ave	0.0	9.1	W. Osborn Rd (between Thomas Rd and Indian School Rd)	1.8	✓		> Sufficient ROW on Loop 101 > Acquisition of ROW for W. Osborn Rd will be required > DHOV ramps at W. Osborn Rd would require spreading the on/off ramps at W. Thomas Rd and W. Indian School Rd	> Agriculture	> No transit services proximate to this site
				W. Indian School Rd	2.8	✓				
				W. Campbell Ave (between Indian School Rd and Camelback Rd)	3.7	✓	✓	> Sufficient ROW on Loop 101 > Acquisition of ROW for W. Campbell Rd will be required > DHOV ramps at W. Campbell Ave would require spreading the on/off ramps at W. Indian School Rd and W. Camelback Rd	> Agriculture > Medium-Density Residential in NE quadrant	> Rt 41 Operates along N. 99th Ave
				W. Missouri Ave (between Camelback Rd and Bethany Home Rd)	4.3		✓	> Sufficient ROW on Loop 101 > Acquisition of ROW for W. Missouri Ave will be required > DHOV ramps at W. Missouri Ave would require spreading the on/off ramps at W. Camelback Rd and W. Bethany Home Rd	> Agriculture > Retail, Commercial, and Office along east and west side of Loop 101 > Medium-Density Residential in west of Loop 101 > High-Density Residential east of Loop 101 > Copper Canyon High School east of Loop 101	> No transit services proximate to this site
				W. Maryland Ave (between Bethany Home Rd and Glendale Ave)	5.3	✓		> Sufficient ROW on Loop 101; there is insufficient ROW within the available median; there is a major drainage channel directly east of the freeway's general purpose lanes presenting significant design constraint > Sufficient ROW on W. Maryland Ave > DHOV ramps at W. Maryland Ave would require spreading the on/off ramps at W. Bethany Home Rd and W. Glendale Ave; major drainage channel presents constraints	> Wesgate City Center > Regional Sports Venues > Agriculture (planned Business Park and other commercial/commerce activities)	> Glendale P&R located in NW quadrant of W. Glendale Rd/Loop 101 TI > Rt 70 and Express Rts 573 & 388 operate through this P&R
	W. Glendale Ave	5.8		✓						
	W. Peoria Ave to N. 75th Ave	9.1	16.0	US60/Grand Avenue	9.8		✓			
			W. Bell Rd	13.5		✓				

Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
Loop 101 (Aqua Fria Fwy) South to North to East (Continued)	W. Peoria Ave to N. 75th Ave (Continued)			N. 83rd Ave (between W. Bell Rd and W. Union Hills Dr)	13.9	✓		> Sufficient ROW on Loop 101 > Sufficient ROW on N. 83rd Ave, if realignment to square with Loop 101 can be accommodated within existing ROW and avoid impacts to New River floodplain to the west > DHOV ramps at N. 8rd Ave would require spreading the on/off ramps at W. Bell Rd	> Arrowhead Towne Center > Peoria Sports Complex/Entertainment District > High-Density Residential east of Loop 101 > Retail/Commercial center west of Loop 101 > New River	> Arrowhead Towne Center Transit Center > Rts 67, 170, 186, 573X, & 575X
	N. 75 <sup>th</sup> Ave to "North Stack" at I-17 (Black Canyon Freeway)	16.0	21.7	N. 71st Ave (between N. 75th Ave and N. 67th Ave)	16.5		✓	> Sufficient ROW on Loop 101 > Sufficient ROW on N. 71st Ave north of Loop 101 > Sufficient ROW on W. Beardsley Rd for south side landing > DHOV ramps at N. 71st Ave would require spreading the on/off ramps at N. 76th Ave and N. 67th Ave	> Medium- to High-Density Residential	> No transit services proximate to this site
				N. 63rd Ave/W. Utopia Rd (between N. 67th Ave and N. 59th Ave)	17.5		✓	> Sufficient ROW on Loop 101 > Sufficient ROW on N. 63rd Ave north and south of Loop 101 > Pedestrian/Bicycle Bridge at this location would need to be removed > DHOV ramps at N. 63rd Ave would require spreading the on/off ramps at N. 67th Ave and N. 59th Ave	> Medium- to High-Density Residential	> No transit services proximate to this site
				N. 43rd Ave (between N. 51st Ave and N. 35th Ave)	19.0		✓	> Sufficient ROW on Loop 101 > Sufficient ROW on W. Beardsley Rd, which is a north/south frontage road to Loop 101 > However, design would be problematic given (1) N. 43rd Ave and Beardselly Frontage Roads are relatively the same elevation as Loop 101, (2) major drainage channel occupies north side, (3) major culvert for Skunk Creek tributary is directly under N. 43rd Ave	> Low- to High-Density Residential northeast and south of N. 43rd Ave at Loop 101 > Adobe Dam Regional Park and publically held land north and west of N. 43rd Ave at Loop 101	> No transit services proximate to this site
				N. 35th Ave	21.0		✓	> Sufficient ROW on Loop 101 > Sufficient ROW on N. 35th Ave north and south of Loop 101 > DHOV ramps at N. 35th Ave would require spreading the on/off ramps west of N. 35th Ave, which would impact Loop 101 overcrossing of Skunk Creek	> Low- to High-Density Residential > Skunk Creek 1,800 feet west of N. 35th Ave	> Rt 35 operates along N. 35th Ave
Loop 101 (Pima Fwy) West to East to South	"North Stack" to SR-51 (Piestewa Freeway)	21.7	28.9	"North Stack"	21.7		✓			
				N. 15th Ave (between N. 19th Ave and N. 7th Ave)	23.5		✓	> Insufficient ROW on Loop 101 > Sufficient ROW on N. 15th Ave	> Medium- to High-Density Residential > Desert Winds Elementary > ResCare Home Care	> No transit services proximate to this site
				N. 16th St (between N. 7th St and N. Cave Creek Rd)	25.9		✓	> Sufficient ROW on Loop 101 > Sufficient ROW on N. 16th St	> City of Phoenix Mountain Preserve > Medium-Density Residential	> No transit services proximate to this site

**Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps**

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
Loop 101 (Pima Fwy) West to East to South (Continued)	SR-51 (Piestewa Freeway) to E. Princess Dr/N. Pima Rd	28.9	35.4	N. 52nd St (between N. Tatum Blvd and N. 56th St)	30.7	✓	✓	<ul style="list-style-type: none"> <li>&gt; Sufficient ROW on Loop 101</li> <li>&gt; ROW for N. 52nd St must be acquired from Arizona State Land Department (ASLD) south of Loop 101 and private party north of Loop 101</li> <li>&gt; DHOV ramps at N. 52nd St would require spreading the on/off ramps at N. Tatum Blvd and N. 56th St</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Regional Commercial Center: Desert Ridge Marketplace, CityNorth Mixed-Use Complex</li> <li>&gt; Commercial/Office Complexes</li> <li>&gt; Mayo Clinic</li> <li>&gt; Musical Instrument Museum (MIM)</li> <li>&gt; JW Marriott Phoenix Desert Ridge Resort &amp; Spa</li> <li>&gt; Undeveloped ASLD and private land</li> </ul>	> Rts 39 & 186 operate on E. Mayo Blvd
				N. 60th St (between N. 56th St and N. 64th St)	32.2	✓		<ul style="list-style-type: none"> <li>&gt; Insufficient ROW on Loop 101</li> <li>&gt; ROW yet to be secured for N. 60th St</li> <li>&gt; Expanding freeway at N. 60th St potentially would require reconstruction of flood diversion structure on the north side or additional ROW on the south side</li> <li>&gt; DHOV ramps at N. 60th St would require spreading the on/off ramps at N. 56th St and N. 64th St</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Undeveloped ASLD lands north and south of Loop 101</li> <li>&gt; Mayo Clinic</li> <li>&gt; Other Medical-related activities</li> </ul>	> No transit services proximate to this site
				N. 68th St (between N. 64th St and N. Scottsdale Rd)	32.2	✓		<ul style="list-style-type: none"> <li>&gt; Insufficient ROW on Loop 101</li> <li>&gt; ROW yet to be secured for N. 68th St</li> <li>&gt; Expanding freeway at N. 68th St potentially would require reconstruction of flood diversion structure on the north side or additional ROW on the south side</li> <li>&gt; DHOV ramps at N. 68th St would require spreading the on/off ramps at N. 64th St and N. Scottsdale Rd</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Undeveloped ASLD lands north and south of Loop 101</li> <li>&gt; Scottsdale 101 Regional Power Center</li> <li>&gt; Shops at Chauncy Ranch</li> <li>&gt; High-Density Residential</li> </ul>	> No transit services proximate to this site
				N. 76th St (between N. Scottsdale Rd and N. Hayden Rd)	33.8	✓		<ul style="list-style-type: none"> <li>&gt; Insufficient ROW on Loop 101</li> <li>&gt; ROW yet to be secured for N. 68th St</li> <li>&gt; Expanding freeway at N. 76th St potentially would require reconstruction of flood diversion structure on the north side</li> <li>&gt; DHOV ramps at N. 76th St would require spreading the on/off ramps at N. Scottsdale Rd and N. Hayden Rd</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Undeveloped ASLD land</li> <li>&gt; Undeveloped private land</li> </ul>	> No transit services proximate to this site
				E. Union Hills Dr (between N. Hayden Rd and N. Princess Dr)	34.9	✓		<ul style="list-style-type: none"> <li>&gt; Sufficient ROW on Loop 101</li> <li>&gt; Sufficient ROW on E. Union Hills Rd south of Loop 101</li> <li>&gt; ROW for has been acquired for E. Union Hills Dr/E. Legacy Blvd Connector north of Loop 101</li> <li>&gt; DHOV ramps at this location would require spreading the on/off ramps at N. Hayden and N. Princess Dr/N. Pima Rd</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Commercial and Light Industrial activities</li> <li>&gt; City of Scottsdale Water Campus</li> <li>&gt; High-Density Residential</li> <li>&gt; Undeveloped ASLD land</li> <li>&gt; Undeveloped private land</li> </ul>	> No transit services proximate to this site

**Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps**

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation			
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit	
<b>Loop 101 (Pima Fwy) West to East to South (Continued)</b>	E. Princess Dr/N. Pima Rd to N. Pima Rd/N. 90th St	35.4	41.1	E. Bell Rd (between N. Princess Dr/N. Pima Rd and E. Frank Lloyd Wright Blvd)	35.9	✓		> Sufficient ROW on Loop 101 > Sufficient ROW on E. Bell Rd > DHOV ramps at E. Bell Rd would require spreading the on/off ramps at N. Princess Dr/N. Pima Rd and E. Frank Lloyd Wright Blvd	> Tournament Players Club (TPC) > WestWorld of Scottsdale Equestrian Center and Entertainment Complex	> No transit services proximate to this site	
				E. Frank Lloyd Wright Blvd	36.6		✓				
				E. Thunderbird Rd	37.8		✓				
				E. Shea Blvd	39.8		✓				
				E. Mountain View Rd (between N. Pima Rd/N. 90th St and E. Shea Blvd)	40.3	✓	✓	> Sufficient ROW available on Loop 101; however - - DHOV ramps at E. Mountain View Rd would require spreading the on/off ramps at E. Shea Blvd - Impact Loop 101 overcrossing of major tributary to Indian Bend Wash - Depressed segment with substantial retain walls requiring removal and reconstruction - Open drain for stormwater located 44 feet from edge of freeway shoulder > Sufficient ROW on E. Mountain View Rd	> Scottsdale Fiesta Power Center > Scottsdale Healthcare North Campus > Commercial and Retail > Low to High-Density Residential	> Rts 81 & 106 operate through the E. Mountain View Rd/N. 90th St intersection	
N. Pima Rd/N. 90th St to "Red Mountain Stack" at Loop 202 (Red Mountain Freeway)	41.1	50.5	Between Chaparral Rd and Indian School Rd	45.8		✓	> Sufficient ROW on Loop 101 > ROW acquisition required for intersecting arterial (E. Camelback Rd alignment) > Distance between N. Pima Rd and Loop 101 may be too short to achieve necessary elevation	> Agriculture > Salt River Pima-Maricopa Indian Reservation > Scottsdale Community College located on E. Chaparral Rd > Land between Loop 101 and N. Pima Rd planned for Commercial & Retail	> No transit services proximate to this site		
<b>Loop 101 (Price Fwy) North to South</b>	"Red Mountain Stack" to US-60 (Superstition Freeway)	50.5	53.8	"Red Mountain Stack"	50.5		✓				
	US-60 (Superstition Freeway) to Loop 202 (Santan Freeway)	53.8	59.9	US-60 (Superstition Fwy)	53.8		✓				
				E. Conference Dr (between W/E Elliot Rd and W/E Warner Rd)	56.6	✓		> Sufficient ROW on Loop 101 > Sufficient ROW on E. Conference Dr > DHOV ramps at E. Conference Dr would require spreading the on/off ramps at E. Elliot Rd and E. Warner Rd	> Arizona State University (ASU) Research Park west of Loop 101 > Low- to High-Density Residential east of Loop 101	Rts 81 & 108 serve ASU Research Park	
				W. Warner Rd	57.4		✓				

**Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps**

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
Loop 101 (Price Fwy) North to South (Continued)	US-60 (Superstition Freeway) to Loop 202 (Santan Freeway) (Continued)			W. Frye Rd (between W. Chandler Blvd and Loop 202)	59.6	✓		<ul style="list-style-type: none"> <li>&gt; Sufficient ROW on Loop 101 north of W. Frye Rd -- DHOV ramps would require spreading the on/off ramps of S. Price Rd north of W. Frye Rd</li> <li>&gt; Sufficient ROW on Loop 101 south of W. Frye Rd -- DHIV ramps would be problematic and may require extgensvie modifications to the Loop 101/Loop 202 System Interchange</li> <li>&gt; Sufficient ROW on W. Frye Rd</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Chandler Fashion Center Mall</li> <li>&gt; Regional Retail and Commercial</li> <li>&gt; Light Industrial</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Chander Fashion Center Transit Center: Rts 72 &amp; 81</li> <li>&gt; Rt 156 operates along W. Chandler Blvd</li> </ul>
		0.0	3.5	N. 28th St (between N. 24th St to N. 32nd St)	1.3	✓		<ul style="list-style-type: none"> <li>&gt; Sufficient ROW on Loop 202</li> <li>&gt; N. 28th St is below the grade of Loop 202; therefore, an overcrossing to facilitate DHOV ramps would require ramps to accommodate to reach the elevated structure, resulting in extensive residential acquisitions and displacements</li> <li>&gt; DHOV ramps at N. 28th St would require spreading the on/off ramps at N. 24th St and N. 32nd St</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Medium-Density Residential</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Rt 10 operates along N. 32nd St and through Central Station via E. Roosevelt St</li> </ul>
				N. 38th St (between N. 32nd St to N. 40th St)	2.6	✓		<ul style="list-style-type: none"> <li>&gt; Sufficient ROW on Loop 202</li> <li>&gt; N. 38th St is below the grade of Loop 202; therefore, an overcrossing to facilitate DHOV ramps would require ramps, but area is undeveloped</li> <li>&gt; Overcrossing would require bridging mainlanes and on/off ramps (west) for N. 40th St; the latter would need to be spread</li> <li>&gt; Holding strictly to the N. 38th St alignment may require lifting the N. 40th St overpass; because the area is undeveloped, an alignment at N. 37th St further west would mitigate this issue</li> <li>&gt;</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Undeveloped parcels north and south of Loop 202</li> <li>&gt; Hospital</li> <li>&gt; Medium- to High-Density Residential</li> </ul>	<ul style="list-style-type: none"> <li>&gt; No transit services proximate to this site</li> </ul>
3.5	9.5	N. Center Parkway (between N. Priest Dr and N. Scottsdale Rd/N. Rural Rd) [MP 6.4]	6.4	✓		<ul style="list-style-type: none"> <li>&gt; Sufficient ROW on Loop 202</li> <li>&gt; Sufficient ROW on N. Center Pkwy north of Loop 202</li> <li>&gt; Access to/from south of Loop 202 would require bridge across the Salt River, possibly with an alignment to N. Hardy Dr, which would avoid direct impact on parking for the Tempe Center for the Arts</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Salt River Projet (SRP) Industrial Park north of Loop 202</li> <li>&gt; Tempe Center for the Arts and Medium- to High-Density Residential south of Loop 202 and south of Salt River</li> <li>&gt; Undeveloped parcels owned by the City of Tempe are located west of the Tempe Center for the Arts</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Rt 66 operates along E. Curry Rd and N. Mill Ave</li> <li>&gt; Rts 1, 3, &amp; 56 operate along N. Priest Dr/N. Galvin Pkwy</li> </ul>		
Loop 202 (Red Mountain Fwy) West to East	SR-143 (Hohokam Expressway) to "Red Mountain Stack" at Loop 101 (Price Fwy/Pima Fwy)									

**Evaluation of Potential Locations for Direct HOV (DHOV) Access Ramps**

Freeway	Segment	Milepost		Potential Direct High-Occupancy Vehicle (DHOV) Access Ramps Locations				Preliminary Evaluation		
		Begin	End	Location	MP	CH2M Hill TechMMO	Charette	Right-of-Way (ROW) Compatibility	Land Use Compatibility	Proximity to P&R and Transit
<b>Loop 202 (Santan Fwy) East to West</b>	Loop 101 (Price Fwy) to "Pecos Stack" at I-10 (Maricopa Freeway)	50.6	55.6	Chandler Village Dr S. (between Loop 101 and S. McClintock Dr)	51.1	✓		> Sufficient ROW on Loop 202 > Sufficient ROW on Chandler Village Dr S. > DHOV ramps to the east would require spreading the on/off ramps for S. Price Rd > DHOV ramps to the west would require spreading the northbound and southbound Loop 101 Connector ramps	> Chandler Fashion Center Mall > Regional Retail and Commercial	> Chander Fashion Center Transit Center: Rts 72 & 81 > Rt 156 operates along W. Chandler Blvd
<b>Loop 202 (South Mountain Freeway) West to East -PLANNED-</b>	"Pecos Stack" to S. 51st Avenue	55.6	68.2	S. 48th St ??	56.1		✓	> Sufficient overall ROW on Loop 202, but median is not sufficiently wide for DHOV lanes; also, general HOV lanes are planned for Loop 202 > Sufficient ROW on S. 48th St	> Church > Medium- to High-Density Residential > Pecos Park	> 40th St/Pecos Rd P&R
	S. 51st Avenue to I-10 (Papago Freeway)	68.2	78.2	W. Dobbins Rd	70.9 Approx		✓	> Sufficient ROW on W. Dobbins Rd	> Low- to Medium-Density Residential	> No transit services proximate to this site
				W. Baseline Rd	71.9		✓	> Sufficient ROW on W. Baseline Rd	> Commerical node at W. Baseline Rd and S. 51st Ave > Medium-Density Residential	> Rt 251 operates along W. Baseline Rd and S. 51st Ave
				SR-30	75.4 Approx		✓		> Commerical and Light Industrial > Agriculture	> No transit services proximate to this site



# Attachment B

## Preliminary Conceptual Drawings: Potential DHOV Locations



W. McDowell Rd

N. 83rd Ave

Legacy Suites

Daravante

N. 79th Ave

79th Ave/I-10

P&R

Papago Freeway



Future N. 79th Ave



# PHOENIX

Maricopa Freeway



IKEA

U-Haul

Tempe

Autoplex

S. Emerald Dr

W. Ruby Dr

W. Carver Rd Alignment

S. Autoplex Loop

TEMPE



S. 50th St

Kyrene  
Elementary  
School District  
No. 28

W. Galveston St Alignment

PHOENIX

Maricopa Freeway



BE  
Aerospace

Chandler  
Pavilions

Sam's  
Club

CHANDLER

W. Galveston St





**INTERSTATE 10 AND INTERSTATE 17  
SPINE WORKSHOP**

October 31, 2012, Revised May23, 2013

**ALTERNATIVE 2 - EXPRESS LANES IDEA**

**SPLIT DIAMOND WITH DIRECT  
HIGH-OCCUPANCY TOLL RAMP  
AT CENTRAL AVENUE**

# Metrocenter

POTENTIALLY IMPACTED PARCELS

Potential Light Rail Transit

Castles - n - Coasters

S. Metro Parkway E

N. Metro Parkway E

W. Cheryl Dr

Black Canyon Freeway



W. Mountain View Rd

N. 26th Dr

POTENTIALLY IMPACTED PARCELS

Potential Light Rail Transit

N. 25th Dr

W. Beryl Ave

N. 25th St

# Rose Mofford Sports Complex



Arizona Canal

Arizona Canal Diversion Channel

149-16-001A

149-16-005

149-16-001E

149-16-005D

149-16-001C

149-09-001R

**POTENTIALLY IMPACTED  
PARCELS**

N. Holmes Blvd

W. Grovers Ave

N. 27th Ave

Northwest  
Industrial Center

Cox  
Communications  
208-06-003  
208-06-008

Church  
In  
Phoenix  
208-05-003G  
208-05-668

Black Canyon  
Tech Center

Black Canyon Freeway



Black Canyon Bell Road  
industrial Park 1

N. 25th Ave

W. Morningside Dr



**Fire Station  
No. 54**

**W. Campbell Ave**

LOOP  
**101**

**Agua Fria Freeway**

**Storm Drain**

**Terrcita Unit 2**



**Desert Ridge  
Marketplace**

**ASLD Land**

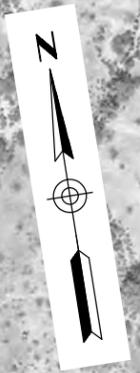
**N. 52nd St**

**LOOP  
101**

**Pima Freeway**

**ASLD Land**

**ASLD Land**



# McCormick Ranch

N. Arabian Trail

E. MOUNTAIN VIEW RD

Pima Freeway

LOOP 101

Storm Drain

Storm Drain

Storm Drain

Storm Drain

# Scottsdale Fiesta

N. 90th St





# Attachment C

## ADOT Design-Build Bid Request: W. Maryland Avenue on the Loop 101/Agua Fria Freeway

**ARIZONA DEPARTMENT OF TRANSPORTATION**

**CONTRACTS AND SPECIFICATIONS SECTION**

**AND**

**ENGINEERING CONSULTANTS SECTION**

**PUBLIC NOTICE  
REQUEST FOR DESIGN-BUILD PROPOSALS**

**101 MA 005 H853301C  
101-A-NFA**

**Agua Fria Freeway (SR 101L)  
SR 101L at Maryland Avenue  
HOV Ramps**

The ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT or Department) is soliciting Statement of Qualifications from Design-Build Proposer, under A.R.S. Title 28, Chapter 20, Article 13 relating to Design-Build Contracts, to utilize the Design-Build contracting procedure for the design and construction of High Occupancy Vehicle (HOV) ramps on Agua Fria Freeway (SR 101L) at Maryland Avenue within the city of Glendale.

The Department programmed amount for this contract is **\$14,100,000**. The location and description of the proposed work are as follows:

The proposed Design-Build HOV ramp work is located in Maricopa County on a portion of the Agua Fria Freeway (SR 101L) from Bethany Home Road (Milepost 5.9) to Glendale Avenue (Milepost 7.0). The work includes the construction of new HOV ramps at Maryland Avenue. The work also consists of constructing retaining walls, drainage improvements, signing, pavement marking, lighting, FMS improvements, barrier, ACFC and signals.

The Department has determined that the work on this project will be considered as being divided into two phases: the **Construction Phase (Phase I)** and the **ACFC Phase (Phase II)**.

The Department-determined Construction Phase (Phase I) Time for completion of the work included in the Constuction Phase (Phase I) will be 230 calendar days.

The Department-determined completion date for ACFC Phase (Phase II) is November 24, 2014.

Proposals containing a Design-Builder Specified Construction Phase (Phase I) Time that is greater than the Department-determined Construction Phase (Phase I) Time will be considered non-responsive. In addition, proposals containing a schedule showing the completion of the ACFC Phase (Phase II) work after November 24, 2014 will also be considered non-responsive.

The method for determining the lowest Price Proposal for this project is known as "A+B", and will take into account the price offering of the Design-Build Proposer, the Technical Proposal Score, and the time within which the Design-Builder will achieve Substantial Completion of the Construction Phase (Phase I) of the entire project.

Disadvantaged Business Enterprises will be afforded full opportunity to submit bids in response to this solicitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award.

A Design-Build Package may be obtained from Contracts and Specifications Section, 1651 West Jackson, Room 121F, Phoenix, AZ (Telephone: (602) 712-7221). These documents should be available for sale to interested parties within one week following the advertisement. The cost is \$18 for a proposal or non-proposal Design-Build Package including Additional Reports, Studies, and Reference Materials which are provided on CD, payable at time of order by cash, check or money order. Checks should be made payable to the Arizona Department of Transportation. No refund will be made for any documents returned. The Department cannot guarantee mail delivery.

Any interested party may receive a non-proposal design build package, which does not include the proposal form.

This project is not eligible for electronic bidding.

Statements of Qualifications for firms interested in the project will be received in sealed packages until **2:00 PM (Arizona Standard Time) on Wednesday, April 17, 2013**, at the office of Contracts and Specifications Section, 1651 West Jackson, Room 121F, Phoenix, AZ 85007. No Statements will be accepted after the time specified.

One original and ten copies of the Statements of Qualifications are required by the Department. Statements shall be submitted in a sealed package. The outer wrapping will clearly indicate the following information:

**101 MA 005 H853301C  
Agua Fria Freeway (SR 101L)  
SR 101L at Maryland Avenue HOV Ramps**

**STATEMENT OF QUALIFICATIONS**

**Submitted By: (Design-Build Proposer's name)**

The format as outlined in the Request for Qualifications format instructions (Section B-1) shall be followed. Statements of Qualifications not conforming to the correct format will be rejected.

In order to qualify for selection, interested Design-Build Proposers shall be pre-qualified through the Department for the performance of the work. If the Design-Build Proposer is a consortium, all members shall be pre-qualified with the Department, as either a contractor or a designer. A member's share of a consortium may not exceed its pre-qualification limit. Design-Build Proposers that are not pre-qualified shall submit the prequalification application a minimum of **five days** prior to the submittal of Statement of Qualifications. Firms proposing as a joint venture shall submit their joint venture application a minimum of **five days** prior to the Statement of Qualifications due date to Contracts and Specifications Section.

Contractor Pre-qualification information may be obtained through Contracts and Specifications Section, 1651 West Jackson Street, Room 121F, Phoenix, AZ 85007-3212, Telephone: (602) 712-7221.

Designer Pre-qualification information may be obtained through Engineering Consultants Section's website: <http://www.azdot.gov/Highways/ecs/index.asp>.

The Department will select at least three Design-Build Proposers for further consideration from among those submitting Statements of Qualifications. Those selected for further consideration will be requested to submit separate Technical and Price Proposals. Final Contract award will be determined through a selection process that considers a Technical Proposal and a Price Proposal.

The right is reserved by the Department to reject any and all Statements of Qualifications and Design-Build Proposals.

Firms submitting Statements of Qualifications shall have the appropriate licenses in compliance with Arizona Revised Statutes, Title 32, Chapter 1 - Architects, Assayers, Engineers, Geologists, Landscape Architects, and Land Surveyors; and Arizona Revised Statutes, Title 32, Chapter 10 - Contractors.

Licensing information is available from:

Registrar of Contractors  
3838 N. Central Ave, Suite 400  
Phoenix, AZ 85012-1906  
Phone: (602) 542-1525  
Fax: (602) 542-1599

Board of Technical Registration  
1110 W. Washington Street, Suite 240  
Phoenix, AZ 85007  
Phone: (602) 364-4930  
Fax: (602) 364-4931

## **SELECTION PROCESS CALENDAR**

The calendar of the various activities which make-up the Selection process is:

<b><u>Activity</u></b>	<b><u>Date</u></b>	<b><u>Time</u></b> <b><u>(Arizona Standard Time)</u></b>
Advertise Request for Statements of Qualifications	3/15/13	
Submittal of Statement of Qualifications	4/17/13	2:00 PM
Announcement of Short-listed firms	5/8/13	
Request for One-on-One Meeting & Submittal of Meeting Agenda	5/16/13	2:00 PM
One-on-One Meetings	5/23/13	
Request for Alternative Technical Concept Meeting	6/12/10	2:00 PM
Submittal of Alternative Technical Concept Proposals	6/13/10	2:00 PM
Alternative Technical Concept Meetings	6/20/10	
Submittal of Technical and Price Proposals	8/7/13	2:00 PM

<u>Activity</u>	<u>Date</u>	<u>Time</u> <u>(Arizona Standard Time)</u>
Submittal of Escrow Documentation	8/15/13	4:00 PM
Interview	8/29/13	
Public Opening of Price Proposals	9/13/13	11:00 AM
Award of Contract	Transportation Board (October 11, 2013)	
Contract Start Time	Date of Notice of Award + 30 Calendar Days	
Submittal of Schedule of Payment Items	Date of Notice of Award + 30 Calendar Days	
Project Construction Phase Completion	Contract Start Time + "B" Calendar Days	

Effective the date of Public Advertisement of this project, no contact is allowed with ADOT Staff, the General Consultant and City of Glendale.

All questions, comments or notices shall be directed to the attention of Rimpal Shah (602-712-8377; rshah@azdot.gov). All communications shall be submitted electronically via e-mail.

The Escrow Documentation will be delivered to the office of Contracts and Specification Section, 1651 W. Jackson Street, Phoenix, Arizona prior to the date and time as listed above. The affidavit will be attached to the outside of the Escrow Documentation container.

**The Department will make every effort to respond to questions submitted by the Design-Build Teams prior to Noon on July 25, 2013. Questions submitted after this date may not receive an answer from the Department.**